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DEPARTMENT OF E&Tc ENGINEERING

Question Bank for Multiple Choice Questions

Program: Diploma in E&Tc Engineering	Program Code:- EJ
Scheme:-I	Semester:- VI
Course:-Emerging Trends in Electronics	Course Code:- 22636

1-Advance Processors	Marks:-16

Content of Chapter:-

1.1 Advances in processor architecture:RISC, Pipelining and Superscalar concepts, advantages and Applications.

1.2 Arduino: Introduction, Compatible R2/R3 Uno board Features. Atmega 328: Introduction, pin description.

1.3 Arduino IDE: Features, Sketch: C,C++ functions setup( ),loop( ), pinMode( ), digitalWrite( ),digitalRead( ) anddelay( )

1.4 Arduino Interfacing: LED, Relay, DC motor.

1.5 ARM: Introduction, Features of ARM7 and ARM7 TDMI, advantages,applications. Versions of ARM

1. Main processor chip in computers is
A. ASIC
B. ASSP
C. CPU
D. CPLD
Answer: - Option C
Explanation:-Main processor chip in computers is CPU.

2.ARM stands for _____
A. Advanced Rate Machines
B. Advanced RISC Machines
C. Artificial Running Machines
D. Aviary Running Machines
Answer: - Option B
Explanation:-ARM stands for Advanced RISC Machines .

3.The CISC stands for _____.
A. Computer Instruction Set Compliment
B. Complete Instruction Set Compliment
C. Computer Indexed Set Components
D. Complex Instruction set computer
Answer: - Option D
Explanation:-The CISC stands for Complex Instruction set computer.

4.The GPIO stand for_____.
A. General Purpose Inner Outer Propeller
B. General Purpose Input Output Pins
C. General Purpose Interested Old People
D. General Purpose Input Output Processor
Answer: - Option B
Explanation:-The GPIO stand for General Purpose Input Output Pins.

5.The IDE stand for_____.
A. In Deep Environment
B. Integrated Development Environment
C. Internal Deep Escape
D. IDE
Answer: - Option B
Explanation:-The IDE stand for Integrated Development Environment.

6.A program written with the IDE for Arduino is called _____.
A. IDE source
B. Sketch
C. Cryptography
D. Source code
Answer: - Option B
Explanation:-A program written with the IDE for Arduino is called Sketch .

7.Arduino IDE consists of 2 functions. What are they?
A. Build() and loop()
B. Setup() and build()
C. Setup() and loop()
D. Loop() and build and setup()
Answer: - Option C
Explanation:-Arduino IDE consists of 2 functions Setup() and loop() .

8.ALU of ARM7 TDMI is_____bit.
A. 8
B. 32
C. 64
D. 10
Answer: - Option B
Explanation:-ALU of ARM7 TDMI is 32 bit.

9.How many digital pins are there on the UNO board?
A. 14
B. 12
C. 16
D. 20
Answer: - Option A
Explanation:- 14 digital pins are there on the UNO board.

10.Most of processors designed by ARM are
A. 16 bit
B. 32 bit
C. 64 bit
D. 8 bit
Answer: - Option B
Explanation:-Most of processors designed by ARM are 32 bit.

11.The function of link register in ARM7TDMI is_____
A. To store return address whenever subroutine is called
B. To store address of I/O device
C. Multiplex the address and data lines
D. Perform addition
Answer: - Option A
Explanation:-The function of link register in ARM7TDMI is To store return address whenever subroutine called .

12.The function of register r15 in ARM7TDMI is as
A. Program Counter
B. CPSR
C. SPSR
D. ALU
Answer: - Option A
Explanation:-The function of register r15 in ARM7TDMI is as Program Counter

13. In the ARM Nomenclature ARMxTDMI, D and M stand for
A. Debug and Fast Multiplier units are present
B. Division and Multiplier units are present
C. Debugger and Multiplier units are not present
D. Division and Multiplier units are not present
Answer: - Option A
Explanation:-In the ARM Nomenclature ARMxTDMI, D and M stand for Debug and Fast Multiplier units are present

14.The computer architecture aimed at reducing the time of execution of instructions is _____
A. CISC
B. RISC
C. ISA
D. ANNA
Answer: - Option B
Explanation:-The computer architecture aimed at reducing the time of execution of instructions is RISC

15.In CISC processor the nature of instruction size is
A. Fixed
B. Variable
C. Both A and B
D. None of the above
Answer: - Option B

Explanation:-.In CISC processor the nature of instruction size is Variable .

16.If the three stages of execution in pipelining are overlapped, how would be the speed of execution?
A. Higher
B. Moderate
C. Lower
D. Unpredictable
Answer: - Option A
Explanation:-If the three stages of execution in pipelining are overlapped speed of execution is higher.

17.In RISC Processors configuration status of control unit is_____.
A. Hardwired
B. Micro programmed
C. Both A and B
D. None of the above
Answer: - Option A
Explanation:-In RISC Processors configuration status of control unit is Hardwired .

18.A function is a series of programming statements that can be called by name. Which command is called once when the program starts:
A. loop()
B. setup()
C. (output)
D. (input)
Answer: - Option B
Explanation:-A function is a series of programming statements that can be called by name. setup() command is called once when the program starts:

19.In ATmega328p 'p' refers to?
A. Production
B. Pico-Power
C. Peripheral
D. Programmable on chip
Answer: - Option B
Explanation:-In ATmega328p 'p' refers to Pico-Power .

20.The throughput of a super scalar processor is _____
A. less than 1
B. 1
C. More than 1
D. Not Known
Answer: - Option C
Explanation:-The throughput of a super scalar processor is More than 1 .

21.Each stage in pipelining should be completed within ____ cycle.
A. 1
B. 2
C. 3
D. 4
Answer: - Option A

Explanation:-Each stage in pipelining should be completed within 1 cycle.

22.The main importance of ARM micro-processors is providing operation with _____
A. Low cost and low power consumption
B. Higher degree of multi-tasking
C. Lower error or glitches
D. Efficient memory management
Answer: - Option A
Explanation:-The main importance of ARM micro-processors is providing operation with Low cost and low power consumption

23.In ARM processor when Interrupt occurs ARM processor goes into following mode
A. FIQ mode
B. Abort mode
C. Supervisor mode
D. Undefined mode
Answer: - Option A
Explanation:-In ARM processor when Interrupt occurs ARM processor goes into FIQ mode .

24.The function of Barrel shifter is
A. Shift Operation in same instruction cycle
B. Shift operation in 2 instruction cycle
C. Shift operation in 4 instruction cycle
D. None of the above
Answer: - Option A
Explanation:-The function of Barrel shifter is Shift Operation in same instruction cycle

25.Evaluate the following statements
I. R13 is traditionally used as the stack pointer and stores the head of
the stack in the current processor mode
II. R14 is the link register where the core puts the return address on
executing a subroutine
III. R15 is the program counter and contains the address of the next
instruction to be fetched
A. All the options are true
B. I and II are true
C. II and III are true
D. I and III are true
Answer: - Option A
Explanation:- R13 is traditionally used as the stack pointer and stores the head of the stack in the current processor mode .R14 is the link register where the core puts the return address on
executing a subroutine .R15 is the program counter and contains the address of the next
instruction to be fetched

26.When the processor is executing simple data processing instructions, the pipeline enables one instruction to be completed every clock cycle, this is also called as _____
A. Throughput
B. Latency
C. Execution
D. None of the above
Answer: - Option A
Explanation:-When the processor is executing simple data processing instructions, the pipeline enables one instruction to be completed every clock cycle, this is also called as Throughput

27.It starts with a /* and continues until a */ what does this do?
A. Loads a sketch
B. Makes comments
C. Compiles quicker
D. Makes stars appear
Answer: - Option B
Explanation:-starts with a /* and continues until a */ it does Makes comments .

28.The function used to execute one or many statements, multiple time_____.
A. setup()
B. loop()
C. (input)
D. (output)
Answer: - Option B
Explanation:-The function used to execute one or many statements, multiple time loop()

29.Default boot loader for the Arduino UNO is_____
A. Optibootloader
B. AIR-boot
C. Bare box
D. GAG
Answer: - Option A
Explanation:-29.Default boot loader for the Arduino UNO is Optibootloader

30 Select proper microcontroller used in Arduino UNO.
A. ATmega328p
B. ATmega2560
C. ATmega32114
D. AT91SAM3x8E
Answer: - Option A
Explanation:-ATmega328p microcontroller used in Arduino UNO.

31._____ and _____ architecture improve the performance of the processor.
A) Pipelining, super-scalar
B) cost,size
C)memory,size
D)Peripherals,operating voltage
Answer: - Option A
Explanation:-Pipelining and super-scalar architecture improve the performance of the processor.

32. Increasing the clock speed _____ the power consumption.
A) Decreases
B) Increases
C) Not known
D) Contract
Answer: - Option B
Explanation:-Increasing the clock speed Increases the power consumption.

33. In battery operated device _____ is important processor selection criteria.
A) Power
B) Memory
C) Size
D) Cost
Answer: - Option A
Explanation:-In battery operated device Power is important processor selection criteria.

34. graphic processing unit is also called as _____unit.
A) ALU
B) Register
C) Visual processing
D) Stack pointer
Answer: - Option C
Explanation:-graphic processing unit is also called as Visual processing unit.
35. system on chip (SOC) architecture provides_____ peripheral to improve effective data communication.
A) Off chip
B) Side by side
C) Near by
D) On chip
Answer: - Option D
Explanation:system on chip (SOC) architecture provides On chip peripheral to improve effective data communication.

36. Suggest processor to handle multimedia applications.
A) digital signal processor
B) floating point co-processor
C) Microprocessor
D) Microcontroller
Answer: - Option A
Explanation:to handle multimedia applications digital signal processor is used.

37. CISC includes _____ complex instructions.
A) Double
B) Single
C) Multi clock
D) Tripple
Answer: - Option C
Explanation:CISC includes Multi clock complex instructions.

38. RISC has _____ performance.
A) Lower
B) Higher
C) Medium
D) Moderate
Answer*:* - Option B
Explanation:RISC has higher performance.

39. _____ emphasis on software.
A) RISC
B) CISC
C) MISC
D) PISC
Answer*:* - Option A
Explanation:RISC emphasis on software.

40. Most of processor designed by ARM are
A) 16 bit
B) 32 bit
C) 64 bit
D) 8 bit
Answer*:* - Option B
Explanation:Most of processor designed by ARM are 32 bit.

41. How much flash memory does the Atmega328 have?
a) 13K bytes
b) 32K bytes
c) 256K bytes
d) 16K bytes
Answer: b
Explanation: A flash memory is a type of non-volatile memory, which does not get erased when the power supply is cutoff from the chip. The Atmega328 has 32K bytes of flash memory.

42. How many timers does the Atmega328 have?
a) 1
b) 2
c) 3
d) 4
Answer: c
Explanation: The Atmega328 has a total of 3 timers, of which 2 are 8-bit timers and 1 are 16-bit timers. The number of bits here represents the resolution of the timers, I.e. the number of bits each timer can store.

43. How many comparators does the Atmega328 have?
a) 1
b) 2
c) 3
d) 4
Answer: a
Explanation: A comparator is basically used for comparing voltages. It takes 2 voltages as input and outputs the higher of the two. The Atmega328 has 1 such comparator only.

44. There are __ ADC and __ PWM Pins on the Atmega328.
a) 9, 7
b) 8, 6
c) 10, 1
d) 5, 18
Answer: b
Explanation: The Atmega328 has 8 ADC Pins and 6 PWM Pins, which are to be connected to the ADC that's built in to the Arduino Uno and the PWM pins provide Pulse Width Modulated output since a digital circuit like a microcontroller cannot provide a perfect analog wave.

45. Which Arduino Boards use the Atmega328?
a) Arduino Uno
b) Arduino Mega
c) Arduino Fio
d) Arduino Due
Answer: a
Explanation: The Arduino Uno uses the Atmega328. Some other boards that use this microcontroller include the Arduino Nano which is a smaller development board than the Arduino Uno.

46. What is the operating voltage of Atmega328?
a) 12V to 9V
b) 1.9V to 5V
c) 1.8V to 5.5V
d) 1.1V to 5V
Answer: c
Explanation: The operating voltage of the Atmega328 is 1.8V to 5.5V. Provide any voltage lower than that and the chip will not function. But however, if any voltage higher than the rated voltage is provided there is a chance of damaging the IC physically. So, under no circumstance should this chip be provided a voltage more than the rated voltage.

47. The Atmega328 is an _____ bit chip.
a) 8
b) 16
c) 32
d) 64
Answer: a
Explanation: The Atmega328 is capable of processing 8 bits of data at a time and hence it has an 8-bit architecture. Other similar 8-bit processors include the Intel 8080 Processor which ran on a similar 8-bit architecture.

48. How many General-Purpose Registers are present in the Atmega328?
a) 12
b) 64
c) 32
d) 9
Answer: c
Explanation: There are 32 General-Purpose Registers in the chip and they are all connected to the ALU (Arithmetic Logical Unit) directly which allow 2 registers to be accessed in one instruction in a clock cycle.

49. The Atmega328 is a ___ SC Microcontroller.
a) RI
b) CI
c) AI
d) BI
Answer: a
Explanation: The Atmega328 is a RISC (Reduced Instruction Set Computer) microcontroller, which allows for a smaller number of cycles per instruction. Thus, making it faster than the CISC (Complex Instruction Set Computer) Architecture.

50. Why is the Arduino Mega more a viable solution when dealing with complex projects, than the Arduino UNO?
a) Higher SRAM on the Arduino Mega
b) More number of GPIO pins on the Arduino Mega
c) More flash memory on the Arduino Mega
d) Higher power rating on the Arduino Mega
Answer: d
Explanation: The Arduino UNO has 14 pins for IO of which 6 support PWM, while the Arduino Mega has 54 pins for IO of which 14 support PWM. Moreover, the Arduino Mega uses the Atmega2560 microcontroller which has an SRAM of 4K bytes and a flash memory of 256K bytes, whereas the Arduino UNO which is supported by the Atmega328P microcontroller has an SRAM of only 2K bytes and a flash memory of a mere 32K bytes.

51. Which Arduino board is famous for integration with fabric-based projects?
a) The LilyPad
b) The UNO
c) The Mega
d) The Nano
Answer: a
Explanation: The Arduino LilyPad is specifically designed for being sewn into fabrics for the purpose of e-textile projects. It comes in 2 variants, one powered by the Atmega328V and the Atmega168V. It has a flash memory of 16K bytes and an SRAM of 1K byte.

52. Which Arduino Product is not just a board but also comes preinstalled with wheels and a motor board.
a) The LilyPad
b) The Robot
c) The Flora
d) The Mega
Answer: b
Explanation: The Arduino Robot comes with 2 Atmega32u4's which have a clock speed of 16MHz and an SRAM of 2.5K bytes and a flash memory of 32K bytes. The bottom board is also connected with two wheels and an Infrared Sensor while the top board is connected to an LCD Screen, 4 buttons, a speaker and a compass chip.

53. Which Arduino Board contains an onboard joystick?
a) Arduino Esplora
b) Arduino Nano
c) Arduino Due
d) Arduino UNO
Answer: a
Explanation: The Arduino Esplora comes with the Atmega32u4 and is based on the Leonardo Hardware. It comes preinstalled with a lot of things including a joystick, buttons, TFT Connector for attaching to external LCD's, an RGB LED, etc. Due to its configuration and setup, it is perfect for beginners to use.

54. For projects where a small microcontroller is required, which boards should we use?
a) Arduino Yun, Leonardo
b) Arduino Esplora, Robot
c) Arduino Due, Mega, Uno
d) Arduino LilyPad, Nano
Answer: d
Explanation: All the Arduino Boards specified above are small and can be used for projects where a very small board is required to compute a large amount of data. In addition to that, a very common use of these boards can include sending data to other larger boards which have greater capacity and computing power like the Arduino UNO, Mega or the Due.

55. Which Arduino Board comes with a Linux Distribution?
a) Arduino Nano
b) Arduino Leonardo
c) Arduino Due
d) Arduino Yun
Answer: d
Explanation: The Arduino Yun comes preinstalled with a Linux Distribution called Linino. It has an Atmega32u4 and a WifiSoC (The Atheros AR9331) which enables it to connect to Wi-Fi. It also has an ethernet port, a microSD Slot, and 20 Digital IO Ports.

56. With the Arduino Mini, in the absence of an inbuilt USB connector on the board. How is one supposed to connect it to the computer?
a) Ethernet Adapter
b) SPI
c) I2C
d) RS232 to TTL Serial Adapter
Answer: d
Explanation: The Arduino Mini does not have an inbuilt USB port and so it can be programmed with any USB Serial to TTL adapter. It contains 14 IO pins of which 6 support PWM. It comes in 2 variants, one with the Atmega168 and the other with the Atmega328 which is a much more recent release of this board.

57. Which Arduino Board would one choose if one had to perform network operations in Linux out of the box?
a) Arduino Diecimila
b) Arduino Yun
c) Arduino Uno
d) Arduino Esplora
Answer: b
Explanation: The Arduino Yun is the only Arduino Board that has an onboard WifiSoC (The Atheros AR9331). It also features a Linux Distribution named Linino based on OpenWRT and can support network operations based on Linux.

58. Which Arduino Board has an XBee Socket inbuilt?
a) Arduino Nano
b) Arduino Micro
c) Arduino Uno
d) Arduino Fio
Answer: d
Explanation: The Arduino Fio has an Atmega32u4 microcontroller and 14 IO pins of which 6 can be used for PWM. It was specifically built for wireless applications and has an XBee socket inbuilt onboard. It can be programmed using an FTDI cable.

59. Which processor supports the Arduino Zero?
a) Atmega328P
b) Atmega32u4
c) ARM Cortex M0+
d) ARM Cortex M3
Answer: c
Explanation: The Arduino Zero uses the Atmel Smart SAM D21 MCU featuring the 32-bit ARM Cortex M0+ CPU. It has a flash memory of 256K bytes and an SRAM of 32K bytes.

60. What is the use of the RESET button on the Arduino UNO?
a) To restart the code present in the Arduino
b) To restore a previous version of a code
c) To erase the code present in the Arduino
d) To erase the SRAM in Arduino Microcontroller
Answer: a
Explanation: The external RESET button on then Arduino is used for restarting the Arduino's bootloader, effectively stopping the execution of the code that was already present on the Arduino and then rerunning it after a few seconds of delay by which point the bootloader is ready. This should be always performed with all external connections to the GPIO pins of the Arduino taken out.

61. What is the use of the Vin pin present on some Arduino Boards?
a) To provide a 5V output
b) Is used for plugging in 3V supply
c) To power the Arduino Board
d) To ground the Arduino Board
Answer: c
Explanation: The Vin Pin can be used for accepting a 9V power supply which is usually given through the

external Jack. It can also be used for getting a 9V output when the Arduino is powered through the Jack, thus acting as both a power source and a short from the power source both when needed.

62. What does the analogRead() function do physically when invoked in a code?
a) It accepts a digital Input
b) Reads the raw voltage value
c) Activates the ADC Circuit to read voltage values
d) Activates the DAC Circuit to read voltage values
Answer: c
Explanation: The Arduino has an onboard ADC (Analog to Digital Convertor) Circuit which when invoked by the analogRead() function, takes the voltage from the pin that is specified by the program and compares them with the threshold value (5V on the Arduino UNO, 7V on the Arduino Mini and Nano, etc.) and then provides a value ranging from 0 to 1023.

63. What is the use for the 2 serial pins on the Arduino Diecimila?
a) To send and receive GPIO digital signals
b) To receive analog signals
c) To send PWM signals
d) To send and receive Serial TTL signals
Answer: d
Explanation: There are two pins for sending and receiving the Serial TTL Signals. The TX (for transmission) and the RX (for receiving). In the Arduino Diecimila they are connected to the corresponding pins of the FTDI USB to Serial Chip.

64. The pins SS, SCK, MOSI and MISO on the Arduino belong to the ___ bus.
a) I2C
b) SPI
c) GPIO
d) Ethernet
Answer: b
Explanation: The Pins SS (Select Slave), SCK (Serial Clock), MOSI (Master Output Slave Input), and MISO (Master Input Slave Output) belong to the SPI (Serial Peripheral Interface) Bus which is used as a form of wired communication between two or more microcontrollers.

65. What is the full form of the I2C Protocol?
a) Inter-Integrated Circuit
b) Intra-Integrated Circuit
c) Integrated-Inter Circuit
d) Infinite-Integrated Circuit
Answer: a
Explanation: The I2C Protocol is used to connect lower speed IC's to microcontrollers. It was developed by Phillips Semiconductors in 1982.

66. What is the function of the IOREF pin on the Arduino UNO?
a) To provide a constant 12V DC supply
b) To provide the voltage corresponding to the standard GPIO working voltage of the board
c) To take input voltage and set it as a reference for all GPIO operations
d) To provide ground
Answer: b
Explanation: The IOREF pin provides the operation voltage reference for the Arduino. Usually on most

Arduino Boards that is 5V but on the Diecimila it is 3.3V however. But this pin should not be at any given time connected to a load as power source.

67. What is the function of the AREF pin in the Arduino UNO?
a) It is used as a reference voltage for all analog voltage calculations in the board
b) It is used as a reference voltage for all digital voltage calculations in the board
c) It is used as a reference voltage for the power source on the board
d) It is used as a reference voltage for the ground pins on the board
Answer: a
Explanation: The AREF pin is used internally by the board for measuring the analog voltages. By default, if nothing is connected to it then it will give the range for analog voltage calculation as 0-5V. But this pin when connected to a lower voltage say 3V will set the range for voltage calculations from0-3V.

68. What are the functions of the SDA and SCL pins of the Arduino UNO?
a) They facilitate I2C communications
b) They facilitate SPI Communications
c) They facilitate USB Communications
d) They facilitate Ethernet Communications
Answer: a
Explanation: The SDA and the SCL pins on the Arduino UNO are used for communicating through the I2C protocol. They are supported by the Wire Library in the Arduino IDE which supports the 7-bit addressing mode.

69. What language is a typical Arduino code based on?
a) C/C++
b) Java
c) Python
d) Assembly Code
Answer: a
Explanation: The Arduino code is basically a lightly modified version of the C++ programming language. It includes certain functions or modules that are specific to the development of the Arduino platform and was preinstalled in the language by the developers.

70. What language is the Arduino IDE built on?
a) C/C++
b) Python
c) HTML
d) Java
Answer: d
Explanation: The Arduino code is primarily a subset of the C++ programming language. However, the IDE (Integrated Development Environment) was written in the Java programming language. An IDE is a software that provides primarily a graphical user interface for compiling and maintaining/editing code for a platform.

71. Is it possible to write code for the Arduino in any other programming language?
a) Yes, you can write
b) No, it only allows the use of Arduino Code
c) Yes, but you must write the code in C/C++ only
d) Yes, but you must write the code in Python Only
Answer: a
Explanation: The Arduino compiler actually translates or in more technical terms ‘compiles’ the code into

assembly language which uses the Arduino's instruction set. Thus, any other language which has a compiler capable of translating or compiling that code into the Arduino's instruction set in assembly can essentially be used for writing Arduino code.

72. Does the Arduino code get processed by an interpreter or a compiler?
a) The Arduino code is processed by an interpreter
b) The Arduino code is first compiled to C++ and then processed using an interpreter
c) The Arduino code is processed by a compiler
d) The Arduino code is directly executed by the processor
Answer: c
Explanation: The Arduino code is a working subset of the C++ programming language. The C++ programming language is a compiled one, not an interpreted language. The main difference between an interpreter and a compiler is the way that each one of them handles the debugging and execution of the code. A compiler first checks if the code has any syntax errors or not and then proceeds to converting or more appropriately translating the written code into assembly, while the interpreter executes the code line by line irrespective of whether there is any syntax error in the code or not.

73. What is the difference between an IDE and a compiler?
a) The IDE executes the code while the compiler gives a graphical environment for writing the code
b) The compiler executes the code while the IDE gives a graphical environment for writing the code
c) The compiler links the code to the respective files and the IDE takes it from there
d) The compiler and the IDE are the same thing
Answer: b
Explanation: According to the primary definitions of a compiler and an IDE, the job of debugging and executing a piece of code falls on the compiler, while the job of the IDE is to provide an easy to use environment for writing the code in the first place.

74. Can external generic C/C++ libraries be imported to the Arduino IDE and used in the code?
a) Yes, external C/C++ libraries can be used with the Arduino code
b) No, no external libraies can be imported to the Arduino code
c) Yes, but only libraries that are approved by the company can be used
d) Yes, but the libraries must be written in Arduino Code only
Answer: a
Explanation: Since the Arduino Language is a subset of the C++ programming language, any existing C/C++ library can be used for importing into an Arduino code. There is no restriction on the use of external libraries since most of the Arduino ecosystem is Open-Source.

75. Is the Arduino code an Object-Oriented programming language or a Procedural programming language?
a) The Arduino Code follows the Object-Oriented ideology
b) The Arduino Code follows the Top-Down Procedural ideology
c) The Arduino Code follows the Bottom-Up Procedural ideology
d) The Arduino Code follows a custom Procedural Ideology
Answer: a
Explanation: Since the Arduino Programming Language is a subset of the C++ Programming Language, it supports the Object-Oriented Programming approach much like C++.

76. Arduino Codes are referred to as _____ in the Arduino IDE.
a) drawings
b) notes
c) sketches
d) links
Answer: c
Explanation: Any Arduino Code that is saved using the Arduino IDE, is referred to as a “sketch” by the Arduino IDE. These “sketches” are nothing but the code saved in a file with the extension name being “.ino”.

77. How many times does the loop() function run on every startup of the Arduino System?
a) 1
b) Depends upon the setup() function
c) Infinitely till the power is supplied to the Arduino
d) 3
Answer: c
Explanation: The loop() function is generally used to carry out most of the calculations that are required to sustain the working of the Arduino project. It is preprogrammed to run continuously once the Arduino is successfully booted and the setup() function has been executed once.

78. Can the loop() function be used to call another function that is custom defined by the programmer?
a) Yes, it can call
b) No, it cannot call
c) Yes, it can call but only functions with no return values
d) Yes, it can call but only functions with return values
Answer: a
Explanation: In C/C++ Programming, a function can call any other function whether it be the main function or any other custom defined function. In the case of the Arduino, the setup() and the loop() functions are custom predefined functions that are a part of the Arduino programming language subsystem.

79. Is the loop() function a replacement of the main() function in the Arduino Programming Environment?
a) No, it is a replacement for the constructor
b) Yes, it is a replacement
c) Yes, but only for certain Arduino Boards
d) No, it is not a replacement
Answer: d
Explanation: The Arduino programming language is a subset of the C++ programming language, so the main function is also present here. However during the active development of any project using the Arduino Environment we do not encounter the main function()’s use since it is prebuilt for that purpose to make the development simple, so that instead of worrying about linking the correct system functions to the main function during the development cycle of the project, the programmer only needs to worry about the actual working of his/her project.

80. Can a programmer not use the loop function at all in a code?
a) Yes
b) No
c) Yes, but it needs to be called at least once
d) Yes, but it needs to be commented out
Answer: a
Explanation: The loop function is a custom predefined function that was designed to execute code over and

over again for the Arduino. However if a programmer can replicate that same functionality in his/her code without the use of the loop() function then there is compulsion for him/her to include the loop() function in the program.

81. Can the loop() function be used to replace the functionality of the setup() function?
a) Yes, it can
b) No, it cannot
c) Yes, it can, but only for certain Arduino Boards
d) Yes, it can, but only for a limited time frame
Answer: a
Explanation: Yes, the loop() function can replace the setup() function completely, theoretically, since both the loop() function and the setup() functions are custom predefined functions in the Arduino Environment. However, this would result in more work from the developer's end since he/she would have to find a way to make configuration code run only once.

82. How to make the loop function run only once but the code inside run infinitely?
a) Create a recursive function call statement
b) Create a nested infinite loop within the loop() function
c) Call the setup() function from the loop() function
d) Call the loop() function from the setup() function
Answer: b
Explanation: Yes, it is possible to make the loop() function execute only once while running the code infinitely. This can be done by using an infinite loop within the loop() function so that the code never goes out of the loop and thus never allowing the loop() function to iterate.

83. Can the loop() function be called recursively?
a) Yes, it can be called recursively
b) No, it cannot be called recursively
c) Yes, it can be called recursively but only by the setup() function
d) Yes, it can be called recursively but only twice
Answer: a
Explanation: The Arduino Programming Language is a working subsystem of the C++ Programming Language. This allows for any function to be called recursively at any point in the program. Since the loop() function is a custom predefined function in the Arduino Ecosystem, it too has to follow that rule.

84. How many times does the setup() function run on every startup of the Arduino System?
a) 1
b) 2
c) 3
d) 4
Answer: a
Explanation: The setup() function is used predominantly to configure the pins, variables, Serial data, etc. and is executed only once throughout the entire cycle of the program. However other than the above-mentioned uses, it can also be used to execute technically all aspects of an Arduino program, but since it only runs one time, it's not very useful for anything other than configuring.

85. Can the setup() function change the value of constant variables?
a) Yes, it can change
b) No, it cannot change
c) Yes, it can change but only integer values
d) Yes, it can change but only byte values
Answer: b
Explanation: In C/C++ Programming, once a constant is declared and initialized, its value cannot be further altered throughout the entire lifecycle of the program. Thus here the setup() function also follows through the same rule since the Arduino Programming Language is a working subset of the C++ Programming Language.

86. Is it syntactically correct to write the loop() function over the setup() function while writing an Arduino program?
a) No, it is not syntactically correct
b) Yes, it is syntactically correct but will result in the loop() method executing first
c) Yes, it is syntactically correct and the setup() function will execute first
d) It is syntactically correct but logically wrong
Answer: c
Explanation: The Arduino programming language is a subset of the C++ programming language, so therefore it supports a bottom-up approach and is an object-oriented programming language, making it irrelevant where the functions are declared.

87. What do we need to do if we want to run the setup() function in an infinite loop?
a) Call the setup() function from a custom named function
b) Call the setup() function from a constructor
c) Call the setup() function from the loop() function
d) Call the setup() function from the destructor
Answer: c
Explanation: The setup() function is designed to run only at the startup of the Arduino code, in order to initialize and configure the setup before running the actual code. However it is theoretically possible to run the setup() function infinitely by calling it from the loop() function as illustrated below…

88. What is the meaning of the data returned by the sizeof() function?
a) Length
b) Location
c) Pointer
d) Memory
Answer: a
Explanation: When the sizeof() function is used, it returns a number which corresponds to the length of the structure in question. It's used by programmers for finding the, say number of elements in an array, or the number of characters in a string, etc…

89. When the sizeof() function is invoked on an array. What information does it return?
a) Number of elements in the array
b) The largest element in the array
c) The total sum of the ASCII values of the elements in the array
d) The largest ASCII value of any element in the array
Answer: a
Explanation: The primary use of the sizeof() function is to return the length or size of an element that is

given to it. So, if this element is an array which is a collection of elements, it will give the number of elements present inside the array.

90. What function will we use to find out the number of elements in an array?
a) sizeof()
b) size()
c) sf()
d) sizeOf()
Answer: a
Explanation: The primary use of the sizeof() function is to return the length or size of an element that is given to it. So, if this element is an array which is a collection of elements, it will give the number of elements present inside the array.

91. What notation should we use for denoting the breadth of an array?
a) sizeof(a[0])
b) sizeof(a)
c) sizeof(a[])
d) sizeof(a.0)
Answer: a
Explanation: When the first element of an array is invoked in the sizeof() function, if the array is a 2D array then it will give the number of elements present in the breadth of the matrix.

92. What does the following code do?
int* ptr = (int*)malloc(100 * sizeof(int));
a) Static Memory Allocation
b) Static Memory Clearance
c) Dynamic Memory Allocation
d) Dynamic Memory Clearance
Answer: c
Explanation: The sizeof() function here is being used to allocate a block of memory. This code is dynamic because the size of int is different on different machine architectures. So, we have allocated a block of memory that is enough to hold 100 integers irrespective of the size of the int data type in the machine in which this code is going to be executed.

93. What are the two modes that the pinMode() method sets for a particular pin?
a) DIGITAL and ANALOG
b) INPUT and OUTPUT
c) TX and RX
d) READ and WRITE
Answer: b
Explanation: The pinMode() method determines whether the pin number given in the code is to be used as an input pin wherein it can read voltage from an external circuit or for setting a particular voltage at the pin output to be plugged to an external circuit.

94. What are the voltage levels that can be detected if a pin is set to OUTPUT using the pinMode() method and the analogRead() method is used, in the Arduino Uno?
a) 0 and 5V
b) 0 to 5.1V
c) 0 to 5V
d) 0 to 10V
Answer: c
Explanation: The Arduino UNO has an operating voltage ranging from 0V to 5V. Hence the Serial monitor will record an output ranging from 0 to 1023. This is done by mapping the value of the voltage to an integer set that has a range of 0 to 1023.

95. What is the difference between the INPUT and INPUT_PULLUP arguments in the pinMode() function?
a) They are both the same
b) INPUT supports only analog voltages while INPUT_PULLUP supports only digital voltage readings
c) INPUT takes the default reading as 0 while INPUT_PULLUP takes default reading as 1023
d) INPUT takes the default reading as 1023 while INPUT_PULLUP takes the default reading as 0
Answer: c
Explanation: The pinMode() function has 2 arguments; the pin number and the mode. The pin number argument takes the number of the pin as input while the mode can be set in 3 different ways, including INPUT, OUTPUT, and INPUT_PULLUP. Here the OUTPUT argument makes the pin ready for sending signals, the INPUT argument makes the pin take a voltage as input from an external source. The INPUT_PULLUP also does the same function as INPUT however only differing in the aspect of base voltage, where the INPUT argument pulls down the voltage of that port to 0V every time there is no voltage is detected across the port while the INPUT_PULLUP argument pulls up the voltage across the port to the maximum for that board whenever there is no input voltage across the port, and the reading at the port decreases with increase in voltage applied across the port.

96. What is the operating frequency of the Arduino UNO Board?
a) 20 MHz
b) 16 Mhz
c) 6 MHz
d) 10 MHz
Answer: b
Explanation: The Arduino UNO makes use of the ATmega328 Processor which has an operating frequency of 16 MHz and a maximum operating frequency of 20 MHz which is not advisable since the higher the switching speed, the hotter the chip will get and may even lead to physical damage of the board.

97. What is the Maximum Operating Voltage of the Arduino Due?
a) 20V
b) 19V
c) 5V
d) 3.3V
Answer: d
Explanation: Most of the Arduino Boards like the Arduino Mega and Uno, have an operating voltage of 5V. However, the Arduino Due, which is supported by the SAM3X8E ARM Cortex-M3 CPU supports a maximum of 3.3V.

98. Analog Pins in the Arduino boards work on the principle of PWM. What is the full form of PWM?
a) Pin Wide Modulation
b) Pulse Waveform Modulation
c) Pulse Width Modulation
d) Pulse Wave Modulation
Answer: c
Explanation: Since perfect analog waveforms can't be achieved on a digital circuit, Pulse Width Modulation is used to create pseudo analog waveforms by varying the "ON" and "OFF" time of a pulse continuously hence creating a series of pulses whose "width" can be modified according to the need of the user. Here "width" refers to the "ON" time of the pulse. Hence the name Pulse Width Modulation.

99. How much Program Memory does the Arduino UNO have?
a) 24K bytes
b) 256K bytes
c) 32K bytes
d) 2K bytes
Answer: c
Explanation: The Arduino UNO is powered by the ATmega328 Processor which has a flash memory (A type of memory that is retained by the chip even after the power supply to the chip is cut off) of 32K bytes.

100. Which of the following boards from the Arduino Family is not powered by a variant of the ATmega processors?
a) Arduino UNO
b) Arduino Nano
c) Arduino Mega
d) Arduino Due
Answer: d
Explanation: The Arduino Due uses the SAM3X8E ARM Cortex-M3 CPU which is a member of the Atmel ARM-Based Processors which uses the RISC (Reduced instruction Set Computing) Architecture and has a maximum operating frequency of 84MHz.

101. What is the full form of EEPROM?
a) Electrically Erasable Programmable Read Only Memory
b) Electrically Encoded Programmable Read Only Memory
c) Electronic Embedded Programmable Read Only Memory
d) Encrypted Electronic Programmable Read Only Memory
Answer: a
Explanation: EEPROM is a type of non-volatile memory which can be programmed and erased by voltage pulses as input. It's used to handle small amounts of data. Originally EEPROMs supported only small amounts of data handling limited to 1 Byte. But however, nowadays EEPROMs can support page operations of many bytes.

102. What is the full form of SRAM?
a) Synchronized Random Access Memory
b) Static Random Access Memory
c) Simplified Random Access Memory
d) Segregated Static Random Access Memory
Answer: b
Explanation: SRAM is a type of volatile memory (volatile as in, it retains the data as long as power is being

supplied to it), which is used for faster access of data. It uses bistable latching circuitry to store data bit by bit. Here, a latch is also called a flip flop which basically has two states depending upon the input signal and it is in this way it stores each bit of data.

103. The Arduino Diecimila has 14 Digital I/O Pins of which __ pins can provide PWM output.
a) 1
b) 4
c) 6
d) 8
Answer: c
Explanation: On the Arduino Diecimila the pins 3, 5, 6, 9, 10, 11 provide 8-bit PWM output. Here PWM refers to Pulse Width Modulation which the Arduino being a digital circuit, uses to replicate analog waveforms for providing traditional voltage specific control.

104. What is the processor used by ARM7?
a) 8-bit CISC
b) 8-bit RISC
c) 32-bit CISC
d) 32-bit RISC
Answer: d
Explanation: ARM7 is a group 32-bit RISC ARM processor cores licensed by ARM Holdings for microcontroller use.

105. What is the instruction set used by ARM7?
a) 16-bit instruction set
b) 32-bit instruction set
c) 64-bit instruction set
d) 8-bit instruction set
Answer: a
Explanation: ARM introduced the Thumb 16-bit instruction set providing improved code density compared to previous designs. The most widely used ARM7 designs implement the ARMv4T architecture, but some implement ARM3 or ARMv5TEJ.

106. How many registers are there in ARM7?
a) 35 register(28 GPR and 7 SPR)
b) 37 registers(28 GPR and 9 SPR)
c) 37 registers(31 GPR and 6 SPR)
d) 35 register(30 GPR and 5 SPR)
Answer: c
Explanation: ARM7TDMI has 37 registers(31 GPR and 6 SPR). All these designs use a Von Neumann architecture, thus the few versions comprising a cache do not separate data and instruction caches.

107. What is the capability of ARM7 f instruction for a second?
a) 110 MIPS
b) 150 MIPS
c) 125 MIPS
d) 130 MIPS
Answer: d
Explanation: It is a versatile device for mobile devices and other low power electronics. This processor architecture is capable of up to 130MIPS on a typical 0.13 um process.

108. Which of the following has the same instruction set as ARM7?
a) ARM6
b) ARMv3
c) ARM71a0
d) ARMv4T
Answer: b
Explanation: The original ARM7 was based on the earlier ARM6 design and used the same ARM3 instruction set.

109. What are t, d, m, I stands for in ARM7TDMI?
a) Timer, Debug, Multiplex, ICE
b) Thumb, Debug, Multiplier, ICE
c) Timer, Debug, Modulation, IS
d) Thumb, Debug, Multiplier, ICE
Answer: b
Explanation: The ARM7TDMI(ARM7 + 16 bit Thumb + JTAG Debug + fast Multiplier + enhanced ICE) processor implements the ARM4 instruction set.

110. ARM stands for _____
a) Advanced RISC Machine
b) Advanced RISC Methadology
c) Advanced Reduced Machine
d) Advanced Reduced Methadology
Answer: a
Explanation: ARM, originally Acorn RISC Machine, later Advanced RISC Machine, is a family of reduced instruction set computing (RISC) architectures for computing processors.

111. What are the profiles for ARM architecture?
a) A,R
b) A,M
c) A,R,M
d) R,M
Answer: c
Explanation: ARMv7 defines 3 architecture “profiles”:
A-profile, Application profile
R-profile, Real-time profile
M-profile, Microcontroller profile.

112. ARM7DI operates in which mode?
a) Big Endian
b) Little Endian
c) Both big and little Endian
d) Neither big nor little Endian
Answer: c
Explanation: Big Endian configuration, when BIGEND signal is HIGH the processor treats bytes in memory as being in Big Endian format. When it is LOW memory is treated as little Endian.

113. In which of the following ARM processors virtual memory is present?
a) ARM7DI
b) ARM7TDMI-S
c) ARM7TDMI
d) ARM7EJ-S
Answer: a
Explanation: ARM7DI is capable of running a virtual memory system. The abort input to the processor may be used by the memory manager to inform ARM7DI of page faults.

114. How many instructions pipelining is used in ARM7EJ-S?
a) 3-Stage
b) 4-Stage
c) 5-Stage
d)2-stage
Answer: c
Explanation: A five-stage pipelining is used, consisting of Fetch, Decode, Execute, Memory, and Writeback stages. A six-stage pipelining is used in Jazelle state, consisting of Fetch, Jazelle, Execute, Memory, and Writeback stages.

115. How many bit data bus is used in ARM7EJ-s?
a) 32-bit
b) 16-bit
c) 8-bit
d) Both 16 and 32 bit
Answer: a
Explanation: The ARM7EJ-s processor has a Von Neumann architecture. This feature is a single 32-bit data bus that carries both instructions and data. Only load, store, and swap instructions can access data from memory. Data can be 8- bit.

116. What is the cache memory for ARM710T?
a) 12Kb
b) 16Kb
c) 32Kb
d) 8Kb
Answer: d
Explanation: The ARM710T is a general purpose 32-bit microprocessor with 8Kb cache, enlarged write buffer and memory management unit combined in a single chip.

117. The Sun micro systems processors usually follow _____ architecture.
a) CISC
b) ISA
c) ULTRA SPARC
d) RISC
Answer: d
Explanation: The Risc machine aims at reducing the instruction set of the computer.

118. The iconic feature of the RISC machine among the following is _____
a) Reduced number of addressing modes
b) Increased memory size
c) Having a branch delay slot
d) All of the mentioned
Answer: c
Explanation: A branch delay slot is an instruction space immediately following a jump or branch.

119. Both the CISC and RISC architectures have been developed to reduce the _____
a) Cost
b) Time delay
c) Semantic gap
d) All of the mentioned
Answer: c
Explanation: The semantic gap is the gap between the high level language and the low level language.

120. Out of the following which is not a CISC machine.
a) IBM 370/168
b) VAX 11/780
c) Intel 80486
d) Motorola A567
Answer: d
Explanation: None.

121. Pipe-lining is a unique feature of _____
a) RISC
b) CISC
c) ISA
d) IANA
Answer: a
Explanation: The RISC machine architecture was the first to implement pipe-lining.

122.In CISC architecture most of the complex instructions are stored in _____
a) Register
b) Diodes
c) CMOS
d) Transistors
Answer: d
Explanation: In CISC architecture more emphasis is given on the instruction set and the instructions take over a cycle to complete.

122. Which of the architecture is power efficient?
a) CISC
b) RISC
c) ISA
d) IANA
Answer: b
Explanation: Hence the RISC architecture is followed in the design of mobile devices.

123. Memory can be accessed in ARM systems by _____ instructions.
i) Store
ii) MOVE
iii) Load
iv) arithmetic
v) logical
a) i, ii, iii
b) i, ii
c) i, iv, v
d) iii, iv, v
Answer: b
Explanation: None.

124. In the ARM, PC is implemented using _____
a) Caches
b) Heaps
c) General purpose register
d) Stack
Answer: c
Explanation: PC is the place where the next instruction about to be executed is stored.

125. The additional duplicate register used in ARM machines are called as _____
a) Copied-registers
b) Banked registers
c) EXtra registers
d) Extential registers
Answer: b
Explanation: The duplicate registers are used in situations of context switching.

126. Each instruction in ARM machines is encoded into _____ Word.
a) 2 byte
b) 3 byte
c) 4 byte
d) 8 byte
Answer: c
Explanation: The data is encrypted to make them secure.

127. The addressing mode where the EA of the operand is the contents of Rn is _____
a) Pre-indexed mode
b) Pre-indexed with write back mode
c) Post-indexed mode
d) None of the mentioned
Answer: c
Explanation: None.

128. How many voltage levels are present when a pin uses digitalWrite()?
a) 1
b) 2
c) 3
d) 4
Answer: b
Explanation: The digitalWrite() function can be used to send out two voltage levels; 0V and 5V which correspond to the digital LOW signal and the digital HIGH signal respectively. These voltage levels can however vary from board to board. For example, in some Arduino Boards the digital HIGH signal corresponds to 3.3V instead of 5V. Hence even if the voltage levels are different here, the meaning of the signal remains the same.

129. Can the digitalRead() function identify analog voltages?
a) Yes, it can
b) No, it cannot
c) Yes, it can but only 2
d) Yes, it can but only 4
Answer: c
Explanation: The digitalRead() function is used to receive digital signals as input through the port and then process the data further. However, it can only distinguish between 5V (3.3V for some Arduino Boards) and 0V which correspond to the digital HIGH and the digital LOW signals respectively.

130. Can the digitalWrite() function be used from any analog pin?
a) No, it cannot
b) Yes, it can, but only on certain Arduino Boards
c) Yes, it can
d) Yes, it can, but only through certain pins
Answer: b
Explanation: The pins in the Arduino Boards are all digital by default. The analog functionality is an addon to the board with the help of an ADC (Analog to Digital Convertor) Circuit, or a DAC (Digital to Analog Convertor) Circuit. Thus, all analog pins support digital IO but not all digital pins support analog IO. However, this is an exception in the Arduino Nano, Mini and Pro Mini.

131. How many arguments does the digitalRead() function have?
a) 1
b) 2
c) 3
d) 4
Answer: a
Explanation: The digitalRead() function is used to take digital signal inputs to the Arduino. It requires 1 argument; the pin number which would indicate which pin is to be used for that particular operation. This will make the Arduino to start reading voltage fluctuations of the order of 0V and 5V.

132. Can the analogRead() function be used as a replacement for the digitalRead() function?
a) No, it cannot be used
b) Yes, it can be used but only on certain Arduino Boards
c) Yes, it can be used
d) Yes, it can be used but only for certain pins
Answer: c
Explanation: The digitalRead() function basically reads voltage differences of 0V and 5V which correspond to 0 and 1023, in the Arduino Ecosystem. This can be recreated using the analogRead() function to check whether there is a voltage across the pin that corresponds to 0 and 1023 on the Arduino.

133. What is the need for a quantizer in Digital Communications?
a) Break up a sampled signal to a finite dataset
b) Sample a pure analog signal
c) Sample a digital signal
d) Encode an analog signal
Answer: a
Explanation: The ADC (Analog to Digital Convertor) Circuit converts the pure analog signal to a digitized signal with discrete voltage points. However, in order to be able to perform further complicated computations on the data, we need to convert the discrete signal into a set of finite data points. This is done by mapping the values to a set of positive real integers.

134. Which of the following is not a Digital Encoding Technique?
a) NRZ (Non-Return to Zero)
b) Amplitude Modulation
c) Manchester
d) RZ (Return to Zero)
Answer: b
Explanation: Any digital signal can be defined as a series of 1's and 0's. These series may or may not be in a predefined pattern. This can make it very difficult for the receiver to be able to decipher the signal. Thus, the digital coding techniques involve mostly converting a random pattern of 1's and 0's into a predefined pattern of a signal which the receiver can decipher easily. Here Amplitude Modulation Technique is an analog modulation technique.

135. Which of the following is not a method to convert analog signals to digital signals?
a) Pulse Code Modulation
b) Pulse Amplitude Modulation
c) Pulse Width Modulation
d) Frequency Modulation
Answer: d
Explanation: Any Modulation Technique that converts an analog signal to a digital signal is of immense importance in pure digital circuits like the Arduino. These help the Arduino's circuit to receive raw unmodulated signals from the outside and process them in a digital environment. Here frequency modulation is the only modulation technique that only works with analog-to-analog signal modulation.

136. What is the numeric base of the math operations performed in binary?
a) 1
b) 2
c) 3
d) 4
Answer: b
Explanation: All binary numbers have a base of 2. This means that this number system has only 2 digits which are 0 and 1. The base of a number system is the number of unique characters or digits that are used for representing numbers.0

137. What is the use of the RESET button on the Arduino UNO?
a) To restart the code present in the Arduino
b) To restore a previous version of a code
c) To erase the code present in the Arduino
d) To erase the SRAM in Arduino Microcontroller
Answer: a
Explanation: The external RESET button on then Arduino is used for restarting the Arduino's bootloader, effectively stopping the execution of the code that was already present on the Arduino and then rerunning it after a few seconds of delay by which point the bootloader is ready. This should be always performed with all external connections to the GPIO pins of the Arduino taken out.

138. What is the use of the Vin pin present on some Arduino Boards?
a) To provide a 5V output
b) Is used for plugging in 3V supply
c) To power the Arduino Board
d) To ground the Arduino Board
Answer: c
Explanation: The Vin Pin can be used for accepting a 9V power supply which is usually given through the external Jack. It can also be used for getting a 9V output when the Arduino is powered through the Jack, thus acting as both a power source and a short from the power source both when needed.

139. What does the analogRead() function do physically when invoked in a code?
a) It accepts a digital Input
b) Reads the raw voltage value
c) Activates the ADC Circuit to read voltage values
d) Activates the DAC Circuit to read voltage values
Answer: c
Explanation: The Arduino has an onboard ADC (Analog to Digital Convertor) Circuit which when invoked by the analogRead() function, takes the voltage from the pin that is specified by the program and compares them with the threshold value (5V on the Arduino UNO, 7V on the Arduino Mini and Nano, etc.) and then provides a value ranging from 0 to 1023.

140. The pins SS, SCK, MOSI and MISO on the Arduino belong to the ___ bus.
a) I2C
b) SPI
c) GPIO
d) Ethernet
Answer: b
Explanation: The Pins SS (Select Slave), SCK (Serial Clock), MOSI (Master Output Slave Input), and MISO

(Master Input Slave Output) belong to the SPI (Serial Peripheral Interface) Bus which is used as a form of wired communication between two or more microcontrollers.

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2.Recent Electronic Components	Marks:-10

Content of Chapter:-

2.1 Flexible PCB:Features and Applications
2.2 Battery [Li - ion, nucleor] : Concepts and Applications
2.3 Memristor, Organic LED: Concepts, Features and Applications
2.4 Surface Mount Device :Concepts,advantages, Applications and Reflow soldering method.

1.OLED are used to create digital display in devices such as _____
A. Only TV screens
B. Only smart phones
C. Only computer monitors
D. All of above
Answer: - Option D
Explanation:-OLED are used to create digital display in devices such as TV screens ,smart phones ,computer monitors .

2.In Li-ion battery, the _____ is/are lithium ion based
A. Positive electrode
B. Negative electrode
C. Positive and negative electrode
D. Electrolyte
Answer: - Option A
Explanation:-In Li-ion battery, the Positive electrode is lithium ion based

3.A nuclear battery is a device which uses energy from the _____ to generate electricity.
A. Hydrocarbon
B. Hydrogen
C. Emission of radioactive isotopes
D. chain reaction of radioactive element
Answer: - Option C
Explanation:-.A nuclear battery is a device which uses energy from the Emission of radioactive isotopes to generate electricity.

4.Compared to other batteries, nuclear batteries are very _____, but have an extremely ____ and high energy density
A. Cheap, long life
B. Costly, long life
C. Cheap, short life
D. Costly, short life
Answer: - Option B
Explanation:-Compared to other batteries, nuclear batteries are very costly , but have an extremely short life and high energy density .

5.Surface-mount technology (SMT) is a method for producing ____ in which the components are mounted or placed directly onto the surface of _____
A. Electric circuit, electric board
B. Electronic circuit, printed circuit board
C. Pneumatic circuit, pneumatic bench
D. Instrumentation circuit, control panel
Answer: - Option D
Explanation:-Surface-mount technology (SMT) is a method for producing Instrumentation circuit in which the components are mounted or placed directly onto the surface of control panel

6.OLED stands for _____
A. Organic Light emitting display.
B. Optical Light emitting display.
C. Organic Light emitting diode.
D. Optical Light emitting diode.
Answer: - Option C
Explanation:-OLED stands for Organic Light emitting diode.

7.In OLED, at least one of the electrode is _____
A. Reactive
B. Transparent
C. Passive
D. Idle
Answer: - Option B
Explanation:-In OLED, at least one of the electrode is Transparent

8. Statement 1: In Li-ion batteries, lithium ions move from the negative electrode to the positive electrode during discharge. Statement 2: In Li-ion batteries lithium ions move from the positive electrode to the negative electrode during charging.
Select correct option for above statement
A. Statement 1 is true but statement 2 is false
B. Statement 2 is true but statement 1 is false
C. Both statements are true
D. Both statements are false
Answer: - Option C
Explanation:-Both statements are true

9.Statement 1: An OLED display works without a backlight
Statement 2: Because OLED emits visible light.
Select correct option for above statement
A. Statement 1 is true but statement 2 is false
B. Statement 2 is true but statement 1 is false
C. Both statements are true
D. Both statements are false
Answer: - Option C
Explanation:-An OLED display works without a backlight Because OLED emits visible light.

10.Memristor is defined by relation _____
A. dφ = M*dq.
B. dq=C*dv.
C. dφ =L*di.
D. dv=R*di
Answer: - Option A
Explanation:-Memristor is defined by relation dφ = M*dq.

11.The surface mount components are accurately placed onto the pads with the help of _____
A. Pick and place machine.
B. Manually.
C. Reflow Machine.
D. Printing Machine
Answer: - Option A
Explanation:-The surface mount components are accurately placed onto the pads with the help of Pick and place machine.

12.Desirable feature of electronics components suitable for emerging applications is _____
A. Higher power consumption.
B. Miniature size.
C. Lower operation speed.
D. Low operating frequency.
Answer: - Option B
Explanation:-Desirable feature of electronics components suitable for emerging applications is Miniature size.

13._____allow more number of components placing on both sides of the flexible dielectric film
A. Single sided flexible circuits
B. Single mounted flexible circuits
C. Double access flexible circuits
D. Sculptured Flex circuits.
Answer: - Option C
Explanation:-Double access flexible circuits allow more number of components placing on both sides of the flexible dielectric film

14.Memristor features unique properties like _____ and _____.
A. Nonvolatile nature, linearity.
B. Volatile nature, non-linearity.
C. Volatile nature, linearity.
D. Nonvolatile nature, non-linearity
Answer: - Option D
Explanation:-Memristor features unique properties like Nonvolatile nature, non-linearity

15._____is considered as a subset of Memristor
A. ROM
B. ReRAM
C. Static RAM
D. DRAM
Answer: - Option B

Explanation:-ReRAM is considered as a subset of Memristor

16.Hysteresis loop and _____ phase shift between current and voltage, at _____ are the significant features of Memristor.
A. 0-degree, zero crossing
B. 90-degree, zero crossing
C. 45 degree, non-zero crossing
D. 180 degree, non-zero crossing
Answer: - Option A
Explanation:-Hysteresis loop and 0-degree phase shift between current and voltage, at zero crossing are the significant features of Memristor.

17.Memristor shows _____ relationship between voltage and current.
A. Linear
B. Nonlinear
C. Exponential
D. logarithmic
Answer: - Option B
Explanation:-Memristor shows Nonlinear relationship between voltage and current.

18.Currently OLED displays are made by _____.
A. Evaporating gases in a vacuum chamber.
B. Evaporating liquid in a vacuum chamber.
C. Evaporating solid in a vacuum chamber.
D. Anodization.
Answer: - Option A
Explanation:-Currently OLED displays are made by Evaporating gases in a vacuum chamber.

19.OLED displays are simpler than LCD because they do not require _____ or _____.
A. Power, filtering.
B. Power, diffusing.
C. Backlight, diffusing.
D. Backlight, filtering.
Answer: - Option D
Explanation:-OLED displays are simpler than LCD because they do not require Backlight or filtering.

20.In the cover lay of FPC, to reduce conductor damage from frequent bending, the thickness of the cover lay should be _____
A. Same as the thickness of the dielectric layer.
B. more than the thickness of the dielectric layer
C. less than the thickness of the dielectric layer
D. Independent of the thickness of the dielectric layer
Answer: - Option A
Explanation:-In the cover lay of FPC, to reduce conductor damage from frequent bending, the thickness of the cover lay should be Same as the thickness of the dielectric layer.

21.Printed circuit board are delivered from one place to other place in plastic or paper protection because of development of_____

A) Leakage current
B) Water drop
C)Dynamic charge
D)Static Charge
Answer: - Option D
Explanation:-.Printed circuit board are delivered from one place to other place in plastic or paper protection because of development of Static Charge

22.Flex PCB design requires_____% of the space and weight of an ordinary circuit board assembly

A) 50
B) 20
C)10
D) 75
Answer: - Option C
Explanation:-Flex PCB design requires 10 % of the space and weight of an ordinary circuit board assembly

23. Commonly used dielectric substrate material is_____

A) Polyester
B) Rubber
C) Mica
D) Polymer
Answer: - Option A
Explanation:-Commonly used dielectric substrate material is Polyester

24. _____are the heart of Flexible Printed Circuits.

A) Dielectric PCBs
B) Flexible PCBs
C) Double sided PCBs
D) Single sided PCBs
Answer: - Option B
Explanation:-Flexible PCB are the heart of Flexible Printed Circuits.

25. _____material has excellent high temperature characteristics.

A) Phenolic
B) Acrylics
C) Polyimide
D) Polyester
Answer: - Option C
Explanation:-Polyimide material has excellent high temperature characteristics.

26.Identify the symbol of component used for emerging application.

A) Resistor
B) compact disc
C) Memristor
D) OLED
Answer: - Option C
Explanation:-

27.In OLED, at least one of the electrode is _____
A) idle
B) transparent
C)active
D) Passive
Answer: - Option B
Explanation:-In OLED, at least one of the electrode is transparent

28. OLED displays provide_____ power consumption compared to LCD
A) Lower
B) Higher
C) Medium
D) zero
Answer: - Option A
Explanation:-OLED displays provide lower power consumption compared to LCD

29. In SMD the wattage required for soldering iron is_____
A) 25 to 50 watt
B) 15 to 25 watt
C) 15 to 30 watt
D) 10 to 50 watt
Answer: - Option B
Explanation:-In SMD the wattage required for soldering iron is 15 to 25 watt
30. For an IC, in a data sheet SMD stands for _____
A) Surface mount device
B) Synchronous mode device
C) Serial mode data
D) Single memory device
Answer: - Option A
Explanation:-For an IC, in a data sheet SMD stands for Surface mount device

31. Identify the SMD component
A) SMD Resistor

B) SMD Resistor network
C) SMD capacitor
D) Leadless Ceramic Chip Carriers
Answer: - Option A
Explanation:-

32.Surface-mount technology (SMT) is a method for producing_____in which the components are mounted or placed directly onto the surface of …….
A) Electric circuit, electric board
B)Electronic circuit, printed circuit board
C)Pneumatic circuit, pneumatic bench
D)Instrumentation circuit, control pane

Answer: - Option B
Explanation:-Surface-mount technology (SMT) is a method for producing Electronic circuit in which the components are mounted or placed directly onto the surface of printed circuit board

33.With surface mount technology(SMT) the devices should _____
A) mount directly
B) have parallel connecting pins
C) requires holes and pads
D) requires PTH
Answer: - Option A
Explanation:-With surface mount technology(SMT) the devices should mount directly

34._____ runs a number of quality checks for the boards visually, such as component alignment and checking for solder bridges
A) reflow oven
B)SMD machine
C)Automatic Optic Inspection machine
D)solder paste printer
Answer: - Option C
Explanation:-Automatic Optic Inspection machine runs a number of quality checks for the boards visually, such as component alignment and checking for solder bridges

35_____soldering is the most widely used method of attaching surface mount components to printed circuit boards (PCBs).
A) WAVE
B) Reflow
C) Pick and place
D) Machine
Answer: - Option B
Explanation:-Reflow soldering is the most widely used method of attaching surface mount components to printed circuit boards (PCBs).

36.A_____ is a machine used primarily for reflow soldering of surface mount electronic components to printed circuit boards (PCB).

A) reflow oven
B) wave oven
C)microwave oven
D)soldering oven
Answer: - Option A
Explanation:-A reflow oven is a machine used primarily for reflow soldering of surface mount electronic components to printed circuit boards (PCB).

37. Preheat is the_____ stage of the reflow process.
A) Second
B) Third
C) First
D) Fourth
Answer: - Option C
Explanation:-Preheat is the First stage of the reflow process.

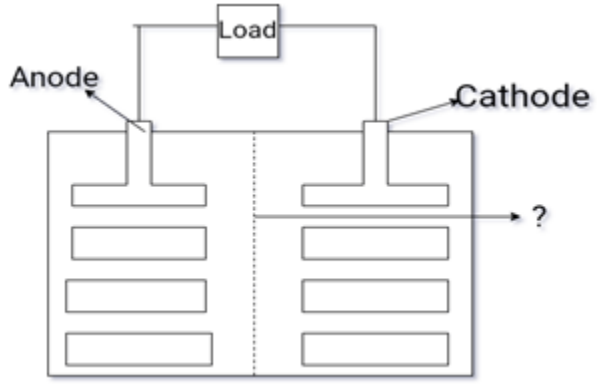
38. Which process is used to deposit metals on glass, ceramic and plastic?
a) Silk plating technique
b) Gas plating technique
c) Electroless plating technique
d) Electroplating technique
Answer: c
Explanation: In electroless plating, a metal ion in solution is reduced to the free metal and deposited as a metallic coating without the use of a coating without the use of an electric current. Thus, this process is used in plating on glass, ceramic and plastic.

39. Electroplating technique is suitable for
a) Making conduction films ceramic
b) Coating with considerable thickness
c) Coating without use of electric current
d) Making conduction films of gold or coppe
Answer: d
Explanation: Electroplating is a process of coating an object with one or more layers of different metal. When dc is passed through the electrolytic solution, the positive metal ions migrate from anode (metal) and deposit on the cathode (substrate).

39. Which of the following process is involve in thick film technology
a) Screen printing
b) Ceramic firing
c) Silk screening
d) All of the mentioned
Answer: c
Explanation: Silk screening is one of the processes of thin film technology.

40. An ancient process used till today for production of circuit films is,
a) Silk Screening technique
b) Surface Mount Technology
c) Ceramic Printing technique
d) Screen Printing technique

41. Which of the following as shown below avoids the direct contact of the positive and negative plate in a lithium-ion battery?



a) Electrolyte
b) Separator
c) Load
d) Rectifier
Answer: b
Explanation: The separator avoids the direct contact and thus short-circuiting of positive and negative plates, thin sheets of some non-conducting material are inserted between them. These sheets are called as separators

42. Which is the electrolyte used in Li-ion battery?
a) Lead dioxide
b) Lithium-based gel
c) Sulfur dioxide
d) Cobalt
Answer: b
Explanation: Lithium-ion batteries also work by shuttling ions between the electrode. During charging, ions travel in one direction; during the discharging process, they go in the other direction. The electrolyte is a lithium-based gel or polymer.

43. Which of the following statement is true for the movement of electrons concerning the direction of current?
a) Same as the direction of current
b) Opposite direction of current
c) Does not depend on the direction of current
d) No movement of electrons
Answer: b
Explanation: During the charging mechanism of lithium-ion battery the current flows from the anode to the cathode whereas the electrons present in the cathode move from cathode to anode thus the movement of the electrons is opposite when compared to the direction of current flow.

44. Which is the material used to as anode in a lithium-ion battery?
a) Brass foil coated with graphite
b) Aluminum foil coated with graphite
c) Copper foil coated with graphite
d) Stainless steel coated with graphite
Answer: b
Explanation: The Lithium-ion battery having round Li-ion cells employ anodes of aluminum foils coated with graphite and is soaked with an organic electrolyte, which enables the transfer of lithium ions in the first place.

45. Which of the following is not a disadvantage of a lithium-ion battery?
a) Complex to manufacture
b) Sophisticated chargers
c) More expensive
d) High energy density
Answer: d
Explanation: The disadvantages of a lithium-ion battery are it is more expensive,since these are more complex to manufacture. These require a sophisticated charger to carefully monitor the charging process which makes it more complex. Whereas high energy density is the advantage of the lithium-ion battery.

46. Which of the following is formed at the graphite electrode during the charging process of a battery when the lithium-ion move through the separator?
a) Water
b) Graphite
c) Lithium hydroxide
d) Lithium carbide
Answer: d
Explanation: During the charging process, lithium ions are released from the metal oxide and move through the separator to the graphite electrode where lithium carbide is formed. The energy stored in the charging process can be released again by the inverse chemical reaction.

47. What is the range of specific energy in Watt-hour per kg in a lithium-ion battery?
a) 0-50
b) 100-265
c) 50-60
d) 60-100
Answer: b
Explanation: Lithium-ion battery has a promising future as a rechargeable battery for the electric hybrid vehicle due to its very high storage capacity,which ranges from 100-265 watt-hour per kg with the fact that it operates at room temperature.

48. Which is the material used as a cathode in a lithium-ion battery?
a) Zinc foils coated lithium metal oxide
b) Brass foil coated with graphite metal oxide
c) Aluminum foils coated with graphite metal oxide
d) Copper foils coated with lithium metal oxide
Answer: c
Explanation: The lithium-ion batteries having round Li-ion cells employ anode of aluminum foils coated with

graphite and cathodes of copper foils coated with lithium metal oxide. The wound electrodes are soaked with an organic electrolyte.

49. What is the maximum storage temperature in degree centigrade of a Li-ion battery?
a) 30
b) 50
c) 60
d) 40
Answer: c
Explanation: Lithium-ion batteries should not be stored at temperatures above 60 degrees centigrade and operated at above 40 degrees centigrade. Likewise there is an appreciable reduction in the potential charging and discharging rate below -5 degrees centigrade.

50. Which of the following is not an advantage of Lithium-ion battery?
a) High specific energy density
b) More expensive
c) Reliability
d) Lower self-discharge rate
Answer: b
Explanation: The lithium-ion battery has many advantages like higher specific energy density than most other types,lower self-discharge rate, has much greater reliability whereas the disadvantage of the li-ion battery is that it is more expensive,since complex to manufacture.

51. Which of the following material is used as separator material in Lithium-ion battery?
a) Brass
b) Metal sheet
c) Paper
d) Plastic
Answer: d
Explanation: The lithium-ion battery employ anodes of aluminum foils coated with graphite and cathodes of copper foils coated with lithium metal oxide. A.plastic separator separates the anode and the cathodes. The wound electrode is soaked with an organic electrolyte.

52. Which of the following circuit is used for cooling of the lithium-ion battery?
a) Air conditioning
b) Heater circuit
c) Ignition circuit
d) EGR circuit
Answer: a
Explanation: For cooling, the heat from the battery can be dissipated only through the air conditioning circuit. The battery heat from the refrigerant circuit of the air conditioning system can be transferred,using conditioned air, a dedicated coolant circuit.

53. What is the maximum operating temperature in degree centigrade above which the lithium-ion battery should not be operated?
a) 10
b) 20
c) 30
d) 40
Answer: d
Explanation: Li-ion batteries have a maximum operating temperature should not be above 40-degree

centigrade. Operating the Li-ion battery beyond this temperature range shortens the battery life due to irreversible damage occurring within the Li-ion cells.

54. By how much variation in the gravity points cell gravity variation can be found?
a) 9
b) 5
c) 10
d) 6
Answer: c
Explanation: Cell gravity variation is one among the other battery troubles during the cell gravity variation the gravity readings of all the cells should be the same. If the reading of some cells is different from the rest by more than 10 gravity points, it indicates the loss of acid from a cell.

55. To avoid which of the following the water level in the electrolyte should be checked periodically?
a) To control the temperature
b) To control the pressure
c) To avoid the damage of the separator and plates
d) To avoid the damage of the electrodes
Answer: c
Explanation: The water in the electrolyte keeps on evaporating and periodic checks must be made to ensure that proper level and gravity is being maintained. If this is not done, the separators and the plate may be permanently damaged.

56. Which is the liquid that is used in the cleaning of the battery terminals and clamps to avoid corrosion?
a) Hydrochloric acid
b) Dilute sulphuric acid
c) Liquid ammonia
d) Liquid nitrogen
Answer: c
Explanation: Due to oxidation the battery terminals and the clamp must be cleaned after regular intervals. After cleaning with a cloth moistened with liquid ammonia, a coat of petroleum jelly helps to retard their corrosion again.

57. Which of the following is not a cause for deterioration of plates?
a) The high specific gravity of the electrolyte
b) Freezing of electrolyte
c) Mechanical damage to the battery
d) The proper mixture of water and acid
Answer: c
Explanation: The deterioration of plates may be caused by any of the following like very high charging or discharging rate, the high specific gravity of the electrolyte, freezing of electrolyte, mechanical damage due to rough ride whereas as the proper mixture of acid and water slows down the deterioration of plates.

58. Which of the following is not a reason for the self-discharge of the battery?
a) Contamination of electrolyte
b) Damaged separators
c) Long term storage
d) Use of distilled water for electrolyte
Answer: d
Explanation: The main cause for self-discharging of the battery are contamination of the electrolyte,

damaged separators and long time storage. By using pure sulphuric acid and distilled water for preparing electrolyte helps in the life of the battery.

59. Which of the following increases due to a reduction in the capacity of battery plates due to sulphation?
a) Pressure
b) Internal resistance
c) Temperature
d) Enthalpy
Answer: b
Explanation: Large lead sulphate crystals, whitish in colour are formed on the plates. These crystals are difficult to be converted back into active materials on recharging. Sulphation of the battery reduces the capacity and increases the internal resistance of the cells.

60. Which of the following is the result of long term storage of the battery?
a) Low load
b) variation in pressure
c) Variation in enthalpy
d) Stratification
Answer: d
Explanation: Stratification is one of the battery troubles. Long term storage of the battery causes stratification of the electrolyte, for example, the bottom layer becomes heavier than the top layers. Such stratification sets up local equalising currents which increase the self-discharge rate.

61. In which type of battery there is no requirement of any water during normal service?
a) Lead-acid
b) Lithium-ion
c) Lead-cadmium grid
d) Zinc-air
Answer: a
Explanation: In the lead-cadmium grid battery does not require any water to be added during normal service, as excessive water loss may be caused due to higher than normal charging rate due to incorrect setting of the regulator.

62. Which of the following is the reason for the discolouring of electrolyte?
a) Improper water and acid in the electrolyte
b) Plates are disintegrating
c) No proper vent plugs
d) Freezing material in the electrolyte
Answer: b
Explanation: Discolouring of electrolyte is one of the battery troubles. The discolouring of the electrolyte is an indication that the plates are disintegrating and the battery has almost exhausted its life.

63. Which among the following damage leads to internal short-circuiting?
a) Separator
b) Post strap
c) Vent plug
d) Container
Answer: a
Explanation: The internal short-circuiting is caused by either damaged separators or when the active

material dropping from the plate forms itself into a heap so high as to cause short-circuiting. It results in rapid self-discharge and sulphation.

64. Which of the following is not a precaution to avoid sulphation?
a) Proper electrolyte level
b) Proper specific gravity
c) Rapid discharging
d) Proper water addition
Answer: c
Explanation: The battery which is not excessive sulphates can be recharged keeping the charging rate low. The precautions to avoid sulphation are the battery water level should be checked, and the electrolyte level and gravity level should be maintained at the proper value and heavy discharge of battery should be avoided.

65. Which of the following lead to the bulged case of a battery?
a) Loss of water
b) Internal short-circuiting
c) Sulphation
d) Overcharging
Answer: d
Explanation: The main trouble a faces is bulged case which because of overcharging of the battery to avoid overcharging the regulated voltage must be reduced. And the clamps should not be too tight and the temperature of the battery should be maintained.

66. Find out the op-amp which does not have same specifications and behaviour as that of N5741?
a) MC1741
b) CA3741
c) SN52741
d) None of the mentioned
Answer: d
Explanation: All these op-amp have the same they specifications and behave the same because the last three digits in each manufacturer designation is 741. For example Fairchild's original μA741 is also manufactured by various other manufacturers under their own designation.

67. The op-amps 741C and 741E are identical to op-amps
a) 741s and 741A
b) 741 and 741A
c) 741A and 741Sc
d) 741 and 741S
Answer: b
Explanation: The 741C and 741E are identical to 741 and 741A except that the former have their performance guaranteed over a temperature range 0^o to 70^o or 75^oc.

68. Which of the following is a military grade op-amp?
a) 741
b) 741C
c) 741S
d) 741SCAnswer: c
Explanation: The 741S is a military grade op-amp with a higher slew rate (rate of change of output voltage per unit of time) than the 741 op-amp.

69. Which of the following is in correct? “First generation op-amp ”
a) Consists of hundred transistors/chip
b) Requires an external frequency compensating network for stable operation
c) Have short circuit protection
d) Has latch-up problem
Answer: c
Explanation: First generation op-amp has no short circuit protection. The op-amp is susceptible to burnout if output accidentally shorted to ground.

70. . What is the disadvantage of integrated circuit?
a) Parameter within the IC cannot be modified
b) Low power requirement
c) ICs are considered to use minimum number of external connections
d) None of the mentioned
Answer: a
Explanation: The disadvantage of IC is that, a lack of flexibility an IC. It is generally not possible to modify the parameters within which an integrated circuit will operate.

71. Whenever an IC is designed manufacturers use a
a) Specific code and manufacturer’s name
b) Specific code and specific type number
c) Specific code and specific value
d) Specific type number
Answer: b
Explanation: Each manufacturer uses a specific code and assign a specific type number to the IC’s produced. That is, each manufacturer uses their own identifying initial followed by IC type number.

72. General purpose op-amp cannot be used for the application
a) Integrator
b) Audio power amplifier
c) Differentiation
d) Summing amplifier
Answer: b
Explanation: Audio power amplifier is a special purpose op-amp and is used only for the specific application they are designed for.

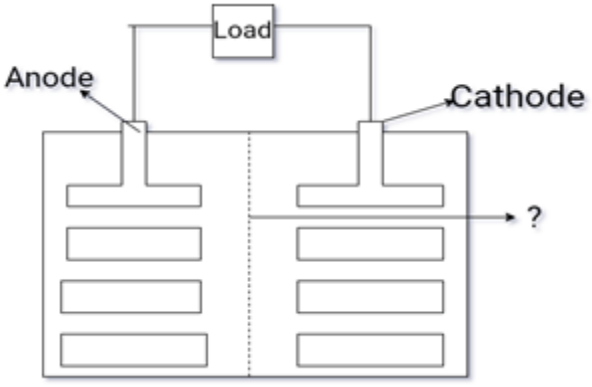
73. Low volume production methods are best suited to hybrid IC technology because
a) It require stipulated temperature to fabricate a circuit
b) It require several steps to fabricate a circuit
c) It require large components to fabricate a circuit
d) It require various designers to fabricate a circuit
Answer: b
Explanation: In hybrid IC, first the individual components are made, wired or metallic interconnection is done and finally they are diffused to form a single circuit.

74. Which is the different version of IC 741C?
a) 741A
b) 741E
c) 741S
d) 741SC
Answer: d
Explanation: 741SC is the different version of 741C IC, which is a commercial grade op-amp with higher slew rate and operating in the same temperature range.

75. An example of second generation IC used in greatest percentage of application
a) µA748
b) MC1558
c) µA741
d) LM101
Answer: c
Explanation: All the IC belongs to second generation op-amp. In that general purpose op-amp'741' is used widely in greatest percentage of application.

76. What is the advantage of Hybrid Integrated Circuit?
a) Miniaturized circuits are made of individual components
b) Insulate components by protection
c) Circuit designer can choose the component value
d) All of the mentioned
Answer: d
Explanation: In hybrid integrated circuit miniaturization can be achieved and allow circuit designer a complete freedom in choosing the resistor values, whereas monolithic IC cannot use some important components on construction.

77. Which of the following as shown below avoids the direct contact of the positive and negative plate in a lithium-ion battery?



a) Electrolyte
b) Separator
c) Load
d) Rectifier
Answer: b
Explanation: The separator avoids the direct contact and thus short-circuiting of positive and negative plates, thin sheets of some non-conducting material are inserted between them. These sheets are called as separators.

79. Which is the electrolyte used in Li-ion battery?
a) Lead dioxide
b) Lithium-based gel
c) Sulfur dioxide
d) Cobalt
Answer: b
Explanation: Lithium-ion batteries also work by shuttling ions between the electrode. During charging, ions travel in one direction; during the discharging process, they go in the other direction. The electrolyte is a lithium-based gel or polymer.

80. Which of the following statement is true for the movement of electrons concerning the direction of current?
a) Same as the direction of current
b) Opposite direction of current
c) Does not depend on the direction of current
d) No movement of electrons
Answer: b
Explanation: During the charging mechanism of lithium-ion battery the current flows from the anode to the cathode whereas the electrons present in the cathode move from cathode to anode thus the movement of the electrons is opposite when compared to the direction of current flow.
81. Which is the material used to as anode in a lithium-ion battery?
a) Brass foil coated with graphite
b) Aluminum foil coated with graphite
c) Copper foil coated with graphite
d) Stainless steel coated with graphite
Answer: b
Explanation: The Lithium-ion battery having round Li-ion cells employ anodes of aluminum foils coated with graphite and is soaked with an organic electrolyte, which enables the transfer of lithium ions in the first place.

82. Which of the following is not a disadvantage of a lithium-ion battery?
a) Complex to manufacture
b) Sophisticated chargers
c) More expensive
d) High energy density
Answer: d
Explanation: The disadvantages of a lithium-ion battery are it is more expensive,since these are more complex to manufacture. These require a sophisticated charger to carefully monitor the charging process which makes it more complex. Whereas high energy density is the advantage of the lithium-ion battery.

83. Which of the following is formed at the graphite electrode during the charging process of a battery when the lithium-ion move through the separator?
a) Water
b) Graphite
c) Lithium hydroxide
d) Lithium carbide
Answer: d
Explanation: During the charging process, lithium ions are released from the metal oxide and move through

the separator to the graphite electrode where lithium carbide is formed. The energy stored in the charging process can be released again by the inverse chemical reaction.

85. What is the range of specific energy in Watt-hour per kg in a lithium-ion battery?
a) 0-50
b) 100-265
c) 50-60
d) 60-100
Answer: b
Explanation: Lithium-ion battery has a promising future as a rechargeable battery for the electric hybrid vehicle due to its very high storage capacity,which ranges from 100-265 watt-hour per kg with the fact that it operates at room temperature.

86. Which is the material used as a cathode in a lithium-ion battery?
a) Zinc foils coated lithium metal oxide
b) Brass foil coated with graphite metal oxide
c) Aluminum foils coated with graphite metal oxide
d) Copper foils coated with lithium metal oxide
Answer: c
Explanation: The lithium-ion batteries having round Li-ion cells employ anode of aluminum foils coated with graphite and cathodes of copper foils coated with lithium metal oxide. The wound electrodes are soaked with an organic electrolyte.

87. What is the maximum storage temperature in degree centigrade of a Li-ion battery?
a) 30
b) 50
c) 60
d) 40
Answer: c
Explanation: Lithium-ion batteries should not be stored at temperatures above 60 degrees centigrade and operated at above 40 degrees centigrade. Likewise there is an appreciable reduction in the potential charging and discharging rate below -5 degrees centigrade.

88. Which of the following is not an advantage of Lithium-ion battery?
a) High specific energy density
b) More expensive
c) Reliability
d) Lower self-discharge rate
Answer: b
Explanation: The lithium-ion battery has many advantages like higher specific energy density than most other types,lower self-discharge rate, has much greater reliability whereas the disadvantage of the li-ion battery is that it is more expensive,since complex to manufacture.

89. Which of the following material is used as separator material in Lithium-ion battery?
a) Brass
b) Metal sheet
c) Paper
d) Plastic
Answer: d
Explanation: The lithium-ion battery employ anodes of aluminum foils coated with graphite and cathodes of

copper foils coated with lithium metal oxide. A.plastic separator separates the anode and the cathodes. The wound electrode is soaked with an organic electrolyte.

90. Which of the following circuit is used for cooling of the lithium-ion battery?
a) Air conditioning
b) Heater circuit
c) Ignition circuit
d) EGR circuit
Answer: a
Explanation: For cooling, the heat from the battery can be dissipated only through the air conditioning circuit. The battery heat from the refrigerant circuit of the air conditioning system can be transferred,using conditioned air, a dedicated coolant circuit.
91. What is the maximum operating temperature in degree centigrade above which the lithium-ion battery should not be operated?
a) 10
b) 20
c) 30
d) 40
Answer: d
Explanation: Li-ion batteries have a maximum operating temperature should not be above 40-degree centigrade. Operating the Li-ion battery beyond this temperature range shortens the battery life due to irreversible damage occurring within the Li-ion cells.

92. The automotive battery is also known as _____
a) lithium ion battery
b) lead-acid storage battery
c) zinc carbon battery
d) weston cell battery
Answer: b
Explanation: The automotive battery, also known as Lead-acid storage battery is an electrochemical device that produced voltage and delivers current. In an automotive battery we can reserve the electrochemical action, thereby recharging the battery, which will then give many years of service.

93. What is present inside a battery?
a) Electrolyte
b) Fluids
c) Acid
d) Steam
Answer: a
Explanation: The electrolyte inside the battery is a mixture of sulfuric acid and water. Sulfuric acid is very corrosive; if it gets on your skin it should be flushed with water. The automotive battery requires special handling. If it gets in your eyes it should be flushed with mild solution of baking soda and water.

94. What do batteries emit while charging?
a) Nitrogen
b) Oxygen
c) Hydrogen
d) Carbon
Answer: c
Explanation: When charging, the battery will emit hydrogen gas; it is therefore extremely important to keep

the flames and sparks away from battery. It is also advisable to wear goggles and gloves while servicing the battery.

95. The battery cannot be sealed because _____
a) they emit noxious gases
b) they emit hydrogen
c) to be exposed to air
d) to have the ventilation
Answer: c
Explanation: Because batteries emit hydrogen gas while charging, the battery case cannot be completely sealed. Years ago there was a vent cap for each cell and we had to replenish the cells when the electrolyte evaporated. Today's batteries (maintenance free) have small vents on the side of the battery; the gases emitted have to go through baffles to escape.

96. What does CCA stand for in engine starting methods?
a) Circuit card assembly
b) Cold cranking amps
c) Chromated copper arsenate
d) Capital cost allowances
Answer: b
Explanation: Today's batteries are rated in term of cold cranking amps. This represents the current that the battery can produce for 30 seconds at $0^{o}C$ before the battery voltage drops below 7.2 volts. An average battery today will have a CCA (Cold Cranking Amps) of 500.

97. Which of the following problem naturally occurs around the battery?
a) Corrosion
b) Scaling
c) Pore formation
d) Rust
Answer: a
Explanation: Corrosion naturally occurs around the battery. Electrolyte condensation contains corrosive sulfuric acid, which destroys the metal of battery terminals, cable ends and battery hold down parts. To clean away the corrosion, use a mixture of baking soda and water.

98. How many key switch positions are there in general in ignition switch?
a) 2
b) 3
c) 4
d) 5
Answer: d
Explanation: The ignition switch allows the driver to distribute electrical current to where it is needed. There are generally 5 key switch positions they are:
i) Lock
ii) Off
iii) Run
iv) Start
v) Accessory.

99. In which switch position are all circuits open?
a) Lock
b) Run
c) Start
d) Accessory
Answer: a
Explanation: In lock position all circuits are open and the steering wheel is in lock position. In some cars, the transmission lever cannot be moved in this position. If the steering wheel is applying pressure to the locking mechanism, the key might be hard to turn.

100. In which ignition switch position is the power supplied to ignition circuit?
a) Off switch position
b) Run switch position
c) Start switch position
d) Lock switch position
Answer: c
Explanation: Power is supplied to the ignition circuit in start switch position. That is why the media stops playing in the start position. This position of the ignition switch is spring loaded so that the starter is not engaged while the engine is on. This position is used momentarily, just in order to activate the starter

101. Neutral safety switch varies due to changes in _____
a) ignition
b) applying clutch
c) gear transmission
d) brakes
Answer: c
Explanation: This switch opens (denies current to) the starter circuit when the transmission is in any gear but Neutral on automatic transmissions. This switch is normally connected to the transmission linkage or directly on the transmission. Most cars utilize this same switch to apply current to the backup lights when the transmission gear is put in reverse.

102. What is the colour of a positive plate of a lead-acid battery?
a) White
b) Grey
c) White
d) Brown
Answer: d
Explanation: A positive plate of a lead-acid battery is brown in colour. A negative plate of a lead-acid battery is grey in colour. For each plate, there is a supporting grid made of an alloy of lead and antimony.

103. What gets deposited on the plates of a discharged lead-acid battery?
a) PbO_2
b) Pb_2O_4
c) Pb
d) $PbSO_4$
Answer: d
Explanation: $PbSO_4$ gets deposited on the plates of a discharged lead-acid battery. During discharging the reaction happens in the right direction. $PbSO_4$ gets deposited on both negative and positive plates.

104. What is the twenty-minute rating of battery?
a) Rate of current for 20 minutes with a minimum cell voltage of 1.5 V
b) Time for which the battery can supply 25 A at 80°F with minimum cell voltage 1.75 V
c) The current which the battery can supply continuously for 30 seconds with minimum cell voltage 1.2 V
d) Lasting power of a battery on a small load
Answer: a
Explanation: The rate of current 20 minutes with a minimum cell voltage of 1.5 V is called a twenty-minute rating of the battery. The temperature of the battery at the start of the test is brought to 80°F. It represents the rate of current a battery can deliver continuously.

105. What is the reserve capacity of battery?
a) Time for which the battery can supply 25 A at 80°F with minimum cell voltage 1.75 V
b) The current which the battery can supply continuously for 30 seconds with minimum cell voltage 1.2 V
c) Lasting power of a battery on a small load
d) Rate of current for 20 minutes with a minimum cell voltage of 1.5 V
Answer: a
Explanation: The reserve capacity is the time for which the battery can supply 25 A at 80°F with minimum cell voltage 1.75 V. It is the measurement for the total capacity of the battery.

106. What is the cold rate of a battery?
a) Lasting power of a battery on a small load
b) Rate of current for 20 minutes with a minimum cell voltage of 1.5 V
c) The current which the battery can supply continuously for 30 seconds with minimum cell voltage 1.2 V
d) Time for which the battery can supply 25 A at 80°F with minimum cell voltage 1.75 V
Answer: c
Explanation: It is a measure of the worst conditions under which a battery is expected to deliver current, e.g., during starting the engine and operating under extreme cold. The cold rate of a battery is the current which the battery can supply continuously for 30 seconds with minimum cell voltage 1.2 V.

107. What is a twenty-hour rate of a battery?
a) The current which the battery can supply continuously for 30 seconds with minimum cell voltage 1.2 V
b) Lasting power of a battery on a small load
c) Time for which the battery can supply 25 A at 80°F with minimum cell voltage 1.75 V
d) Rate of current for 20 minutes with a minimum cell voltage of 1.5 V
Answer: b
Explanation: A twenty-hour rate of a battery is the lasting power of a battery on a small load. During this test, the temperature should be about 80oF. This rating is important for powering accessories when the engine is not running.

108. What should a fully-charged 6 cell automotive battery indicate?
a) 12 V
b) 12.6 V
c) The specific gravity of 1.29 at 32°C
d) 12.6 V and the specific gravity of 1.29 at 32°C
Answer: d
Explanation: A fully-charged 6 cell automotive battery indicates 12.6 V and a specific gravity of 1.29 at 32°C. There should be no leak. The battery can be checked using a digital multimeter.

109. What is the number of positive plates in a battery cell?
a) One more than the negative plates
b) Two less than the negative plates
c) One less than the negative plates
d) Two more than the negative plates
Answer: c
Explanation: The number of positive plates in a battery cell is one less than the negative plates. One positive and one negative group of plates are sliding over each other, with separators sandwiched between them.

110. What is a maintenance-free battery?
a) A battery having lead-antimony plate grid
b) A battery having lead-calcium plate grid
c) A battery does not contain acid
d) A battery does not contain water
Answer: b
Explanation: A maintenance-free battery is a battery having a lead-calcium plate grid. The battery which uses this plate grid loses water very slowly.

111. Which of the following is the advantage of alkaline battery?
a) High energy density
b) Good discharge characteristics over a wide range of temperature
c) The specific gravity of electrolyte remains the same
d) Cheap raw materials are used
Answer: c
Explanation: The advantage of the alkaline battery is that the specific gravity of electrolyte remains the same. The electrolyte does not take part in chemical reactions on charging or discharging.

112. A battery is an arrangement of electrolytic cells.
a) True
b) False
Answer: b
Explanation: A battery is not an arrangement of electrolytic cells, but an arrangement of electrochemical cells. An electrochemical cell is one which converts chemical energy into electrical energy whereas an electrolytic cell is one which converts electrical energy into chemical energy. Since batteries convert chemical energy to electrical energy, it is an arrangement of electrochemical cells.

113. Which of the following is not a requirement for a useful battery?
a) It should be light and compact
b) It should have a reasonable life span
c) It should ideally have a constant voltage throughout its lifespan
d) It should supply Alternating Current(AC)
Answer: d
Explanation: A useful battery is expected to be light and compact to be easily transported. It is expected to have a reasonable lifespan to justify its usage. Its voltage should not vary appreciably during usage so that it doesn't adversely affect the circuit it is used in. A battery supplies Direct Current(DC) and not Alternating Current(AC).

114. Which of the following statements is true regarding a primary cell?
a) The electrode reactions can be reversed
b) It can be recharged
c) An example of a primary cell is a mercury cell
d) An example of a primary cell is a nickel-cadmium storage cell
Answer: c
Explanation: A primary cell is one in which the electrode reactions occur only once and cannot be reversed by applying electrical energy. Therefore, primary cells cannot be recharged. A mercury cell is an example of a primary cell, whereas a nickel-cadmium storage cell is an example of a secondary cell.

115. Secondary cells are also called storage cells.
a) True
b) False
Answer: a
Explanation: Secondary cells are those cells in which the electrode reaction can be reversed by applying an electrical energy. Therefore, they can be used to store electrical energy. So, they are also known as storage cells.

116. Which of the following is used as an anode in a dry cell?
a) Zinc
b) Graphite
c) Mercury(II) oxide
d) Nickel
Answer: c
Explanation: A dry cell is constructed using zinc and graphite. It consists of a zinc cylinder through whose centre passes a graphite rod. The zinc cylinder acts as an anode, whereas the graphite rod acts as a cathode.

117. Why do leak proof dry cells have an iron or steel sheet covering the zinc cylinder?
a) It increases the potential difference between the anode and cathode
b) It acts as a barrier around the zinc cylinder which can develop holes during use
c) It makes it waterproof
d) It prevents the leakage of current
Answer: b
Explanation: In a dry cell, zinc loses electrons and the zinc ions dissolve into the electrolyte. As a result, the zinc cylinder of the dry cell develops holes as it is used. To prevent the leakage of electrolyte through these holes, an iron or steel sheet is used to cover the cylinder.
118. Which of the following is the electrolyte used in a dry cell?
a) Ammonium chloride
b) Manganese dioxide
c) Potassium hydroxide
d) Sulphuric acid
Answer: a
Explanation: The electrolyte in a dry cell is ammonium chloride in the form of a moist paste placed next to the zinc anode. In some dry cells marketed as “heavy-duty”, the ammonium chloride is replaced by zinc chloride.

119. What is the role of manganese dioxide in a dry cell?
a) It acts as an electrolyte
b) It acts as the cathode
c) It acts as an anode
d) It acts as a depolarizer
Answer: d
Explanation: In a dry cell, in the remaining space between the electrolyte and the graphite cathode, a second paste consisting of ammonium chloride and manganese dioxide is applied. The manganese dioxide acts as a depolariser as it helps to prevent the build-up of hydrogen gas bubbles.

120. What is the final oxidation state of manganese after the electrochemical reactions in a dry cell?
a) +4
b) +3
c) +2
d) +1
Answer: b
Explanation: In a dry cell, in the cathode reaction, manganese dioxide(MnO_2) is reduced to form manganese oxide-hydroxide(MnO(OH)). In this process, the oxidation state of manganese changes from +4 to +3. Hence the final oxidation state of manganese is +3.

121. Which of the following scientists invented the first dry cell?
a) Carl Gassner
b) Nikola Tesla
c) Antione Lavoisier
d) Georges Leclanché
Answer: a
Explanation: In the year 1886, Carl Gassner obtained a German patent on a variant of the wet Leclanché cell, which can be known as the dry cell because it did not have a liquid electrolyte. Instead, a mixture of ammonium chloride and plaster of paris was used.

122. What is the final product that zinc forms during the functioning of a mercury cell?
a) ZnO
b) ZnO_2
c) Zn
d) $Zn(OH)_2$
Answer: a
Explanation: A mercury cell consists of a zinc anode and a mercury(II) oxide cathode. Potassium hydroxide is used as the electrolyte. In the electrochemical reaction, zinc is oxidised to become zinc oxide(ZnO) whereas mercury(II) oxide is reduced to elemental mercury.

123. Which of the following appliances would not use sodium hydroxide as an electrolyte in their mercury cells?
a) Calculators
b) Hearing aids
c) Electronic watches
d) Photographic cameras with a flash
Answer: d
Explanation: Sodium hydroxide cells have nearly constant voltage at low discharge currents whereas potassium hydroxide cells provide a constant voltage at high discharge currents. Therefore, sodium

hydroxide cells are ideal for calculators, hearing aids and electronic watches whereas potassium hydroxide cells are ideal for photographic cameras with a flash.

124. Which of the following is the voltage output of a mercury cell?
a) 1.55V
b) 1.35V
c) 2.55V
d) 1V
Answer: b
Explanation: Mercury batteries use a reaction between mercuric oxide and zinc in an alkaline electrolyte to produce electricity. Its voltage during discharge is a constant 1.35V. The common dry cell, on the other hand, provides a voltage of 1.5V.

125. Which of the following statements is not true with respect to a lead storage cell (or a lead-acid battery)?
a) The electrolyte used is an aqueous solution of sulphuric acid
b) The anode is made up of lead
c) The cathode is made up of lead(IV) oxide
d) It is a primary cell
Answer: d
Explanation: A lead storage cell is a secondary cell which has a grid of lead packed with finely divided spongy lead for an anode and a grid of lead packed with lead(IV) oxide for a cathode. The electrolytic solution used in a lead-acid battery is an aqueous solution of sulphuric acid.

126. Which of the following products are formed when a lead storage battery is discharged?
a) SO_2
b) Pb
c) PbO_2
d) $PbSO_4$
Answer: d
Explanation: During the working of the lead storage battery, $PbSO_4$ is formed at both the electrodes and sulphuric acid is used up. At the anode, Pb is oxidised to form $PbSO_4$ and at the cathode, PbO_2 is reduced to form $PbSO_4$.

127. A light emitting diode is _____
a) Heavily doped
b) Lightly doped
c) Intrinsic semiconductor
d) Zener diode
Answer: a
Explanation: A light emitting diode, LED, is heavily doped. It works under forward biased conditions. When the electrons recombine with holes, the energy released in the form of photons causes the production of light.

128. Which of the following materials can be used to produce infrared LED?
a) Si
b) GaAs
c) CdS
d) PbS Answer: b
Explanation: GaAs has an energy band gap of 1.4 eV. It can be used to produce infrared LED. Various other combinations can be used to produce LED of different colors.

129. The reverse breakdown voltage of LED is very low.
a) True
b) False
Answer: a
Explanation: The reverse breakdown voltages of LEDs are very low, typically around 5 V. So, if access voltage is provided, they will get fused.

130. What should be the band gap of the semiconductors to be used as LED?
a) 0.5 eV
b) 1 eV
c) 1.5 eV
d) 1.8 eV
Answer: d
Explanation: Semiconductors with band gap close to 1.8 eV are ideal materials for LED. They are made with semiconductors like GaAs, GaAsP etc.

131. What should be the biasing of the LED?
a) Forward bias
b) Reverse bias
c) Forward bias than Reverse bias
d) No biasing required
Answer: a
Explanation: The LED works when the p-n junction is forward biased i.e., the p- side is connected to the positive terminal and n-side to the negative terminal.

132. Increase in the forward current always increases the intensity of an LED.
a) True
b) False
Answer: b
Explanation: As the forward current is increased for an LED, the intensity of the light increases up to a certain maximum value. After that, the intensity starts decreasing.

133. Which process of the Electron-hole pair is responsible for emitting of light?
a) Generation
b) Movement
c) Recombination
d) Diffusion
Answer: c
Explanation: When the recombination of electrons with holes takes place, the energy is released in the form of photon. This photon is responsible for the emission of light.
134. What is the bandwidth of the emitted light in an LED?
a) 1 nm to 10 nm
b) 10 nm to 50 nm
c) 50 nm to 100 nm
d) 100 nm to 500 nm
Answer: b
Explanation: The bandwidth of the emitted light is 10 nm to 50 nm. Thus, the emitted light is nearly (but not exactly) monochromatic.

135. Which of the following is not a characteristic of LED?
a) Fast action
b) High Warm-up time
c) Low operational voltage
d) Long life
Answer: b
Explanation: The warm-up time required should be lower so that the lighting action can take place faster. This is one of the advantages LED have over incandescent lamps.

136. When does an integrated circuit exhibit greater degree of freedom and electrical performance?
a) In thin and thick film technology
b) In semiconductor technology
c) In semiconductor and films technology
d) In thick film technology only
Answer: c
Explanation: Combining films and semiconductor technology provide a better electrical performance than either technology can provide separately.

137. Give the thickness range of the film used in thin film technology
a) 0.5-2.5 mils
b) 0.02-8 mils
c) 10-20 mils
d) 0.05-0.0 7mils
Answer: b
Explanation: Thin films have thickness varying from 50 Å to 20,000 Å.
W.k.t, 1 Å=0.4 µmil,
=>50 Å=50 × 0.4µmil=0.02 mmil,
=>20,000 Å=20, 000*0.4µmil=8 mmil,
=>therefore, the thickness range from 0.02-8 mmil.

138. Which technology is used to get cheap resistors and capacitors?
a) Thick film technology
b) Thin film technology
c) Thin and thick film technology
d) None of the mentioned
Answer: b
Explanation: Thick film technology produces cheap and rugged components, whereas thin film technology provides greater precision in manufacturing but is quite expensive. The processing equipment for thick film circuit is relatively inexpensive and is easy to use.

139. How is the process of film deposition carried out in cathode sputtering?
a) Slower than evaporation method
b) Faster than evaporation method
c) Similar to same as evaporation method
d) All of the mentioned
Answer: a
Explanation: Cathode sputtering and vacuum evaporation uses identical system. However, the process of

film deposition in cathode sputtering is slower than evaporation method. Since depositing a micron-thick film takes minutes to hours, compared to seconds to minutes for evaporation.

140. How a uniform film with good crystal structure is attained in cathode sputtering process?
a) By hitting high energy particle directly on the substrate
b) Allowing Less time for the particles to deposit on the substrate
c) High energy particle diffuse through low pressure gas and deposits on the substrate
d) Heavy inert gas is used for film deposition on the substrate
Answer: c
Explanation: The process of cathode sputtering is performed at a low pressure (about 10^{-12} torr). So, when the high energy particle landing on the substrate actually results in a very uniform film and adhesion.

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3.Next Generation telecom Network	Marks:-16

Content of Chapter:-

3.1 NGN architecture: Features, Functional block diagram, Network components: Media Gateway, Media Gateway Controller, and Application Server.

3.2 NGN Wireless Technology: Telecom network Spectrum: Types [licensed and unlicensed], Mobile Network Evolution (2G to 5G), Comparative features,

3.3 Fiber to the Home (FTTH): Features, Architecture And Components: Optical Line Termination (OLT), Optical Network Unit (ONU).

3.4 NGN Core: Features, Multi Protocol Label Switching (MPLS): Concepts,Features and advantages.

3.5 Next generation transmission system: Optical Transport Network variants: Synchronous Transfer Module STM1, STM4, STM16, STM64 and STM256Features: bit rates and capacity .Passivc Optical Network: BPON, Ethernet PON, Gigabit PON features.

1. The E2Eoptical path in an OTN network is specified by layer
A. ODU
B. OTU
C. OCH
D. OPU
Answer: - Option C

2.In NGN ,the interface not supporting media interaction is
A. UNI
B. ANI
C. NNI
D. SNI
Answer: - Option B

3.Number of layer in NGN architecture are
A. 7
B. 6
C. 5
D. 4
Answer: - Option D

4.In NGN communication is possible
A. Within a city
B. Within a state
C. Within a country
D. Anywhere in world
Answer: - Option D

5.Layers of NGN are
A. Access ,Transport, Control ,Service Layer
B. Physical , Data link, Network , Session Layer
C. Application , Session , Data link , Network, Transport, layer
D. Network , Application Layer
Answer: - Option A

6.In NGN CDF (Content Delivery Function) is a function of
A. Transport Stratum
B. Service Stratum
C. Transport and Service stratum
D. Not from above
Answer: - Option B

7.The wavelength range of the XG-PON1 downstream signal and the range of upstream signal on a single-fiber system are
A. Same
B. For downs stream signal wavelength is greater than that of upstream signal
C. For downs stream signal wavelength is lower than that of upstream signal
D. Depend on application it varies
Answer: - Option B

8.---------- multiplexing is used in 3G.
A. FDMA
B. CDMA
C. TDMA
D. Not From Above
Answer: - Option B

9.MPLS header length is a field of ---- bits.
A. 32
B. 24
C. 20
D. 8
Answer: - Option A

10.8000 frames/sec are transmitted in 125 µsec, in
A. STM-4
B. STM-64
C. STM-1
D. STM-256
Answer: - Option C

11.The use of EXP (Experimental) bits are
A. Quality of service
B. Avoid a packet being stuck in a routing loop
C. Receiving, transmitting a labeled packet on a data link.
D. Not from above
Answer: - Option A

12.The protection scheme in an OTN network is defined by
A. G 709
B. G 873.1
C. G 798
D. G 872
Answer: - Option B

13.SDH is ----------
A. Session layer Protocol
B. Transport layer Protocol
C. Service Protocol
D. Application Protocol
Answer: - Option B

14.Data speed in 5G is --------
A. More than 1Gbps
B. 64Kbps
C. 2 Mbps
D. 4 Kbps
Answer: - Option A

15.TTL in a MPLS label is
A. Transistor Transistor Logic
B. Time To Live
C. Technology Transfer Layer
D. Not from above
Answer: - Option B

16.NGN is a _____ Network.
A) Packet-based
B) Message-based
C) IP-based
D) Circuit –based
Answer: - Option A

17. In NGN ,the interface not supporting media interaction is____
A) UNI
B) NNI
C) SNI
D) ANI
Answer: - Option D

18. Pick the odd one out of the application of Next Generation Network
A) Emergency Calling Services
B) Intelligent Call Routing
C) Advanced Toll Free
D) ATM
Answer: - Option D

19. _____ Functions provide the connectivity for all components and physically separated units within the NGN.
A) Transport layer
B) service layer
C) Data link layer
D) Control layer
Answer: - Option A

20. Media Gateways are located in _____ of NGN.
A) Access Layer
B) Transport Layer
C) Control Layer
D) Service Layer
Answer: - Option A

21. _____supports services such as voice or video telephony subscribe and message.
A) Network components
B) Modem
C) PSTN/ISDN emulation service component
D) IP multimedia service component
Answer: - Option D

22._____ provides functions such as media conversion and echo control.
A) Trunk Media gateway
B)Access gateway
C)Signaling gateway
D)Border Gateway
Answer: - Option B

23.The _____ provides the signaling interface between the VoIP network and the PSTN signaling network
A)Signaling gateway
B)Access gateway
C)Border Gateway
D)Trunk Media gateway
Answer: - Option A

24.Pick the odd one out of the NGN Network components
A)Access gateway
B)PSTN
C) GSM
D)Trunk Media gateway
Answer: - Option C

25.Session Border Controller provides functions such as _____.
A) Network Address Translation and Firewall Traversal.
B) Call logic and call control functions
C)Packetisation, echo control
D)Announcements and tones, and collect user information.
Answer: - Option A

26.The radio spectrum is the part of the electromagnetic spectrum with frequencies from -----.
A) 87.5 to 108.0 MHz
B) 148.5 kHz–283.5 kHz
C)30 Hertz to 300 GHz.
D)1.711 MHz–30.0 MHz
Answer: - Option C

27.In licensed radio bands, _____ frequency range is between
840 MHz, 900MHz.
A) AM broadcast
B) FM broadcast
C) Television
D) Cellular phones
Answer: - Option D

28. The ultra-high frequency band of radio waves in the electromagnetic wave is used as in _____.
A) Commercial FM radio
B) Television
C) Cellular phone communication
D) Microwaves
Answer: - Option B

29.Industrial, Scientific, Medical type includes several medical monitors and other devices that operate in the _____.
A) 900-MHZ, 2.4-GHz
B) 500-MHZ, 2.4-MHz
C) 100-KHZ, 2.4 KHz
D)900-MHZ, 4.5-GHz
Answer: - Option A

30_____manages and sets standards with regard to the spectrum use.
A) Wi-Fi Alliance
B) European Telecommunications Standards Institute
C) Federal Communications Commission
D) WLAN Association
Answer: - Option C

31. Identify from the following unlicensed radio band application.
A) Commercial FM radio
B) Aeronautical navigation service
C) Television
D) Cellular phones
Answer: - Option B

32.In FTTH, following protocol is used for up streaming directions.
A) TDMA
B) CDMA
C) FDMA
D) PDMA
Answer: - Option A

33.In FTTH, telemedicine is ---------- service
A) Symmetric
B) Asymmetric
C) balanced
D) Unbalanced
Answer: - Option B

34. FTTx architecture can be applicable for --
A) Symmetric broadband
B) Asynchronous
C) Asymmetric broadband
D) point-to-point or point-to-multipoint
Answer: - Option D

35. The _____ would include the modulation schemes for both the upstream and downstream channels
A) Transmission Convergence layer
B) ATM layer
C) session layer
D) Physical Media Dependent layer
Answer: - Option D

36. FTTx network architecture uses --------medium between ONU and OLT.
A) Copper
B) Fiber
C) Glass
D) Metal
Answer: - Option D

37.OLT provides interface to-----
A) subscriber and the subscribed services.
B)Television to CD player
C) Waveguide to antenna
D) OTDR to waveguide
Answer: - Option A

38.In MPLS for TTL (Time to Live) the Number of bits used are _____
A) 20
B) 3
C) 1
D) 8
Answer: - Option A

39. In MPLS Network, at the first Edge LSR, label is added to the packet. This process is called____
A) PUSH
B) POP
C) SWAP
D) XCH
Answer: - Option A

40. MPLS technology efficiently supports to-
A) Network services
B) IP Based services
C) Circuit based services
D) Packet-based services
Answer: - Option D

41.The software substituted for hardware and stored in ROM.
a) Synchronous Software
b) Package Software
c) Firmware
d) Middleware
Answer: c
Explanation: Software refers to a collection of programs. Firm wares act as a link between the hardware and the system. It is stored in read only memory.

42.Middleware has enabled the production of various types of smart machines having microprocessor chips with embedded software.
a) True
b) False
Answer: b
Explanation: The statement is false. Firmware is designed for this purpose and not middleware. A middleware is for providing abstraction in programming.

43. A “glue” between client and server parts of application.
a) Middleware
b) Firmware
c) Package
d) System Software
Answer: a
Explanation: A middleware acts as a glue between client and server parts of application. It provides programming abstraction which means hiding all the relevant details.

44. MOM stands for?
a) Message oriented middleware
b) Mails oriented middleware
c) Middleware of messages
d) Main object middleware
Answer: a
Explanation: MOM is message-oriented middleware. It is basically responsible for sending and receiving messages across distributed systems.

45. Storage of firmware is _____
a) Cache Memory
b) RAM
c) External
d) ROM
Answer: d
Explanation: Firmware is stored in ROM which is the read only memory. Firmware basically acts as a link between the hardware and the system.

46. DNS stands for?
a) Domain Name System
b) Direct Name System
c) Direct Network System
d) Domain Network System
Answer: a
Explanation: DNS stands for Domain Name System. Domain name system is the way in which the internet domain names are traced and then translated into IP addresses.

47. A software that lies between the OS and the applications running on it.
a) Firmware
b) Middleware
c) Utility Software
d) Application Software
Answer: b
Explanation: It is called as middleware. Middleware enables the interaction between the Operating System and the applications running on it.

48. A type of middleware that allows for between the built-in applications and the real-time OS?
a) Firmware
b) Database middleware
c) Portals
d) Embedded Middleware
Answer: d
Explanation: It is called the embedded middleware since it activates the communication link between the built-in applications and the real time operating system.

49. What is the other name for object middleware?
a) Object request interface
b) Object enabled interface
c) Object Request broker
d) Object enabled broker
Answer: c
Explanation: It is also called as object request broker. It gives the applications ability to send the objects and receive services through an object.

50. The _____ calls certain procedures on remote systems and is used to perform synchronous or asynchronous interactions between systems.
a) Procedure
b) RPC
c) Message Oriented
d) DB
Answer: b
Explanation: It is called the RPC or the Remote Procedure Call. The functioning is to call certain procedures on remote applications. This is generally utilized in a software application.

51. What is the name of the web browsing format language supported by 2.5G technology?
a) Wireless Application Protocol
b) Hypertext Markup Language
c) Extensible Markup Language
d) Hypertext Transfer Protocol
Answer: a
Explanation: 2.5G technology supports a new web browsing format language, which is called Wireless Application Protocol (WAP). It allows standard web pages to be viewed in a compressed format specifically designed for small, portable hand held wireless devices.

52. What is the name of the internet microbrowser technology used by NTT DoCoMo in Japan?
a) Wireless Application Protocol
b) I-mode
c).W-mode
d) Hypertext Markup Language
Answer: b
Explanation: I-mode is a wireless data service and Internet microbrowser technology introduced by NTT DoCoMo on its PDC network in 1998. It is currently used by other wireless services throughout the world.

53. 2.5G upgrade path for a particular wireless carrier does not match the original 2G technology choice made earlier by the same carrier.
a) True
b) False
Answer: b
Explanation: As 2.5G is the upgradation of 2G technology, 2.5G upgradation path must match the original 2G technology. For example, 2.5G upgrade solution designed for GSM must dovetail with original GSM interface so that change of hardware is not required.

54. Which of the following is not a TDMA standard of 2.5G network?
a) HSCSD
b) GPRS
c) EDGE
d) GSM
Answer: d
Explanation: GSM (Global System for Mobile) is a TDMA standard for 2G network. HSCSD (High Speed Circuit Switched Data), GPRS (General Packet Radio Service) and EDGE (Enhanced Data rates for GSM Evolution) are TDMA standards of 2.5G technology.

55. Which of the following is a 2.5G CDMA standard?
a) IS-95
b) Cdma2000
c) IS-95B
d) CdmaOne
Answer: c
Explanation: IS-95B (Interim Standard 95B) is code division multiple access standard for 2.5G. It is an upgradation of IS- 95 which is a second generation standard of CDMA.

56. HSCSD supports which 2G standard?
a) GSM
b) IS-136
c) GSM and IS-136
d) PDC
Answer: a
Explanation: High Speed Circuit Switched Data (HSCDC) supports the Global system for Mobile (GSM) standard. It only requires a software upgrade at the base station.

57. How does HSCSD differs from the GSM to obtain higher speed data rate?
a) By allowing single user to use one specific time slot
b) By allowing single user to use consecutive user time slots
c) By using 8-PSK modulation technique
d) By allowing multiple users to use individual time slot
Answer: b
Explanation: HSCSD allows individual data users to use consecutive time slots in order to obtain higher speed data access on the GSM network. In case of GSM, it limits each user to use only one specific time slot.

58. GPRS and EDGE supports which 2G standard?
a) GSM only
b) IS-136 only
c) GSM and IS-136 both
d) PDC
Answer: c
Explanation: GPRS (General Packet Radio Service) network provides a packet network on dedicated GSM or IS-136 radio channels. EDGE (Enhanced Data rates for GSM Evolution) is also developed keeping in desire both GSM and IS-136 operators.

59. How is HSCSD different from GPRS?
a) Infrastructure
b) Multiple Access Scheme
c) Modulation technique
d) Switching Technique
Answer: d
Explanation: GPRS is a packet based network. HSCSD dedicates circuit switched channels to specific users whereas GPRS supports many more users, but in a bursty manner.

60. What changes GPRS need to acquire while upgrading itself from GSM?
a) A whole new base station
b) New transceiver at base station
c) New channel cards
d) New packet overlay including routers and gateways
Answer: d
Explanation: GPRS requires a GSM operator to install new routers and Internet gateways at the base station along with new software upgrade. New base station RF hardware is not required.

61. Which new modulation technique is used by EDGE?
a) BPSK
b) 8- PSK
c) DQPSK
d) AFSK
Answer: b
Explanation: EDGE uses a new digital modulation format, 8- PSK (Octal Phase Shift Keying). It is used in addition to GSM's standard GMSK (Gaussian Minimum Shift Keying) modulation.

62. Various air interface formats used by EDGE are also known as _____
a) Modulation and coding schemes
b) Coding schemes
c) Modulating air interface
d) Air interface coding schemes
Answer: a
Explanation: EDGE allows nine different air interface formats known as multiple modulation and coding schemes (MCS). Each MCS state may use either GMSK or 8- PSK modulation for network access, depending upon the instantaneous demands of the network and the operating conditions.

63. EDGE is sometimes also referred as _____
a) HSCSD
b) 3GPP
c) EGPRS
d) EGSCSD
Answer: c
Explanation: EDGE is sometimes also referred as Enhanced GPRS (EGPRS). It is an enhancement of a GSM network in which EDGE is introduced on top of the General Packet Radio Service (GPRS). It is used to transfer data in a packet switched mode on various time slots.

64. What is one disadvantage of EDGE in comparison to HSCSD and GPRS?
a) Low data rates
b) Small coverage range
c) Low speed
d) No advancement
Answer: b
Explanation: Because of the higher data rates and relaxed error control covering in many of the selectable air interface formats, the coverage range is smaller in EDGE than in HSCSD or GPRS.

65. Which of the following is not a characteristic of 3G network?
a) Communication over VoIP
b) Unparalleled network capacity
c) Multi-megabit Internet access
d) LTE based network
Answer: d
Explanation: Multi-megabit Internet access, communication using Voice over internet Protocol (VoIP), voice activated calls, unparalleled network capacity are some of the characteristics of 3G network. 3G systems promise unparalleled wireless access which is not possible in 2G systems. LTE (Long term Evolution) is a standard of 4G systems.

66. What is the term used by ITU for a set of global standards of 3G systems?
a) IMT 2000
b) GSM
c) CDMA
d) EDGE
Answer: a
Explanation: International Telecommunications Union (ITU) used the term IMT-2000 in 1998. It is used for a set of global standards for third generation (3G) mobile telecoms services and equipment.

67. Which of the following leads to evolution of 3G networks in CDMA systems?
a) IS-95
b) IS-95B
c) CdmaOne
d) Cdma2000
Answer: d
Explanation: 3G evolution of CDMA system leads to cdma2000. It is based on the fundamentals of IS-95 and IS-95B. IS-95 is a 2G standard for CDMA systems. IS-95B is a CDMA system for 2.5G networks.

68. Which of the following leads to the 3G evolution of GSM, IS-136 and PDC systems?
a) W-CDMA
b) GPRS
c) EDGE
d) HSCSD
Answer: a
Explanation: The 3G evolution for GSM, IS-136 and PDC systems leads to W-CDMA (Wideband CDMA). It is based on the network fundamentals of GSM, as well as merged versions of GSM and IS-136 through EDGE. GPRS, EDGE and HSCSD are 2.5G networks.

69. What is 3GPP?
a) Project based on W-CDMA
b) Project based on cdma2000
c) Project based on 2G standards
d) Project based on 2.5G standards
Answer: a
Explanation: 3GPP is a 3G Partnership Project for Wideband CDMA standards based on backward compatibility with GSM and IS-136. The project was established in December 1998. Its initial scope was to make a globally applicable third generation mobile phone system.

70. What is 3GPP2?
a) Project based on W-CDMA
b) Project based on cdma2000
c) Project based on 2G standards
d) Project based on 2.5G standards
Answer: b
Explanation: 3GPP2 is a 3G Partnership Project for Cdma2000 standards based on backward compatibility with earlier CdmaOne 2G CDMA technology. It was initiated by IMT-2000 to cover high speed, broadband and Internet Protocol (IP) based mobile systems. It mainly focuses on North American and Asian regions.

71. Which of the following is not a standard of 3G?
a) UMTS
b) Cdma2000
c) TD-SCDMA
d) LTE
Answer: d
Explanation: UMTS (Universal Mobile Telecommunication System), TD-SCDMA (Time Division Synchronous Code Division Multiple Access), Cdma2000 are the standards defined for 3G networks. LTE (Long Term Evolution) is a 4G standard for high speed wireless communication.

72. Which of the following 3G standard is used in Japan?
a) Cdma2000
b) TD-SCDMA
c) UMTS
d) UTRA
Answer: c
Explanation: Japan uses UMTS (W-CDMA) standard for its 3G network. The standards used are UMTS 800, UMTS 900, UMTS 1500, UMTS 1700 and UMTS 2100. They are standardized by ARIB (Association of Radio industries and Business).

73. What does the number 2000 in IMT-2000 signifies?
a) Year
b) Number of subscribers per cell
c) Number of cells
d) Area (Km)
Answer: a
Explanation: The International Telecommunication Union (ITU) defined the third generation (3G) of mobile telephony standards, IMT-2000 to facilitate growth, increase bandwidth, and support more diverse applications. The number 2000 in IMT-2000 indicates the start of the system (year 2000) and the spectrum used (around 2000 MHz).

74. Which of the following is not an application of third generation network?
a) Global Positioning System (GPS)
b) Video conferencing
c) Mobile TV
d) Downloading rate upto 1 Gbps
Answer: d
Explanation: 3G applications include GPS (Global Positioning System), MMS (Multimedia Messaging System), video conferencing, location based services, video on demand, wireless voice telephony and high

data rates with peak downloading rate of 100 Mbps. For 4G networks, the peak downloading rate is 1 Gbps.

75. Which type of cell provides the best level of service for average subscribers?
a) Acceptance cell
b) Barred cell
c) Reserved cell
d) Suitable cell
Answer: d
Explanation: A suitable cell is a cell on which the UE may camp on to obtain normal service. The UE shall have a valid USIM and such a cell shall fulfil all the following requirements. It provides the best level of service for average subscribers.

76. With the normal cyclic prefix, how many symbols are contained in 1 frame?
a) 7
b) 140
c) 12
d) 40
Answer: b
Explanation: There are two different type of Cyclic Prefix. One is normal Cyclic Prefix and the other is 'Extended Cyclic Prefix' which is longer than the Normal Cyclic Prefix. Normal cyclic prefix contains 140 symbols in 1 frame

77. What is the PBCH scrambled with?
a) Current frame number
b) Physical cell ID
c) UE's CRNTI
d) Not scrambled
Answer: b
Explanation: The PBCH is scrambled prior to modulation with a cell-specific sequence that depends on the cells' identity. In contrast to the synchronization signals, the PBCH is transmitted on the 72 reserved subcarriers, which are QPSK-modulated.

78. What is the length of the shortest possible PDCCH in bits?
a) 144
b) 288
c) 72
d) 576
Answer: c
Explanation: PDCCH is a physical channel that carries downlink control information (DCI). Shortest possible PDCCH is 72 bits.

79. What is the average uploading speed of 4G LTE network?
a) 1-3 Gbps
b) 2-5 Gbps
c) 1-3 Mbps
d) 2-5 Mbps
Answer: d
Explanation: Verizon 4G LTE wireless broadband is 10 times faster than 3G able to handle download speeds between 5 and 12 Mbps (Megabits per second) and upload speeds between 2 and 5 Mbps.

80. Which of the following is not a part of the characteristic of 4G network?
a) Multirate management
b) Fully converged services
c) Software dependency
d) Diverse user devices
Answer: a
Explanation: 4G is the fourth generation of broadband cellular network technology, succeeding 3G. Its characteristics include fully converged services, software dependency and diverse user devices.

81. What does SGSN stands for?
a) Serving GPRS Support Node
b) Supporting GGSN Support Node
c) Supporting GPRS Support Node
d) Supporting Gateway Support Node
Answer: a
Explanation: The Serving GPRS Support Node (SGSN) is a main component of the GPRS network, which handles all packet switched data within the network, e.g. the mobility management and authentication of the users. The SGSN performs the same functions as the MSC for voice traffic.

82. What location management feature is supported by 4G?
a) Concatenated Location Registration
b) Concurrent Location Register
c) Concatenated Management
d) Collated Location Registration
Answer: a
Explanation: 4G supports concatenated location registration. Concatenated location registration reports to the network that they are concatenated to a common object.

83. In 2007 _____ announced its plan to transmit its network to 4G standard LTE with joint efforts of Vodafone group.
a) Verizon Wireless
b) AirTouch
c) Netflix
d) V Cast
Answer: a
Explanation: In 2007, Verizon announced plans to develop and deploy its fourth generation mobile broadband network using LTE, the technology developed within the Third Generation Partnership Project (3GPP) standards organization.

84. Hybrid ARQ is part of the _____ layer.
a) PDCP
b) RLC
c) MAC
d) PHY
Answer: c
Explanation: Hybrid automatic repeat request (hybrid ARQ or HARQ) is a combination of high-rate forward error-correcting coding and ARQ error-control. It is part of the MAC layer.

85. Multiple access schemes are used to allow _____ mobile users to share simultaneously a finite amount of radio spectrum.
a) Many
b) One
c) Two
d) Ten-Fifteen
Answer: a
Explanation: Multiple access schemes are used to allow many mobile users to share simultaneously a finite amount of radio spectrum. The sharing of spectrum is required to achieve high capacity by simultaneously allocating the available bandwidth to multiple users.

86. The technique that makes possible the task of listening and talking in communication system is called _____
a) Simplexing
b) Duplexing
c) Modulating
d) Multiple access technique
Answer: b
Explanation: In conventional telephone systems, it is possible to talk and listen simultaneously. This effect is called duplexing and is generally required in wireless telephone systems.

87. Frequency division duplexing provides _____ distinct bands of frequencies for _____ user.
a) Two, two
b) One, two
c) Two, one
d) Two, many
Answer: c
Explanation: Frequency division duplexing (FDD) provides two distinct bands of frequencies for every user. In FDD, any duplex channel actually consists of two simplex channels.

88. The forward band in FDD provides traffic from the mobile to base station.
a) True
b) False
Answer: b
Explanation: The forward band in FDD provides traffic from the base station to the mobile. The reverse band provides traffic from the mobile to the base station.

89. The frequency separation between each forward and reverse channel changes throughout the system.
a) True
b) False
Answer: b
Explanation:The frequency separation between each forward and reverse channel is constant throughout the system. It is regardless of the particular channel being used. A device called a duplexer is used inside each subscriber unit and base station to allow simultaneous bidirectional radio transmission.

90. Time division duplexing uses _____ to provide both a forward and reverse link.
a) Frequency
b) Time
c) Time and frequency
d) Cell spacing
Answer: b
Explanation: Time division duplexing (TDD) uses time instead of frequency to provide both a forward and reverse link. In TDD, multiple users share a single radio channel by taking turns in the time domain.

91. TDD is effective for _____
a) Fixed wireless access and users are stationary
b) Dynamic wireless access and users are stationary
c) Fixed wireless access and users are moving
d) Dynamic wireless access and users are moving
Answer: a
Explanation: TDD is effective for fixed wireless access when all users are stationary. This makes the propagation delay does not vary in time among the users. Because of rigid timing required for time slotting, TDD generally is limited to cordless phone or short range potable access.

92. In wideband systems, the transmission bandwidth of a single channel _____ coherence bandwidth of the channel.
a) Equal to
b) Not related to
c) Larger than
d) Smaller than
Answer: c
Explanation: In wideband systems, the transmission bandwidth of a single channel is much larger than the coherence bandwidth of the channel. Thus, multipath fading does not greatly vary the received signal power within a wideband channel.

93. In narrowband system, the channels are usually operated using TDD.
a) True
b) False
Answer: b
Explanation: In narrowband system, channels are usually operated using FDD. To minimize interference between forward and reverse links on each channel, the frequency separation is made as great as possible within the frequency spectrum.

94. Narrowband FDMA allows users to share the same radio channel allocating a unique time slot to each user.
a) True
b) False
Answer: b
Explanation: In narrowband FDMA, a user is assigned a particular channel which is not shared by other users in the vicinity. However narrowband TDMA allows the users to share the same radio channel allocating a unique time slot to each user.

95. Which UE category supports 64 QAM on the uplink?
a) Only category 5
b) Only category 4
c) Only category 3
d) Category 3,4 and 5
Answer: a
Explanation: Category information is used to allow the eNB to communicate effectively with all the UEs connected to it. The UE-category defines a combined uplink and downlink capability. Only UE category 5 supports 64 QAM on the uplink.

96. What type of handovers is supported by LTE?
a) Hard handover only
b) Soft handover only
c) Hard and soft handover
d) Hard, soft and softest handover
Answer: a
Explanation: LTE supports only hard handover. It does not receive data from two frequencies at the same time because switching between different carrier frequencies is very fast so soft handover is not required.

97. What is the minimum amount of RF spectrum needed for an FDD LTE radio channel?
a) 1.4 MHz
b) 2.8 MHz
c) 5 MHz
d) 20 MHz
Answer: b
Explanation: In telecommunication, Long-Term Evolution (LTE) is a standard for high-speed wireless communication for mobile devices and data terminals, based on the GSM/EDGE and UMTS/HSPA technologies. The minimum amount of RF spectrum needed for an FDD LTE radio channel is 2.8 MHz.

98. Which organization is responsible for developing LTE standards?
a) UMTS
b) 3GPP
c) 3GPP2
d) ISO
Answer: b
Explanation: The 3rd Generation Partnership Project (3GPP) is a collaboration between groups of telecommunications standards associations, known as the Organizational Partners. LTE (Long Term Evolution) introduced in 3GPP R8, is the access part of the Evolved Packet System (EPS).

99. Which channel indicates the number of symbols used by the PDCCH?
a) PHICH
b) PDCCH
c) PBCH
d) PCFICH
Answer: d
Explanation: PCFIH channel indicates the number of symbols used by the PDCCH. The actual number of OFDM symbols occupied in any given subframe is indicated in the PCFICH (Physical Control Format Indicator Channel), which is located in the first OFDM symbol of each subframe.

100. How often can resources be allocated to the UE?
a) Every symbol
b) Every slot
c) Every subframe
d) Every frame
Answer: c
Explanation: Resources can be located to the UE every subframe. CCE Index is the CCE number at which the control channel data (PDCCH) is allocated. Normally this index changes for each subframe, i.e. even the same PDCCH data (e.g, a PDCCH for the same UE) allocated in each subframe changes subframe by subframe.

101. What is the largest channel bandwidth a UE is required to support in LTE?
a) 10 MHz
b) 20 MHz
c) 1.4 MHz
d) 5 MHz
Answer: b
Explanation: The LTE format was first proposed by NTT DoCoMo of Japan and has been adopted as the international standard. LTE-Advanced accommodates the geographically available spectrum for channels above 20 MHz.

102. In LTE, what is the benefit of PAPR reduction in the uplink?
a) Improved uplink coverage
b) Lower UE power consumption
c) Reduced equalizer complexity
d) Improved uplink coverage, lower UE power consumption and reduced equalizer
Answer: d
Explanation: PAPR is the relation between the maximum power of a sample in a given OFDM transmit symbol divided by the average power of that OFDM symbol. PAPR reduction in the uplink leads to improved uplink coverage, lower UE power consumption and reduced equalizer complexity.

103. Which RLC mode adds the least amount of delay to user traffic?
a) Unacknowledged mode (UM)
b) Acknowledged mode (AM)
c) Low latency mode (LM)
d) Transparent mode (TM)
Answer: d
Explanation: The transparent mode entity in RLC does not add any overhead to the upper layer SDUs. The entity just transmits the SDUs coming from upper layer to MAC.

104. How much bandwidth is required to transmit the primary and secondary synchronization signals?
a) 1.08 MHz
b) 1.4 MHz
c) 930 kHz
d) 20 MHz
Answer: a
Explanation: Cell synchronization is the very first step when UE wants to camp on any cell. 1.08 MHZ is required to transmit the primary and secondary synchronization signals.

105. _____ is responsible for tunneling multicast packets to the MS's currently subscribed FA.
a) Multicast home agent
b) Mobile multicast
c) Mobile station
d) Base station
Answer: a
Explanation: Multicast home agent (MHA) is responsible for tunneling multicast packets to the MS's currently subscribed FA. MHA serves MSs that are roaming around the foreign networks and are within its service range.

106. Every MS can have only one MHA.
a) True
b) False
Answer: a
Explanation: Every MS can have only one MHA, which dynamically changes based on the location of the MS, whereas a HA of an MS never changes. The protocol requires that each MHA must be a multicast group member.

107. _____ provides a fast and efficient handoff for MSs in foreign networks.
a) MHA
b) MMP
c) CBT
d) MS
Answer: b
Explanation: MMP provides a fast and efficient handoff for MSs in foreign networks. It also enables location-independent addressing.

108. MMP combines the concepts of _____ and _____
a) Mobile IPs, GSM
b) Core based trees, GSM
c) Mobile IPs, core based trees
d) Core based trees, LTE
Answer: c
Explanation: MMP combines the concepts of Mobile IP and core-based trees (CBT). Here the former controls communication up to the foreign network, and the latter manages movement of the MSs inside them.

109. _____ designed for an Internet work environment with small wireless cells.
a) MMP
b) RMDP
c) RM2
d) Mobicast
Answer: d
Explanation: Mobicast is designed for an Internet work environment with small wireless cells. It assumes that a set of cells are grouped together and are served by a domain foreign agent (DFA).

110. _____ serve as multicast forwarding agents and are meant to isolate the mobility of the mobile host from the main multicast delivery tree.
a) DFA
b) MHA
c) FA
d) MMP
Answer: a
Explanation: DFAs serve as multicast forwarding agents and are meant to isolate the mobility of the mobile host from the main multicast delivery tree. This hierarchical mobility management approach tries to isolate the mobility of the FAs from the main multicast delivery tree.

111. Mobicast is based on a method proposed by the IETF to support multicast over Mobile-IP.
a) True
b) False
Answer: a
Explanation: Mobicast is based on a method proposed by the IETF to support multicast over Mobile-IP. To handle the case when an MS is both the source and recipient of a multicast session, one needs to minimize the possibility of rebuilding the complete multicast tree at each foreign domain the MS visits.

112. _____ is meant to be implemented for use on the MBONE.
a) MMP
b) RMDP
c) RM2
d) Mobicast
Answer: b
Explanation: The reliable multicast data distribution protocol (RMDP) is meant to be implemented for use on the MBONE. It relies on the use of FEC and ARQ information to provide reliable multicast service.

113. _____ is a reliable multicast protocol and is used for both wired and wireless environments.
a) MMP
b) RMDP
c) RM2
d) Mobicast
Answer: c
Explanation: Reliable mobile multicast (RM2) is a reliable multicast protocol and is used for both wired and wireless environments. RM2 guarantees sequential packet delivery to all its multicast members without any packet loss.

114. _____ relies on IGMP.
a) MMP
b) RMDP
c) RM2
d) Mobicast
Answer: c
Explanation: RM2 relies on the Internet group management protocol (IGMP) to manage multicast group membership. RM2 is a hierarchical protocol that divides a multicast tree into subtrees, whereby subcasting within these smaller regions is applied using a tree of retransmission servers.

115. Each stage of information transfer is required to follow the fundamentals of _____
a) Optical interconnection
b) Optical hibernation
c) Optical networking
d) Optical regeneration
Answer: c
Explanation: Optical networking uses optical fiber as a transmission medium. It provides a connection between users to enable them to communicate with each other by transporting information from a source to a destination.

116. _____ is a multi-functional element of optical network.
a) Hop
b) Optical node
c) Wavelength
d) Optical attenuation
Answer: b
Explanation: An optical node is a multi-functional element which acts as a transceiver unit capable of receiving, transmitting and processing the optical signal. The optical nodes are interconnected with optical fiber links.

117. A signal carried on a dedicated wavelength from source to destination node is known as a _____
a) Light path
b) Light wave
c) Light node
d) Light source
Answer: a
Explanation: A light path is a dedicated path from a source to a destination. The data can be sent over the light paths as soon as connections are set up. A controlling mechanism is present to control the data flow.

118. The fundamentals of optical networking are divided into _____ areas.
a) Two
b) One
c) Four
d) Three
Answer: d
Explanation: The fundamentals divided into three areas contain mainly optical network terminology. The other two areas include functions and types of optical network node and switching elements and the wavelength division multiplexed optical networks.

119. The optical networking fundamentals are _____ of the transmission techniques.
a) Dependent
b) Independent
c) Similar
d) Dissimilar
Answer: b
Explanation: The optical networking fundamentals include transfer of data. Irrespective of the difference in the transmission techniques, the fiber networking fundamentals remain the same.

120. The network structure formed due to the interconnectivity patterns is known as a _____
a) Network
b) Struck
c) Topology
d) D-pattern
Answer: c
Explanation: A topology is a combination of patterns interconnected to each other. It provides connection patterns to users at different places. It embarks on the principle of multi-usability.

121. In the _____ topology, the data generally circulates bi-directionally.
a) Mesh
b) Bus
c) Star
d) Ring
Answer: b
Explanation: In a bus topology, data is input via four port couplers. The couplers couples and stations the data bi-directionally and are removed from the same ports.

122. The ring and star topologies are combined in a _____ configuration.
a) Mesh
b) Fringe
c) Data
d) Singular
Answer: a
Explanation: The mesh configuration is a combination of ring and star topologies. It is referred to as full-mesh when each network node is interconnected with all nodes in the network.

123. The full-mesh configuration is complex.
a) False
b) True
Answer: b
Explanation: The full-mesh topology is a combination of two or more topologies. It is often preferred for the provision of either a logical or virtual topology due to its high flexibility and interconnectivity features.

124. How many networking modes are available to establish a transmission path?
a) Three
b) One
c) Two
d) Four
Answer: c
Explanation: There are two networking modes often referred to the networking. These are connection-oriented and connectionless networking modes. These include an end-to-end and bidirectional communication environment between source and destination.

125. Packet switching is also called as _____
a) Frame switching
b) Cell switching
c) Trans-switching
d) Buffer switching
Answer: b
Explanation: In packet or cell switching, messages are sent in small packets called cells. Cells from different sources are statistically multiplexed and are sent to the destinations.

126. _____ mode is temporary, selective and continuous.
a) Cell switching
b) Buffer switching
c) Cache
d) Circuit switching
Answer: d
Explanation: An end-to-end connection is required for a circuit switching to take place. The transmissions are continuous and are in real time. Once the transmission is complete, the connection is ended.

127. A _____ is a series of logical connections between the source and destination nodes.
a) Cell circuit
b) Attenuation circuit
c) Virtual circuit
d) Switched network
Answer: c
Explanation: A virtual circuit consists of different routes which provide connections between sending and receiving devices. These routes can change at any time and the incoming return route does not have to mirror the outgoing route.

128. _____ refers to the process whereby a node finds one or more paths to possible destinations in a network.
a) Routing
b) Framing
c) Lightning
d) Cloning
Answer: a
Explanation: Routing refers to the path finding process in a network. In this, the control and data functions are performed to identify the route and to handle the data during the journey from source to destination.

129. How many stages are possessed by the control plane?
a) Two
b) Three
c) Four
d) Five
Answer: b
Explanation: The routing process called as control plane has three stages. These are neighbor discovery, topology discovery and path selection. These stages enable the network in routing mechanisms efficiently.

130. Optical switching can be classified into _____ categories.
a) Two
b) Three
c) Four
d) One
Answer: a
Explanation: Optical switching is classified into two categories same as that of electronic switching. The two categories are circuit switching and packet switching.

131. _____ are the array of switches which forms circuit switching fabrics.
a) Packet arrays
b) Optical cross connects
c) Circuit arrays
d) Optical networks
Answer: b
Explanation: Optical cross-connects incorporate switching connections or light paths. These larger arrays can switch signals from one port to another.

132. _____ is an example of a static circuit-switched network.
a) OXC
b) Circuit regenerator
c) Packet resolver
d) SDH/SONET
Answer: d
Explanation: The circuit is said to be static when the network resources remain dedicated to the circuit connection. This should be followed during the entire transfer and the complete message follows the same path.

133. What is the main disadvantage of OCS?
a) Regenerating mechanism
b) Optical session
c) Time permit
d) Disability to handle burst traffic
Answer: d
Explanation: In traffic conditions, data is sent in the form of bursts of different lengths. Thus, the resources cannot be readily assigned. The OCS cannot efficiently handle burst traffic.

134. Optical electro-conversions takes place in _____ networks.
a) Sessional
b) Optical packet-switched
c) Optical circuit-switched
d) Circular
Answer: c
Explanation: In an optical packet-switched network, data is transported in the optical domain. This is done without intermediate optic-electrical conversions. Optical electro-conversions takes place in circuit-switched networks.

135. How many functions are performed by an optical packet switch?
a) Four
b) Three
c) Two
d) One
Answer: a
Explanation: An optical packet switch performs four basic functions. These include routing, forwarding, switching and buffering.

136. _____ provides data storage for packets to resolve contention problems.
a) Switching
b) Routing
c) Buffering
d) Reversing
Answer: c
Explanation: Switching involves directing the packets. Routing provides network connectivity while forwarding and reversing involves defining a packet. Buffering usually provides data storage for packets.

137. What is usually required by a packet to ensure that the data is not overwritten?
a) Header
b) Footer
c) Guard band
d) Payload
Answer: c
Explanation: A packet consists of a header and the payload. The label points to an entry in the lookup table. A guard band is usually included to ensure the data is not overwritten.

138. Routing technique is faster than the labeling technique. State whether the given statement is true or false.
a) False
b) True
Answer: a
Explanation: Labeling suggests where the packet should be directed. Routing routes the data in the given direction. Thus, labeling technique is efficient and faster than the routing technique.

139. _____ provides efficient designation, routing, forwarding, switching of traffic through an optical packet-switched network.
a) Label correlation
b) Multiprotocol label switching
c) Optical correlation
d) Routing
Answer: b
Explanation: Multiprotocol label switching (MPLS) was first proposed by CISCO systems. Earlier, it was called as tag switching. MPLS uses labels to forward, switch, designate the traffic.

140. MPLS is independent of layer 2 and 3 in the OSI model. State whether the given statement is true or false.
a) True
b) False Answer: a
Explanation: MPLS is flexible in the current protocol landscape. It supports Ethernet, frame relay as a data link layer but is independent of layer 2 and 3 in the OSI model.

141. Which of the following service is provided by Multiprotocol label switching (MPLS)?
a) Data forwarding
b) Routing
c) VPN's
d) Switching
Answer: c
Explanation: One of the important services provided by MPLS is IP virtual private networks. All others are provided by packet switched networks. These VPN's provide a secure, dedicated wide area network (WAN) in order to connect the offices all over the world.

142. Burst header cell is also known as _____
a) Burst channel
b) Burst header circuit
c) Burst regenerator
d) Burst header packet
Answer: d
Explanation: Burst header cell consists of information regarding switching and destination address. It works with the use of transmission units called as data bursts.

143. What is the exception in the similarities between the optical Ethernet and the Ethernet LAN?
a) Physical layer
b) Data-link layer
c) Refractive index
d) Attenuation mechanism
Answer: a
Explanation: Optical Ethernet is similar to the conventional Ethernet LAN with the exception of the physical layer. Physical layer includes the flow of data in the form of binary digits. This transmission takes place on the bit level.

144. Which technology is used by optical Ethernet?
a) GP-technology
b) HJ-technology
c) IP-technology
d) GB-technology
Answer: c
Explanation: Optical Ethernet is the fourth generation of the Ethernet family. The earlier generations include X.25, Frame Relay and ATM. Unlike these technologies, optical Ethernet uses IP-based technology.

145. When was the Gigabit Ethernet network developed?
a) 1977
b) 1988
c) 1990
d) 2002
Answer: b
Explanation: The Gigabit Ethernet (Gbe) network was developed in 1988. It was developed by merging two technologies namely 802.3 Ethernet and ANSI X3T11 fiber channel.

146. Optical Ethernet can operate at the transmission rates as low as _____
a) 10 M bits per second
b) 40 M bits per second
c) 100 M bits per second
d) 1000 M bits per second
Answer: a
Explanation: Usually, high transmission rates define optical Ethernet. The ITU-T Recommendation specifies the physical layer for optical Ethernet. It can operate at transmission rates as low as 10 M bits per second.

147. How many types of optical Ethernet connections are developed?
a) Two
b) One
c) Four
d) Three
Answer: d
Explanation: There are three different types of optical Ethernet connections. They are point-to-point, point-to-multipoint, and multipoint-to-multipoint. Multipoint refers to more number of connections on either side.

148. Which type of connection can be used as an Ethernet switch?
a) Point-to-point
b) Multipoint-to-multipoint
c) Multipoint-to-point
d) Point-to-multipoint
Answer: b
Explanation: The multipoint-to-multipoint configuration refers to the bus, tree or mesh topology. Such a mesh can be made to work as a switching hub with non-blocking switching features. It facilitates switching between different optical Ethernet users.

149. How many aspects are included in the standard Ethernet protocol?
a) One
b) Two
c) Four
d) Three
Answer: c
Explanation: Optical Ethernet follows standard Ethernet protocol. This protocol includes four different aspects: Frame, MAC, signaling components and the physical medium.

150. Which of the following is not included in the Ethernet frame format?
a) MAC
b) Preamble
c) Destination address
d) Source address
Answer: a
Explanation: The Ethernet frame format includes preamble, destination and source addresses, length, data and the check sequence. MAC is the protocol which is used for sharing the network nodes.

151. The _____ provides point-to-point access to a bidirectional single-mode optical fiber.
a) Optical regenerator

b) Optical session
c) Optical distribution node
d) Optical buffer
Answer: c
Explanation: The ODN is abbreviated as Optical distribution node. It can access an optical fiber on a point-to-point basis. Thus, a single mode bidirectional optical fiber can be accessed by an Optical distribution node.

152. _____ is the de-multiplexing technique used to split SONET bandwidth into logical groups.
a) SDH
b) Virtual concatenation
c) STS-1
d) Optical breakdown
Answer: b
Explanation: Virtual concatenation (VC) is basically a splitting technique. It can split the SONET bandwidth into groups. These groups may be transported or routed independently.

153. Ethernet switches support multiprotocol label switching.
a) True
b) False
Answer: a
Explanation: Ethernet switches support multiprotocol label switching. This feature is desired mainly in MAN. The use of such switches in LAN exceeds the network capabilities.

154. Length field in MAC frame ensures that the frame signals stay on the network in order to detect the frame within the correct time limit.
a) True
b) False
Answer: b
Explanation: MAC frame includes Length field to identify the type or length of the network protocols. The data field is used to ensure that the frame signals stay on the network long enough to detect the frame within the desired limit.

155. The _____ protocol is not used when the Ethernet connections are configured for a full duplex operation.
a) TCP/IP
b) MAC
c) CSMA/CD
d) DTH
Answer: c
Explanation: In Ethernet connections, the full-duplex operation situation may lead to an increased frame dropping rate. The dropped frame cannot be detected without collision. Thus, CSMA protocol is not used in full duplex mode.

156. Optical Ethernet provides switching capabilities in layers _____
a) 1 and 2
b) 2 and 3

c) 3 and 4
d) 1 and 4
Answer: b
Explanation: Layer 2 and 3 are data link and network layers. IP routing is usually considered to be ⅔ switched network. Thus, unlike conventional LAN, optical Ethernet provides switching capabilities between layers 2 and 3.

157. The _____ approach can provide interconnection among multiple site locations within 40 km range.
a) 3 Gbe
b) 5 Gbe
c) 1 Gbe
d) 10 Gbe
Answer: d
Explanation: The 10Gbe approach uses a 40 km window range. It can be used in LAN's and MAN. It provides switch-to-switch network within data centers.

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4.Digital Factory	Marks:-16

Content of Chapter:-

4.1 Internet of Things IoT:
Introduction, principles and features of Cyber Physical system Components [Sensors, Edge-Gateways, Cloud].

4.2 Architectures [Sensor to cloud various data routes: sensor - PLC - SCADA -cloud, sensor-server-cloud, sensor-edge gateway-cloud], Applications in Automotive/ Discrete Manufacturing; Telecom Industry; Agro Industries

4.3 14.0/1IoT/ Smart Manufacturing:Introduction/ Evolution from 11.0 to 14.0,Applications and benefits of 14.0, Compare 13.0 with 14.0, Architecture of 14.0

1.Agriculture IoT stick is smart gadget work on principle of
A. Plug & sense
B. Plug and play
C. Plug and work
D. Plug and socket
Answer: - Option A

2.Vehicle communication, driver less car, connected cars are the example of IoT in
A. Agriculture
B. Electronics
C. Automotive
D. Discrete Manufacturing
Answer: - Option A

3.Real time driver monitor system to detect monitor fatigue level of driver using IoT in automotive includes
A. Sensors to detect eye blinks, gas, impact sensors and alcohol detecting sensors
B. Sensors for GPS
C. Fluid level sensors
D. RFID tags
Answer: - Option A

4.Movement of materials from suppliers to shop floor and throughout the assembly line can be tracked with the help of
A. GSM
B. GPS
C. Gyroscope
D. RFID
Answer: - Option A

5.Nut and Bolt manufacturing is an example of discrete manufacturing with
A. High complexity and low volume

B. Low complexity and high volume
C. Low complexity low volume
D. High complexity high volume
Answer: - Option A

6.The first revolution is about
A. Water and steam to mechanize production
B. Mass production Electronics & IT
C. Electric power
D. Mass Production
Answer: - Option A

7.Electrical power and locomotives are the inventions of
A. First revolution
B. Second revolution
C. Third Revolution
D. Fourth revolution
Answer: - Option A

8.What is an industrial revolution?
A. Significant change that affects a single industry only
B. New technologies and novel ways of perceiving the world that trigger a profound change in economic and social structures
C. An event that happened in a previous century and doesn't affect modern society
D. A series of technological advances that may or may not have a profound effect on societies
Answer: - Option A

9.Which series of events best describes the transformations of the first three industrial revolutions?
A. Mechanization of production; introduction of mass production; the digital revolution
B. Mechanization of production; invention of steamships and railroads; the digital revolution
C. Discovery of electricity; the growth of mass production; the digital revolution
D. Mechanization of production; the agrarian revolution; the digital revolution
Answer: - Option A

10.Steps to turn big data become smart data. Please choose the correct one.
A. Data > Knowledge > Information > Wisdom > Decisions
B. Data > Information > Knowledge > Wisdom > Decisions
C. Data > Information >> Decisions > Wisdom > Knowledge
D. Data > Information > Wisdom > Knowledge > Decisions
Answer: - Option A

11. When a mobile user is connected to the mobile service, how many sets of information is exchanged?
a) 1

b) 2
c) 3
d) 4
Answer: b
Explanation: Two different sets of information is exchanged between user and mobile-logical and physical context.

12. Point out the wrong statement.
a) Each mobile device contains and is capable of transmitting a large amount of information concerning the condition or state of the device and the user who carries the device
b) Location is the prime example of context
c) When we search for something near us, the search engine returns results that are independent of location
d) All of the mentioned
Answer: b
Explanation: When parsed properly, this information can provide intelligent systems with not only the user's identification but the context in which that user finds himself.

13. Which of the following context contains information derived from measurements made from the mobile device or its sensors?
a) Physical
b) External
c) Logical
d) All of the mentioned
Answer: a
Explanation: Physical context provides location, ambient device conditions, device states, and more.

14. Which of the following context contains information derived from the user or from the manner in which the user has interacted with services over time?
a) Physical
b) External
c) Logical
d) All of the mentioned
Answer: c
Explanation: Logical contexts are information about the purpose a location serves, a digital identity and its associated attributes, relationships, interests, past searches, Web sites visited, privileges, and preferences.

15. Point out the correct statement.
a) When a phone transmits its GPS coordinates to a service, that service may be able to compare that location to the customer's registered home address
b) Only one mechanisms exist for aggregating WSDL documents into a searchable form
c) AJAX is an OASIS standard that is searchable and is in the JSON format
d) All of the mentioned
Answer: a
Explanation: This will send information appropriate to each environment back to the user.

16. Which of the following provides a set of methods for using modules to construct loosely coupled complex systems from standard parts?
a) SOA

b) OCCI
c) WCF
d) None of the mentioned
Answer: a
Explanation: Method of construction of the modules is abstracted out of the system and encapsulated in SOA.

17. What is the role played by Web service in SOA?
a) service consumer
b) service provider
c) service user
d) none of the mentioned
Answer: b
Explanation: SOA requires a standard messaging protocol and a form of federated database system.

18. Which of the following plays the role of the orchestrator providing programmed logic that works with the data parsed by the Context Parser?
a) Context Logic Processor
b) Context Physical Processor
c) Context View Processor
d) All of the mentioned
Answer: a
Explanation: The Context Parser takes all the input data (digital signals in many cases) and applies a logical schema to create the needed structured objects for the Logic Processor's use.

19. The specific ontology that applies to a mobile SOA is _____
a) WOL
b) OWL
c) oXML
d) None of the mentioned
Answer: a
Explanation: WOL stands for Web Ontology Language.

20. The concept of creating a structured representation of concepts and their relationship in a domain is referred to as _____
a) analogy
b) ontology
c) generalization
d) all of the mentioned
Answer: b
Explanation: Ontology is a formal way of specifying a shared abstraction.

21. Identify one that is not the element of IoT
A) People
B) Process
C) Security
D) Things
Answer: - Option A

22. Recognize the first IoT Device

A) Smart watch
B) ATM
C) Radio
D) Video card
Answer: - Option A

23. The role of gateway is to____
A) Collect data
B) Manage data
C) Security
D) Store data
Answer: - Option A

24. IoT is evolved from ___ communication
A) M2M
B) B2B
C) M2B
D) M2H
Answer: - Option A

25. IoT is natural extension of _____
A) I3.0
B) Smart factory
C) Computer
D) SCADA
Answer: - Option D

26.___ are smart devices that uses embedded processors, sensors and communication hardware to collect and
send data which is acquired from environment.
A) Computers
B) Networks
C) Things
D) Protocols
Answer: - Option C

27.Device layer elements are_____
A) Sensors, Actuators, Transceivers
B) PLC, SCADA
C)Cloud, Data centre
D) Switches, Gateways
Answer: - Option A

28.Analysis, Storage and Management of data accomplished at _____
A) IoT Gateway level
B)Data centre/cloud

C)Edge IT
D)Interface of sensors and actuators
Answer: - Option B

29.Machine Learning and visualization technology generally accomplished at ____
A) IoT Gateway
B) Sensor level
C)Edge IT
D) Things level\
Answer: - Option C

30. _____ devices are able to intervene the physical reality like switching of the light or adjust the temperature of room.
A) IoT Gateway
B) Cloud
C) Sensor
D) Actuators
Answer: - Option D

31. Operations on server side is done at_____
A) Device Layer
B) Gateway Layer
C) Platform Layer
D) Data Centre
Answer: - Option B

32. Data aggregation and Data Acquisition systems takes place at ___ layer
A) Stage 2 Gateway level
B) Stage 1 Sensor level
C) Stage 3 Edge IT level
D) Stage 4 Cloud level
Answer: - Option A

33. Vehicle Communication, driverless car,connected cars are the examples of IoT in:
A) Agriculture
B) Electronics
C) Automotive
D) Discrete Manufacturing
Answer: - Option C

34. "_____" is the industry term for the manufacture of finished products that are distinct items capable of being easily counted, touched or seen"
A) Discrete Manufacturing
B) Smart Manufacturing
C) Digital Manufacturing
D) Intelligent Manufacturing
Answer: - Option A

35.Real time driver monitor system to detect monitor fatigue level of driver using IoT in automotive includes
A) RFID Tags

B) Sensors for GPS
C) Fluid level sensors
D)"Sensors to detect eye blinks, gas, impact sensors and alcohol detecting sensors"
Answer: - Option D

36.Which of the following is more appropriate about connected cars?
A) Cars with GPS capability
B) Cars with internet surf capabilities
C)Internet enabled cars having communication with other cars
D) Car with infotainment service
Answer: - Option C

37. Aircraft or satellite manufacturing is an example of discrete manufacturing with
A) High Complexity and Low volume
B) Low Complexity and high volume
C) Low Complexity and low volume
D) High Complexity and high volume
Answer: - Option A

38. Smart farming can be achieved by using:
A) Humidity sensors
B) IoT stick
C) pH sensors
D) Temperature sensors
Answer: - Option B

39. ____ Technologies enables user to produce more and faster with efficient allocation of resources.
A) I1.0
B) I2.0
C) I3.0
D) I4.0
Answer: - Option B

40. The aspects like Economy, Business, Society was impacted by____
A) I1.0
B)I2.0
C)I3.0
D)I4.0
Answer: - Option A

41. What is cyber security?
a) Provides security against malware
b) Provides security against cyber-terrorists
c) Protects a system from cyber attacks
d) All of the above
Answer: d
Explanation: Cyber security provides security to a system against cyber-attacks by using various technologies, and processes.

42. What does cyber security protect?
a) Criminals
b) Internet-connected systems
c) Hackers
d) None of the above
Answer: a
Explanation: It protects internet-connected systems such as hardware, software, and data from cyber-attacks. It aims to reduce cyberattacks against the system, network, and technologies by reducing unauthorized exploitation, vulnerability, and threats.

43. Who is the father of computer security?
a) August Kerckhoffs
b) Bob Thomas
c) Robert
d) Charles
Answer: a
Explanation: August Kerckhoffs, a linguist and German professor at HEC, wrote an essay in the Journal of Military Science in February 1883. Kerckhoff had unwittingly established the foundations for contemporary encryption, earning him the title of "Father of Computer Security."

44. Which of the following is an objective of network security?
a) Confidentiality
b) Integrity
c) Availability
d) All of the above
Answer: d
Explanation: The objectives of network security are Confidentiality, Integrity, and Availability.
Confidentiality: The function of confidentiality is to keep sensitive company information safe from unwanted access. The confidentiality component of network security ensures that data is only accessible to those who are authorized to see it.
Integrity: This goal entails ensuring and preserving data accuracy and consistency. The purpose of integrity is to ensure that data is accurate and not tampered with by unauthorized individuals.
Availability: The purpose of availability in Network Security is to ensure that data, network resources, and services are always available to legitimate users, whenever they need them.

45. Which of the following is defined as an attempt to steal, spy, damage or destroy computer systems, networks, or their associated information?
a) Cyberattack
b) Computer security
c) Cryptography
d) Digital hacking
Answer: a
Explanation: An effort to steal, spy on, damage, or destroy diverse components of cyberspace, such as computer systems, related peripherals, network systems, and information, is known as a cyber attack.

46. Which of the following is a type of cyber security?
a) Cloud Security
b) Network Security

c) Application Security
d) All of the above
Answer:d
Explanation: Since technology is improving, the threats and attacks against the technology are also increasing. Hence, to provide security, it is divided into the following types:
Cloud Security: Provides security for the data stored on the cloud.
Network Security: Protects the internal network from threats.
Application Security: Protects data stored in the application software.

47. What are the features of cyber security?
a) Compliance
b) Defense against internal threats
c) Threat Prevention
d) All of the above
Answer: d
Explanation: The features are as follows:
Compliance: Creating a program that meets the requirements and rules of the users.
Defense against internal threats: Should provide security against internal exploitation.
Threat Prevention: Should be capable of detecting the threat and preventing them.

48. Which of the following is not a cybercrime?
threat?
a) Denial of Service
b) Man in the Middle
c) Malware
d) AES
Answer: d
Explanation: Denial of Service, Man in the Middle, and Malware exploit the system causing a threat to security, hence they are considered as cybercrime. AES (Advanced Encryption Standard) provides security by encrypting the data.

49. Which of the following is a component of cyber security?
a) Internet Of Things
b) AI
c) Database
d) Attacks
Answer: a
Explanation: The Internet of Things (IoT) is a network of physical objects embedded with sensors, software, and other technologies to connect and exchange data with other devices and systems through the internet.

50. Which of the following is a type of cyber attack?
a) Phishing
b) SQL Injections

c) Password Attack
d) All of the above
Answer: d
Explanation: Attacks are Phishing, SQL Injections, and Password Attacks.
Phishing: The attacker sends a large number of fraudulent emails and gains access to the system.
SQL Injections: The attacker gains access to the protected information by adding malicious code to the SQL server.
Password Attacks: Attackers gain access to the passwords unethically and gain access to the confidential data.

51. Which of the following is not an advantage of cyber security?
a) Makes the system slower
b) Minimizes computer freezing and crashes
c) Gives privacy to users
d) Protects system against viruses
Answer: a
Explanation: The advantages are minimization of computer freezing and crashes, user privacy, and protection against viruses, worms, etc. Disadvantages include the system becoming slow, configuring firewalls correctly can be difficult, need to update the new software in order to keep security up to date.

52. "Cyberspace" was coined by _____
a) Richard Stallman
b) William Gibson
c) Andrew Tannenbaum
d) Scott Fahlman
Answer: b
Explanation: William Gibson, an American-Canadian fiction pioneer, and coiner, examined the many streams of technology and invented the word "cyberspace" in 1821. The phrase refers to linked technologies that aid in information exchange, interaction with digital devices, storage and digital entertainment, computer and network security, and other information technology-related matters.

53. In _____ hacking became a practical crime and a matter of concern in the field of cyber technology.
a) 1991
b) 1983
c) 1970
d) 1964
Answer: c
Explanation: In the case of hackers in the 1970s, hackers and cyber thieves found out how wired technologies operate and how they might be abused to obtain a competitive edge or misuse the technology.

54. Governments hired some highly skilled hackers for providing cyber security for the country or state. These types of hackers are termed as _____
a) Nation / State sponsored hackers
b) CIA

c) Special Hackers
d) Government Hackers
Answer: a
Explanation: Nation / State-sponsored hackers are those who are engaged or paid by a nation's or state's government to safeguard the country from cyber terrorists and other groups or individuals, as well as to expose their plans, communications, and activities.

55. The Computer Fraud & Abuse Act was adopted in the United States in the year _____
a) 1985
b) 1987
c) 1989
d) 1984
Answer: d
Explanation: In 1984, the United States enacted this cyber security policy with the objective of guaranteeing that computer-related crimes are not gone unpunished. This regulation also prohibits unauthorized access to computers and the information they contain.

56. Which of the following act violates cyber security?
a) Exploit
b) Attack
c) Threat
d) Vulnerability
Answer: b
Explanation: A threat is a possible danger that might lead to a security breach and cause harm to the system or network. Vulnerability is a word that refers to a flaw in a network or system that might be exploited by an attacker. Exploiting a security flaw might result in unexpected and unwanted effects. A cyber-attack is an attempt by attackers to alter, delete, steal or expose any specific data by gaining unauthorized access.

57. Which of the following actions compromise cyber security?
a) Vulnerability
b) Attack
c) Threat
d) Exploit
Answer: c
Explanation: A threat is defined as a potential hazard that might result in a breach of security and cause harm to the system or network. Vulnerability is a term that refers to a weakness in a network or system that an attacker may exploit. Exploiting a weakness in security might have unintended and undesirable consequences.

58. Which of the following is the hacking approach where cyber-criminals design fake websites or pages for tricking or gaining additional traffic?
a) Pharming
b) Website-Duplication

c) Mimicking
d) Spamming
Answer: a
Explanation: Pharming is a strategy and approach used by cybercriminals to create phony web pages and sites in order to mislead users into giving over personal information such as login IDs and passwords.

59. _____ is not a type of peer-to-peer cyber-crime?
a) MiTM
b) Injecting Trojans to a target victim
c) Credit card details leak in the deep web
d) Phishing
Answer: c
Explanation: Peer-to-peer includes phishing, as well as the distribution of Trojans and worms to individuals. The leakage of a huge number of people's credit card data on the deep web, on the other hand, is classified as a computer-as-weapon cyber-crime.

60. Gaining Wi-Fi access dishonestly is not a cyber-crime.
a) False
b) True
Answer: a
Explanation: It is a cyber-crime, according to section 66 of the IT Act of 2000, which was subsequently replaced by more wider and precise legislation (the IT Act of 2008), if anybody accesses anyone's Wi-Fi network without the owner's consent or for malevolent purposes.

61. A cyber-criminal or penetration tester uses the additional data that stores certain special instructions in the memory for activities to break the system in which of the following attack?
a) Clickjacking
b) Buffer-overflow
c) Phishing
d) MiTM
Answer: b
Explanation: The excess data that contains certain specific instructions in the memory for actions are projected by a cyber-criminal or penetration tester to break the system in a buffer-overflow attack.

62. Which of the following do Cyber attackers commonly target for fetching IP address of a target or victim user?
a) ip tracker
b) emails
c) websites
d) web pages
Answer: c
Explanation: Enumeration by cyber-attackers is also feasible via websites since attackers target websites in order to obtain the victim's or target user's IP address.

63. _____ is defined as an attempt to harm, damage or cause threat to a system or network.
a) Digital crime
b) Threats
c) System hijacking
d) Cyber Attack

Answer: d
Explanation: Extortion, identity theft, email hacking, digital surveillance, stealing hardware, mobile hacking, and physical security breaches are all examples of cyber assaults or activities.

64. They are nefarious hackers, and their main motive is to gain financial profit by doing cyber crimes. Who are "they" referred to here?
a) White Hat Hackers
b) Black Hat Hackers
c) Hactivists
d) Gray Hat Hackers
Answer: b
Explanation: Black Hat hackers, often known as "crackers," are a sort of cyber crime that gain illegal access to a user's account or system in order to steal confidential data or introduce malware into the system for personal gain or to harm the company.

65. IT security in any firm or organization is maintained and handled by _____
a) Software Security Specialist
b) CEO of the organization
c) Security Auditor
d) IT Security Engineer
Answer: d
Explanation: This is a position in a company or organisation where an individual develops and maintains different systems and security tools for the company or organisation to which he or she belongs.

66. _____ is a information security technology used for avoiding browser-based hacking.
a) Remote browser access
b) Adware remover in browsers
c) Incognito mode in a browser
d) Anti-malware in browsers
Answer: a
Explanation: Browsers are a popular target for cybercriminals looking to compromise information security. These criminals will be unable to infect the system and browser with malware if a user initiates remote surfing by isolating the end user's browsing session, therefore limiting the attack surface area.

67. Where did the term "hacker" originate?
a) MIT
b) New York University
c) Harvard University
d) Bell's Lab
Answer: a
Explanation: The term "hacker" was coined at MIT (Massachusetts Institute of Technology) because individuals and highly competent professionals use computer languages to address various challenges. In this context, labels such as geeks and nerds have been coined.

68. Tor is not used by the military, cyber-criminals, activists, journalists, law enforcement officers, etc.
a) False
b) True
Answer: a
Explanation: Tor protects the privacy of instant messaging, browsing data, relay conversations, and other

internet services, which is why it is utilized by the military, cybercriminals, activists, journalists, and law enforcement officials.

69. What is the existence of weakness in a system or network is known as?
a) Attack
b) Exploit
c) Vulnerability
d) Threat
Answer: c
Explanation: Vulnerability is a term that refers to a weakness in a network or system that an attacker may exploit. Exploiting a weakness in security might have unintended and undesirable consequences.

70. Which of the following is the oldest phone hacking method used by hackers to make free calls?
a) Clickjacking
b) DMOS
c) Cracking
d) Phreaking
Answer: d
Explanation: Phreaking, often known as phone-hacking, is an old hacking technique in which skilled professionals research, explore, and experiment with telephone networks in order to obtain free calling services.

71. What is legal form of hacking known as?
a) Hactivism
b) Cracking
c) Non ethical Hacking
d) Ethical hacking
Answer: d
Explanation: Ethical hacking is a type of hacking used by white-hat hackers to conduct penetration testing and discover possible dangers in businesses and organisations.

72. Criminal minded individuals who work for terrorist organizations and steal information of nations and other secret intelligence making a cyber crime are _____
a) Red Hat Hackers
b) Cyber Terrorists
c) State sponsored hackers
d) Blue Hat Hackers
Answer: b
Explanation: Cyber terrorists are highly skilled programmers and cyber criminals who conceal their identities and trails of activity while carrying out harmful operations via the internet. They are paid to obtain unauthorized access to a country's data centers or to break into the intelligence agencies' network.

73. Which of the following is an internet scam done by cyber-criminals where the user is convinced digitally to provide confidential information.
a) MiTM attack
b) Phishing attack

c) Website attack
d) DoS attack
Answer: b
Explanation: Phishing is a type of cybercrime in which a person is digitally persuaded to disclose private information. Phishing comes in a variety of forms. Some of them employ malware and emails to divert users to various websites.

74. _____ is not a step followed by cyber-criminals in data breaching.
a) Exfiltration
b) Research and info-gathering
c) Attack the system
d) Fixing the bugs
Answer: d
Explanation: During a hack, cyber-criminals first do research on the target, gathering data about the victim's system and network. Then go ahead and attack. Once the attacker has gained access, he or she takes sensitive information.

75. What is the full form of Malware?
a) Malfunctioning of Security
b) Malicious Software
c) Malfunctioned Software
d) Multipurpose Software
Answer: b
Explanation: Malware refers to a variety of malicious software and applications that can represent a threat to a system, network, or anything else in cyberspace. Viruses, Trojans, Ransomware, spyware, worms, rootkits, and other types of malware are examples of prevalent malware.

76. Philip Zimmerman released _____ in 1991, and it is a sophisticated encryption tool.
a) Data Encryption Standard
b) Pretty Good Privacy
c) Protected Good Privacy
d) Advanced Encryption Standard
Answer: b
Explanation: This encryption program package known as PGP (Pretty Good Privacy) has grown in popularity around the world because it aids in data communication authentication as well as privacy protection through cryptographic algorithms that encrypt and decrypt plain texts (in emails and files) to cipher texts and vice versa.

77. The _____ term refers to a group of hackers who are both white and black hat.
a) Yellow Hat hackers
b) Grey Hat hackers
c) Red Hat Hackers
d) White-Black Hat Hackers
Answer: b
Explanation: Grey Hat Hackers are a hybrid of ethical and unethical hacker personalities. They hack other people's computers for fun, but they don't hurt them, and they exploit network faults and vulnerabilities without the admin or owner's awareness.

78. _____ is broadly known as CIA triad.
a) AIC (Authenticity, Integrity, Confidentiality)
b) AIN (Availability, Integrity, Non-repudiation)
c) NIC (Non-repudiation, Integrity, Confidentiality)
d) AIC (Availability, Integrity, Confidentiality)
Answer: d
Explanation: Because people get confused with the acronym with the abbreviation and the secret agency name Central Intelligence Agency, the CIA Triad has been renamed AIC (Availability, Integrity, Confidentiality) Triad.

79. Which of the following ethical hacking technique is used for determining which operating system (OS) is running on a remote computer?
a) OS fingerprinting
b) OS penetration testing
c) Digital-printing
d) Footprinting
Answer: a
Explanation: OS fingerprinting is an ethical hacking technique used for determining what operating system (OS) is running on a remote computer. OS Fingerprinting is the practice of examining data packets that come from a network in order to extract intelligence that may be utilized in future assaults

80. Under which IT Act does misuse of digital signatures for fraudulent purposes come?
a) section 72
b) section 68
c) section 78
d) section 65
Answer: a
Explanation: Misuse of digital signatures is a frequent kind of cybercrime perpetrated by cybercriminals and black hat hackers. Section 72 of the Indian Information Technology Act governs this fraudulent act.

81. Which of the following is a type of intelligence gathering which is non-interfering & subtle in nature?
a) AI
b) concrete
c) competitive
d) cognitive
Answer: c
Explanation: The term “competitive intelligence collecting” refers to the process of obtaining information about your rivals through internet resources, studies, and newsgroups. Competitive intelligence collection is non-intrusive and deceptive.

82. _____ is not an email-related hacking tool.
a) Mail Password
b) Email Finder Pro
c) Mail PassView
d) Sendinc
Answer: d
Explanation: Sendinc is not a tool that compromises email data. It is used to protect business email accounts and provides a fast web-based solution for businesses to start delivering secure emails. The other three are email hacking tools.

83. Which of the following DDoS in mobile systems wait for the owner to trigger the cyber attack?
a) botnets
b) programs
c) virus
d) worms
Answer: a
Explanation: Botnets on infected mobile devices are waiting for orders from their owners. It starts a DDoS flood attack after receiving the owner's instructions. As a result, calls are not connected or data is not sent.

84. The least strong security encryption standard is _____
a) WPA3
b) WPA2
c) WPA
d) WEP
Answer: d
Explanation: Wireless security is an important aspect of cyber-security. Wired Equivalent Privacy (WEP), Wi-Fi Protected Access (WPA), WPA2, and WPA3 are the most common kinds of wireless security. WEP is a famously insecure encryption protocol.

85. Which of the following is defined as a number of Internet-connected systems, where each of them is running one or more bots?
a) Virus
b) Botnet
c) Trojan
d) Worms
Answer: c
Explanation: A botnet is a collection of Internet-connected devices that each host one or more bots. Bot-herders are in charge of botnets. Botnets have emerged as one of the most serious threats.

86. _____ is not an example of DNS hijacking.
a) HTTP-based DNS hacking
b) ISP DNS hijacking
c) DNS hijacking for phishing
d) DNS hijacking for pharming
Answer: a
Explanation: DNS hijacking is a nasty internet attack in which a user's requests are sent to a DNS server due to a system's TCP/IP settings being overridden. DNS hijacking attacks include ISP DNS hijacking, DNS hijacking for phishing, and DNS hijacking for pharming.

87. Which of the following can diminish the chance of data leakage?
a) Steganography
b) Chorography
c) Cryptography
d) Tomography
Answer: a
Explanation: Ordinary files are targeted by hackers or other cybercriminals in order to disguise distinct data or information within another data file. You can reduce the risk of data leaking by employing steganography.

88. Abbreviate TOR.
a) The Onion Router
b) Tactical Onion Router
c) The Onion Reader
d) The Open Router
Answer: a
Explanation: Tor, short for The Onion Router, is an open-source application that allows internet users to protect their privacy, security, and data collection tactics.

89. What is the full form of AES?
a) Advanced Encrypted Standard
b) Active Encryption Standard
c) Advanced Encryption Security
d) Advanced Encryption Standard
Answer: d
Explanation: Advanced Encryption Standard, abbreviated as AES, is a fairly novel block cypher that performs all calculations in bytes rather than bits and is at least six times quicker than 3-DES.

90. Which of the following can be made functional to diverse aspects of software development & hardware improvement activities?
a) Social engineering
b) Reverse engineering
c) Reverse hacking
d) Cracking
Answer: b
Explanation: Reverse engineering may be applied to a variety of software development and hardware enhancement tasks. This technique absorbs how a system or programme operates, as well as the principles that must be applied in order to break or reproduce it.

91. _____ is a paradigm of distributed computing to provide the customers on-demand, utility based computing service.
a) Remote Sensing
b) Remote Invocation
c) Cloud Computing
d) Private Computing
Answer: c
Explanation: Cloud computing is a paradigm of distributed computing to provide the customers with on-demand, utility based computing services. Cloud users can provide more reliable, available and updated services to their clients in turn.

92. Cloud providers provide cloud services to the cloud users.
a) True
b) False
Answer: a
Explanation: The statement is true. There are three types of users often called as cloud stakeholders.

93. Which of the following is not a cloud stakeholder?
a) Cloud providers
b) Clients

c) End users
d) Cloud users
Answer: b
Explanation: There are three types of stakeholders cloud providers, cloud users and the end users.

94. These cloud services are of the form of utility computing i.e. the _____ uses these services pay-as-you-go model.
a) Cloud providers
b) Clients
c) End users
d) Cloud users
Answer: d
Explanation: The cloud users use these services pay-as-you-go model. The cloud users develop their product using these services and deliver the product to the end users.

95. Which of the following is not a type of cloud?
a) Private
b) Public
c) Protected
d) Hybrid
Answer: c
Explanation: There is no protected cloud. There are three types of cloud-private, public and hybrid.

96. In this type of cloud, an organization rents cloud services from cloud providers on-demand basis.
a) Private
b) Public
c) Protected
d) Hybrid
Answer: b
Explanation: This happens in public cloud. Services are provided to the users using utility computing model.

97. In this type of cloud, the cloud is composed of multiple internal or external cloud.
a) Private
b) Public
c) Protected
d) Hybrid
Answer: d
Explanation: The hybrid cloud is composed of multiple internal or external clouds. This is the scenario when an organization moves to public cloud computing domain from its internal private cloud.

98. _____ enables the migration of the virtual image from one physical machine to another.
a) visualization
b) virtualization
c) migration
d) virtual transfer
Answer: b
Explanation: Virtualization enables the migration of the virtual image from one physical machine to another. This feature is useful for cloud as by data locality lots of optimization is possible.

99. Most of the cloud architectures are built on this type of architecture.
a) skeleton

b) grid
c) linear
d) template
Answer: b
Explanation: Most of the cloud architectures are built on Grid architecture. Grid is a type of distributed computing architecture where organizations owning data centers collaborate with each other to have common benefits.

100. Saas stands for?
a) Software as a service
b) System Software and services
c) Software as a system
d) System as a service
Answer: a
Explanation: SAAS is Software as a service. It delivers a single application through the web browser to thousands of customers using a multitenant architecture.

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5.Smart World	Marks:-12

Content of Chapter:-

5.1 Evolution of smart home.

5.2 Basic requirements and components for Smart Home : Video Monitoring, Security and alarm , Door control,Heating Ventilation and Air Conditioning control (HVAC), Smart lighting, Smart metering and Web controlling appliances.

5.3 Basic requirements for Smart City:SmartTransportation ,Smart Healthcare,Smart waste,Smart physical safety/Security (IP based CCTV, Fire and Gas detection, Fire extinguishers) and Smart education.

5.4 10T/M2M Network architecture: Conceptual diagram Domains for operation: Application domain, Network domain, M2M device domain. Network components: functions of Sensors, Access devices, Gateways, Access Protocols,communication Network and application server.

1. _____ adjusts the segment size to be smaller than MTU.
a) Internet Protocol 6
b) User Datagram Protocol
c) Internet Protocol 4
d) Transmission Control Protocol
Answer: d
Explanation: The Transmission Control Protocol is an example of a protocol that adjusts its segment size to be smaller than the MTU.

2. What is the use of the MQ2 Gas Sensor?
a) Object Identification
b) To provide 3G Connectivity
c) To measure presence of gas
d) To measure Wi-Fi strength
Answer: c
Explanation: The MQ2 Gas sensor is used to measure the degree of presence of particular types of gases in the surrounding air. It can detect Methane, Butane, LPG and smoke quantities present in the air surrounding the sensor.

3. How many terminals does the MQ2 Gas Sensor have?
a) 1
b) 3
c) 2
d) 4
Answer: d
Explanation: The MQ2 Gas Sensor has 4 terminals. These include the Vcc for accepting positive voltage to power the sensor, GND for ground connections to complete the circuit and activate the sensor, Dout which provides a digital output terminal and an Aout which provides the analog output terminal.

4. Does the MQ2 Gas Sensor have a fixed sensitivity?
a) Yes
b) No
Answer: b
Explanation: The sensitivity of any sensor is its ability to detect the smallest degree of change in the measuring medium that generates an accurate output in the sensor's terminals. The sensitivity of the MQ2 Gas Sensor is not fixed in itself and can be varied using a potentiometer.

5. What will happen if we supply a voltage of 25V to the Vcc of the MQ2 Gas Sensor?
a) Damage is caused
b) Module will shut down
c) Module will not respond for the time the voltage is applied
d) Module will function normally
Answer: a
Explanation: The MQ2 Gas Sensors are mostly built to work on a voltage of approximately 5V. Any voltage lower than that and the board will not be able to power on, but however any voltage significantly above that and the board may suffer permanent damage.

6. What is the maximum output voltage that the MQ2 Gas Sensor can put out on its analog output pin?
a) 1V
b) 140V
c) 5V
d) 10V
Answer: c
Explanation: The maximum output voltage of the MQ2 Gas Sensor is 5V. Any PPM concentrations within that limit can be detected with accuracy by the sensor. However, one can detect higher or lower PPM concentrations to a certain degree by adjusting the potentiometer.

7. Can the MQ2 Gas Sensor differentiate between two different gases with the same PPM?
a) Yes
b) No
Answer: b
Explanation: The MQ2 Gas Sensor is not designed to tell which gases are present in the air surrounding the module. It can only tell what is the concentration or PPM value of a gas. The nature or name of the gas has to be known beforehand while using this sensor.

8. If the PPM concentration of a gas that is being detected by the MQ2 Gas Sensor increases what will happen to its Digital Output pin?
a) Voltage Increases
b) Voltage Decreases
c) Voltage becomes 0
d) Voltage doesn't change
Answer: d
Explanation: The MQ2 Gas Sensor has two output pins, one is digital and one is analog. The digital pin can only vary between two voltage levels which corresponds to 2 Logic Levels, 1 and 0 or 5V and 0V respectively. So if a gas is present then the digital output becomes 5V but cannot detect any kind of change in concentration of the gas.

9. If the PPM concentration of a gas that is being detected by the MQ2 Gas Sensor increases what will happen to its Analog Output pin?
a) Voltage Increases
b) Voltage Decreases
c) Voltage becomes 0
d) Voltage doesn't change
Answer: a
Explanation: The MQ2 Gas Sensor has two output pins, one is digital and one is analog. The analog pin's voltage is set so that it is directly proportional to the PPM value in the air subject to variation in calibration from the potentiometer, so as the PPM level rises so does the voltage in the analog output pin until it reaches 5V.

10. What is the full form of the abbreviation called PPM?
a) Parts Per Million
b) Parts Per Milligram
c) Parts Per Megagram
d) Parts Per Millilitre
Answer: a
Explanation: The correct full form of the PPM abbreviation is Parts per million. It is a way of measuring the concentration of a particular gas in the air, by using the ratio of it and comparing it to others. For example: 1000 PPM of LPG means that if you count 1 million gas molecules within a closed space, 1000 of them would be LPG molecules while the rest would be other gases.

11. What is the name of the mesh surrounding the MQ2 Gas Sensor?
a) Anti-Heat Mesh
b) Anti-Explosion Mesh
c) Anti-Air Mesh
d) Filtration Mesh
Answer: b
Explanation: The MQ2 Gas Sensor is surrounded by a mesh called Anti-Explosion Mesh. This protects the actual sensor inside from combusting as it remains in a heated condition during normal operation and coming into contact with gases like methane or butane or LPG may ignite the gas and cause dangerous accidents.

12. Classes used to describe an application's primary elements.
a) Domain Classes
b) Application
c) Context
d) View
Answer: a
Explanation: Domain classes are used to describe an application's primary elements and characteristics.

13. In web applications, domain classes are generally the first things to be defined.
a) True
b) False
Answer: a
Explanation: Domain classes represent data that is saved for posterity—in a permanent storage system—so it interacts with controllers, as well as representing data displayed in views.

14. In Grails, domain classes are placed under:-
a) /grails-app/WEB-INF/
b) /grails-app/domain/
c) /grails-app/domain/WEB-APP
d) /grails-app/
Answer: b
Explanation: In Grails, domain classes are placed under the /grails-app/domain/ directory.

15. The creation of domain classes by executing a simple command which is:-
a) grails create-domain-class
b) grails create-domain-class domain class name
c) domain class name
d) none of the mentioned
Answer: b
Explanation: The creation of domain classes, like most other things in Grails, can be carried out by executing a simple command in the following form:
grails create-domain-class domain class name

16. The command domain class name in creation of domain classes generates a file named domain class name.groovy.
a) True
b) False
Answer: a
Explanation: It generates a skeleton domain class file named domain class name.groovy inside the /grails-app/domain/ directory.

17. Corresponding unit tests files are also generated for each domain class while creating domain classes.
a) True
b) False
Answer: a
Explanation: In addition, corresponding unit tests files are also generated for each domain class under an application's test/unit directory.

18. Static field which defines constraints on the domain class.
a) static{}
b) static field{}
c) static constraint{}
d) static constraints{}
Answer: d
Explanation: static constraints = { }, defines constraints on the domain class.

19. Declaration name which indicates that object's name field can't be blank.
a) blank:false
b) blank:true
c) all of the mentioned
d) none of the mentioned
Answer: a
Explanation: The declaration name(blank:false) indicates that a Player object's name field cannot be left blank.

20. A variety of constraints can be used to enforce a domain class's structure.
a) True
b) False
Answer: a
Explanation: Under certain circumstances, if a constraint is too elaborate, it's often incorporated within an application's controller prior to creating an object of a certain domain class.

21. A smart home incorporates all the advanced_____.
A) Automation Systems
B)Ignition Systems
C) Backup Systems
D) Traffic Control Systems.
Answer: - Option A
22._____ provides ability to monitor and control various home devices through wireless connection.
A) Optical Fibre
B) Motor
C) Smart Home
D)Generator
Answer: - Option C

23. Lights can be turn ON when aphoto-electric sensor detects that it's dark. It is possible in one of the following system.
A) Security System
B) Home Automation System
C) Safety System
D) Networking system.
Answer: - Option B

24. The oldest and best-known smart home automation system is_____
A) A-10
B) B-10
C) C-10
D) X-10
Answer: - Option D

25.X-10 home automation system uses_____ to send regular switching signal.
A) Household electricity wiring
B)RF cable
C)Telephone Cable
D)Optic fibre
Answer: - Option A

26.Name the device that constantly crawls around floors sweeping the dust.
A) Hair dryer
B)Robotic vacuum cleaner
C)Electric oven
D)Refrigerator
Answer: - Option B

27._____are main component of home appliances control system.
A) Amplifier, equaliser, oscillator.
B)modulator, mixer, local
C)voltage amplifier, filter, power amplifier
D)Sensors, processors, relay
Answer: - Option D

28.Video monitoring system for home consists of _____and _____ .
A) camera , displays
B)generator, motor
C)heater, compressor
D)oscillator, mixer
Answer: - Option A

29. The use of _____ can assured that family will be safe from unforeseen dangers.
A) Smart door
B) Smart meter
C) Smart dustbin
D) Smart TV
Answer: - Option A

30.Home appliances in smart home can be controlled remotely over long distance is possible due to _____
A) amplifiers
B)web-based application
C)repeater
D)splitter
Answer: - Option B

31."Hey Google, turn on all lights.". This voice command is for _____ used in smart home.
A)Amazon Alexa
B)Google Home
C)Apple's Home Kit,
D)Amazon Prime
Answer: - Option B

32.Identify the one that is not provided in smart home.
A) Comfort, security
B)Remote automation.
C)Improving traffic flow on road
D)Save time and effort.
Answer: - Option C

33.Automated traffic signals are part of _____ .
A)Smart TV
B)Smart Transportation
C)Smart Home
D)Smart Watch
Answer: - Option B

34. _____delivers health information and services to enable data transmission, storage and retrieval for clinical, educational and administrative purposes.
A) E-health
B) E-BIKE
C) E-news paper
D) E- challan
Answer: - Option A

35. This education system is replacing traditional classroom, and provides the flexibility of learning.
A) Smart TV
B) Smart Transportation
C) Smart Education.
D) Smart Watch
Answer: - Option C

36. Efficient and energy-saving waste management system reduces _____.
A) Air pollution
B) Natural resources
C) Human Life
D) Road Traffic
Answer: - Option A

37.Name the detector used for fire safety in smart city .
A) PH detector
B)Moisture Detector
C)Smoke detector
D)Salt detector.
Answer: - Option C

38.M2M communication is a communication between
A)Machine to Machine
B)Motor to Machine
C)Machine to Motor
D)Motor to Motor
Answer: - Option A

39.Function of device domain in M2M network is_____.
A)Processing of sensor data
B)Analysis of sensor data
C)Collection and transmission of sensor data
D)Interpretation of sensor data
Answer: - Option C

40. In a ---------- networks, all nodes communicate with each other using some intermediate gateways.
A) Client- server
B) Cooperative
C) point to point network
D) Fully distributed
Answer: - Option B

41. The major difference between a multimedia file and a regular file is _____
a) the size
b) the attributes
c) the ownership
d) the rate at which the file must be accessed
Answer: d
Explanation: Multimedia files must be accessed at a specific rate whereas accessing regular files requires no special timings.

42. Video is represented as a series of images formally known as _____
a) pics
b) shots
c) frames
d) snaps
Answer: c
Explanation: None.

43. The faster the frames are displayed, _____
a) the rougher the video appears
b) the smoother the video appears
c) it gets blurry
d) none of the mentioned
Answer: b
Explanation: None.

44. The characteristic of the eye to retain the image for a short time after it has been presented is known as _____
a) persistence of vision
b) learning power
c) memory mapped input
d) none of the mentioned
Answer: a
Explanation: None.

45. When will Local playback be used?
a) the multimedia data are delivered from a local file system
b) a computer next to you is playing something
c) a multimedia file is being played on a system in the local network
d) none of the mentioned
Answer: a

46. Multimedia files stored on a remote server are delivered to a client across the network using a technique known as _____
a) download
b) streaming
c) flowing
d) leaking
Answer: b

47. What are the two types of streaming techniques?
a) progressive download & real time streaming
b) regular download & real time streaming
c) real time & virtual time streaming
d) virtual time streaming
Answer: a

48. A media file containing audio or video is downloaded and stored on the client's local file system in _____
a) progressive download
b) regular download
c) real time streaming
d) virtual time streaming
Answer: a
Explanation: As the file is being downloaded, the client is able to play back the media file without having to wait for the file to be downloaded in its entirety.

49. Progressive download is most useful for _____
a) short video clips
b) long video clips
c) extremely long and high quality videos
d) none of the mentioned
Answer: a

50. The media file is streamed to the client but is only played and not stored by the client in _____
a) progressive download
b) regular download
c) real time streaming
d) virtual time streaming
Answer: c

51. Real time streaming is most useful for _____
a) short video clips
b) long video clips
c) extremely short and low quality videos
d) none of the mentioned
Answer: b

52. Which devices provides positional information to the graphics system ?
a) Input devices
b) Output devices
c) Pointing devices
d) Both a and c
Answer: d
Explanation: Input devices positional information to the system they often called pointing devices.

53. The number of pixels stored in the frame buffer of a graphics system is known as
a) Resolution
b) Depth
c) Resalution
d) Only a
Answer: d
Explanation: Number of pixels determines the resolution .

54. In graphical system, the array of pixels in the picture are stored in
a) Memory
b) Frame buffer
c) Processor
d) All of the mentioned
Answer: a
Explanation: Frame buffer is mainly used to store pixels.

55. Heat supplied to the cathode by directing a current through a coil of wire is called
a) Electron gun
b) Electron beam
c) Filament
d) Anode and cathode
Answer: c
Explanation: In CRT the filament is responsible for supply of power.

56. What is the term C.O.P. referred in terms of refrigeration?
a) Cooling for Performance
b) Coefficient of Performance
c) Capacity of Performance
d) Co-efficient of Plant
Answer: b
Explanation: Coefficient of Performance is generally referred as C.O.P. for Refrigeration, which is used to measure the capacity or level up to which the refrigeration will occur.

57. How is the refrigerant used in the Air refrigeration cycle?
a) In the compressor
b) In the condenser
c) Directly in contact
d) Not used at all
Answer: a
Explanation: Refrigerant used in Air refrigeration cycle is pure air, and it's used directly in contact with the area of refrigeration. Whereas in Expansion refrigeration, refrigerants are used in condensers etc.

58. The Domestic absorption type refrigerator was invented by?
a) Baltzer Von Platan
b) Carl Munters
c) Carl Munters and Baltzer Von Platan
d) Light Foot
Answer: c
Explanation: The Domestic absorption type refrigerator was invented by two Swedish engineers, Carl

Munters and Baltzer Von Platan, in 1925 while they were studying for their undergraduate course of Royal Institute of Technology in Stockholm. Whereas Light foot invented the Bell – Coleman cycle.

59. What is NOT one of the advantages of using closed Air Refrigeration system?
a) Compact in construction
b) Lower coefficient of performance
c) Lighter in weight
d) Environmental Friendly
Answer: b
Explanation: Air refrigeration system is used mainly due to light in weight, smaller and environment friendly due to use of air as a refrigerant. Also, it has a higher co-efficient of performance.

60. The COP of vapor compression having vapor as dry saturated after compression having refrigeration effect (Re) of 58.84 and work done (W) of 17.95 is _____
a) 3.865
b) 4.234
c) 4.39
d) 3.278
Answer: d
Explanation: The COP is given by Refrigeration effect by work done,
COP=ReW
=58.8417.95=3.278.

61. In lithium bromide absorption refrigeration system it is not necessary to keep the refrigeration temperature above 0°C.
a) False
b) True
Answer: a
Explanation: In lithium bromide absorption refrigeration system it is necessary to keep the refrigeration temperature above 0°C as it is the freezing point of water. Water is used as a refrigerant in the system.

62. The C.O.P for reverse Carnot refrigerator is 2. The ratio of lowest temperature to highest temperature will be _____
a) four times
b) three times
c) twice
d) half
Answer: b
Explanation: Reverse Carnot C.O.P. = t2−t1t1
2 = X−YY
2 = XY – 1
Thus, XY = 3 i.e. X=3Y i.e. Higher temperature = 3 times Lower temperature.

63. Which is the S.I. unit to measure pressure in refrigeration?
a) Bar
b) Newton
c) Joule
d) Pascal
Answer: d
Explanation: Generally, unit like N/mm^2, N/m^2, KN/mm^2 and MN/mm^2 etc. are used but the S.I. unit used is N/m^2 i.e. Pascal.

64. What is the main disadvantage of natural refrigeration methods?
a) They are dependent on local conditions
b) They are not environment friendly
c) They are expensive
d) They are poisonous
Answer: a
Explanation: Natural Refrigeration process is dependent on the local conditions like temperature of surrounding, pressure at which it occurs, and volume of the refrigerant, etc. hence it cannot be predicted exactly.

65. Reduction in operating pressure in the Air refrigeration cycle results in _____
a) decrease in C.O.P.
b) always decreases
c) increase in C.O.P.
d) no change in C.O.P.
Answer: c
Explanation: As the operating pressure reduces, the change in work done decreases. Hence the C.O.P of refrigeration increases.

66. What is the key difference between a simple VAR and Electrolux refrigerator?
a) Working mechanism
b) Generator
c) Absorber
d) Liquid pump
Answer: d
Explanation: Simple VAR uses a generator to do work as well as a pump to pressurize the liquid to the generator. So, total work done is the summation of work done by a pump and generator. Refrigeration effect is the heat absorbed in the evaporator. But as in the case of Electrolux refrigerator pump is not present. It is the VAR system with no liquid pump; hence, it is the key difference between Simple VAR and Electrolux refrigerator.

66.The ratio of COP of vapor compression cycle and COP of Carnot cycle is known as?
a) Theoretical COP
b) Performance index
c) Relative COP
d) Ideal COP
Answer: b
Explanation: The ratio of COP of vapor compression cycle and COP of Carnot cycle is known as the Refrigeration efficiency or performance index (P.I). Whereas relative COP is the ratio of Actual COP divided by Ideal COP.

67. Efficiency of the Refrigerator is _____ to the C.O.P of refrigerator.
a) independent
b) directly proportional
c) inversely proportional
d) equal
Answer: a
Explanation: Efficiency is the ratio of work done to heat supplied, whereas C.O.P is the ratio of Refrigeration effect to work done. Hence it is totally independent quantity.

68. In a domestic icebox type refrigerator, the ice block is kept at the top because _____
a) hot air can be easily removed from the top
b) cold air can flow down due to buoyancy effect
c) it is easy for the user to operate
d) disposal of water is easier
Answer: b
Explanation: Buoyancy effect acts similar to the gravitational force that occurs on the surface outside, hence the more dense cold air comes to the bottom and the hot air goes at the top, but there is no chance of hot air in the refrigerator.

69. The COP of refrigerator may be improved by _____
a) keeping the higher (T_2) temperature the same while decreasing the lower (T_1) temperature
b) decreasing the higher (T_2) as well as the lower (T_1) temperature
c) decreasing the higher (T_2) temperature and increasing the lower (T_1) temperature
d) increasing the higher (T_2) as well as the lower (T_1) temperature
Answer: c
Explanation: The COP of refrigerator can be given by :
COP = T1(T2−T1). Hence by decreasing the higher temperature T_2 or by increasing the lower temperature T_1 the COP may be improved.

70. What is the value of Refrigeration effect if m_2 = 2 kg/min, m_3 = 0.8 kg/min and enthalpies for the refrigerant at saturated vapor and saturated liquid line are 1420 and 1260 kJ/kg?
a) 129
b) 196
c) 194
d) 192
Answer: d
Explanation: Given: m_2 = 2 kg/min
m_3 = 0.8 kg/min
h_1 = 1420 kJ/kg and $h_{f10} = h_{11}$ = 1260 kJ/kg
As, $m_1 = m_2 – m_3$
= 2 – 0.8
= 1.2
Refrigeration effect = $m_1 (h_1 – h_{11})$
= 1.2 (1420 – 1260)
= 1.2 x 160
= 192 kJ/min.

71. What is the other name for Electrolux refrigerator?
a) Three-fluid absorption system
b) Four-fluid absorption system
c) Single-fluid absorption system
d) Two-fluid absorption system
Answer: a
Explanation: Electrolux refrigerator uses Ammonia, Hydrogen, and Water to carry out the desired effect. As three fluids are used for the operation, Electrolux refrigerator is also called a Three-fluid absorption system.

72.Which of the refrigerant is used as a refrigerant in Lithium Bromide Absorption Refrigeration system?
a) Lithium Bromide
b) Hydrogen
c) Water
d) Ammonia
Answer: c
Explanation: Water is used as a refrigerant in Lithium Bromide Absorption Refrigeration system whereas lithium bromide, which is highly hydroscopic salt, is used as an absorbent. Lithium Chromate is used a corrosion inhibitor.

73.C.O.P. of the refrigerator is always _____ the C.O.P. of the heat pump when both are working between the same temperature limits.
a) greater than
b) equal to
c) inverse of
d) less than
Answer: d
Explanation: C.O.P. = Desired effect / Work
As the desired effect for the heat pump is higher than the refrigerator. So, numerator value is higher for heat pump keeping denominator constant.
Can also be proved by this equation,
$(C.O.P.)_R = (C.O.P.)_P - 1$.

74.What is the difference between Heat Pump and Refrigerator?
a) Work is output in refrigerator and work is input in heat pump
b) Both are almost similar, just the desired effect is different
c) Heat Pump Gives efficiency and refrigerator gives C.O.P.
d) Both are similar
Answer: b
Explanation: Heat Pump and Refrigerator work on the same principle. Work needs to be given to get the desired effect. The characteristic which differentiates both of them is the temperature of the desired effect, heat pump desires for higher temperature whereas the Refrigerator desires for lower temperature than atmospheric temperature.

75.The C.O.P for reverse Carnot refrigerator is 2. The ratio of highest temperature to lowest temperature will be _____
a) 3 times
b) 4 times
c) 1/3 times
d) 1/2 times

Answer: c
Explanation: Reverse Carnot C.O.P. = t2−t1t1
2 = X−YY
2 = XY – 1
Thus, XY = 3 i.e. X=3Y i.e. Lowest temperature = 13 times Highest temperature.

76.For the systems working on reversed Carnot cycle, what is the relation between C.O.P. of Refrigerator i.e. $(C.O.P.)_R$ and Heat Pump i.e. $(C.O.P)_P$?
a) $(C.O.P.)_R = (C.O.P)_P - 1$
b) $(C.O.P.)_R + (C.O.P)_P + 1 = 0$
c) $(C.O.P.)_R = (C.O.P)_P$
d) $(C.O.P.)_R + (C.O.P)_P = 1$
Answer: a
Explanation: If we put the values of C.O.P. for standard system i.e. $(C.O.P.)_R = T_1/ (T_2 - T_1)$ and $(C.O.P.)_P = T_2/ (T_2 - T_1)$,
$(C.O.P.)_P - (C.O.P.)_R = 1$.
$\{T_2 / (T_2 - T_1)\} - \{T_1 / (T_2 - T_1)\} = 1$.

77.Which refrigerants are used in Electrolux and Li-Br water refrigeration system?
a) Water and Bromide
b) Ammonia and Water
c) Ammonia and Lithium
d) Water and Water
Answer: b
Explanation: In the Electrolux refrigerator, ammonia is used as a refrigerant, and in the case of Li-Br water system water is used as a refrigerant due to their desirable properties to produce refrigeration effect.

78. What is the value of Refrigeration effect if m_1 = 4 kg/min, and enthalpies for the point 1, 2, 4, 5, 9 are 1350, 1550, 1480, 1620, and 280 kJ/kg. If the refrigeration effect is 4280 kJ/min and work done is 15 kW, then what is the value of C.O.P.?
a) 4.75
b) 6.00
c) 5.50
d) 4.85
Answer: a
Explanation: Given: m_1 = 4 kg/min
h_1 = 1350 kJ/kg
h_{f9} = h10 = 280 kJ/kg
h_2 = 1550 kJ/kg
h_4 = 1480 kJ/kg
h_5 = 1620 kJ/kg
As, enthalpies of all points is given but it is a redundant data cause direct values of refrigeration effect and work is given, hence C.O.P. can be found easily.
Refrigeration effect = $m_1 (h_1 - h_{11})$
= 4280 kJ/min
Work = 15 kW = 900 kJ/min
C.O.P. = Refrigeration effect / Work
= 4280 / 900
= 4.75.

79.What happens to the COP of a Carnot refrigerator in summer and in winter?
a) The COP remains unaffected
b) The COP fluctuates continuously during winter and summer
c) The COP is more in winter
d) The COP is more in summer
Answer: c
Explanation: As the higher temperature T_2 will always be lower in winter when compared with that of summer i.e. the temperature of air available of heat rejection will be low, the COP in winter will be higher.

80.What are the fluids used in the Electrolux refrigerator?
a) Hydrogen, Water, Bromide
b) Hydrogen, Water, Ammonia
c) Hydrogen, Water
d) Hydrogen, Water, Lithium
Answer: b
Explanation: Electrolux refrigerator uses Ammonia, Hydrogen, and Water to carry out the desired effect. As three fluids are used for the operation, Electrolux refrigerator is also called a Three-fluid absorption system.

81.What is the common application of Air standard refrigeration system?
a) Cold storage
b) Car air conditioning system
c) Domestic refrigerators
d) Aircraft air conditioning
Answer: d
Explanation: As a sufficient amount of air is obtained while aviation of air crafts, the only thing is to reduce its velocity, and then it can be used for air conditioning in air crafts.

82.In a domestic vapour compression refrigerator, which of the following refrigerants commonly used?
a) Freon
b) Air
c) NH_3
d) CO_2
Answer: a
Explanation: FREON is a trading name for several gases called refrigerants. Commonly used refrigerants are hydrofluorocarbons and hydrocarbons. Though ammonia and dichlorodifluoromethane have the same boiling point, it is not toxic like ammonia. Hence, it is safe to use Freon than ammonia.

83.Which of the following process is used in winter air conditioning?
a) Cooling and Dehumidification
b) Heating and Humidification
c) Dehumidification
d) Humidification
Answer: b
Explanation: In Winter, the weather is dry and cold, so the process of heating and humidification is done to get the desired comfort conditions.

84. A refrigerating machine working on Carnot cycle operates between 300K and 250K. Determine the COP.
a) 10
b) 4
c) 6
d) 5
Answer: d
Explanation: The COP of refrigerating machine is given by
COP = T1(T2−T1)=250(300−250)=5.

85.Which type of evaporator is used in household refrigerators?
a) non-frosting evaporator
b) non-corrosive evaporator
c) frosting evaporator
d) defrosting evaporator
Answer: c
Explanation: Evaporators used in household refrigerators, low-temperature evaporators, and bare pipe coils in storage boxes come under frosting type. These operate at temperature always below 0°C. Coils frost continuously and need to be defrosted at regular interval of time.

86. In transport aviation, the air conditioning systems are based on _____ cycle.
a) Reversed Joule's cycle
b) Otto cycle
c) Reversed Carnot cycle
d) Reversed Brayton cycle
Answer: d
Explanation: It is because in vapor-cycle the disadvantage was that due to the leakage loss of fluid it would cause the aircraft to be completely without cooling.

87.Which of the following process is used in summer air conditioning?
a) Heating and Humidification
b) Cooling and Dehumidification
c) Humidification
d) Dehumidification
Answer: b
Explanation: In Summer, the weather is humid and hot, so the process cooling and dehumidification is done to get the desired comfort conditions.

88.A psychrometric chart is a graphical representation of various physical properties of dry air.
a) False
b) True
Answer: a
Explanation: Psychrometric chart is a graphical representation of the various thermodynamic properties of moist air. This is used to find out properties of air in the field of air conditioning.

89.The efficiency of Carnot heat engine is 40%. What is the value of C.O.P. of a refrigerator operating on reversed Carnot cycle?
a) 10
b) 4
c) 1.5
d) 2.5
Answer: c
Explanation: η_E = 40% = 0.4
C.O.P. of heat pump = 1 / η_E = 1 / 0.4 = 2.5
As we know, $(C.O.P.)_R = (C.O.P.)_P - 1$
C.O.P. of refrigerator = 2.5 − 1
= 1.5.

90.The expansion valve in a refrigerator does not control the flow of refrigerant.
a) True
b) False
Answer: b
Explanation: Expansion valve acts as a diffuser, where pressure reduction is carried out using an orifice. By controlling the flow of refrigerant flowing through an orifice, the desired pressure drops obtained.

91.Which type of evaporator is generally used to cool drinking water?
a) Plate evaporator
b) Shell and tube evaporator
c) Finned evaporator
d) Shell and coil evaporator
Answer: d
Explanation: The shell and coil evaporators are the dry expansion evaporators used to chill water. The shell may be sealed or open. If the shell is sealed, then it is used for cooling drinking water.

92.If the Coefficient of performance of a heat pump is 5, then what is the value of the Coefficient of performance of the refrigerator operating under the same conditions?
a) 0.2
b) 3
c) 4
d) 6
Answer: c
Explanation: As we know, the equation between Coefficient of performance of Refrigerator and heat pump:
$(C.O.P.)_R = (C.O.P.)_P - 1$
Hence, C.O.P. of refrigerator = C.O.P. of heat pump − 1
= 5 − 1
= 4.

93.Two refrigerators M and N operate in series. The refrigerator M absorbs energy at the rate of 1 kW from a body at temperature 400 K and rejects energy as heat to a body at a temperature T. The refrigerator N absorbs the same quantity of energy which is rejected by the refrigerator N from the body at temperature T, and rejects energy as heat to a body at temperature 800 K. If both the refrigerators have the same C.O.P., what is the value temperature T?
a) 565.68 K
b) 459.21 K
c) 200 K
d) 600 K
Answer: a
Explanation: Given: T_1 = 400 K, T_2 = 800 K, C.O.P. of M = C.O.P. of N
C.O.P. of refrigerator M = $T_1 / (T_2 - T_1)$
= 400 / (T − 400)
C.O.P. of refrigerator N = $T_1 / (T_2 - T_1)$
= T / (800 − T)
Equating both the C.O.P. we get,
400 / (T − 400) = T / (800 − T)
T_2 = 400 x 800
T = √320000
T = 565.68 K.

94.Dense air Bell-Coleman refrigerator is preferred than open cycle air refrigerator.
a) False
b) True
Answer: b
Explanation: In open cycle air refrigerator the main drawback is the freezing of the moisture in the air during expansion stroke which is liable to choke up the valves. Hence dense air refrigerator is preferred.

95.Capillary tube, as an expansion device is used in?
a) Room air conditioners
b) Water coolers
c) Domestic refrigerators
d) All of the mentioned
Answer: d
Explanation: The capillary tube as an expansion device is used in small capacity hermetic sealed refrigeration units such as in water coolers, domestic refrigerators and room air conditioners, etc.

96.What of the following uses natural convection air-cooled condensers?
a) High capacity room air conditioners
b) Industrial air conditioners
c) Domestic refrigerators
d) High capacity water coolers
Answer: c
Explanation: Natural convection phenomenon is used to carry out the operation. Large surface area is required for the proper heat transfer between the mediums. Due to the slow process and able to handle low capacity used just in small-capacity applications like domestic refrigerators.

97.What is the material of tubes used for shell and tube condenser in ammonia refrigeration system?
a) Copper
b) Steel
c) Brass
d) Aluminum
Answer: b
Explanation: As ammonia is toxic and has the ability to rust the material which comes in the contact. So, in the ammonia refrigeration system, steel tubes are used for shell and tube condensers to avoid the corrosion.

98.What is the difference between the temperature of entering and leaving water in the cooling tower?
a) Range
b) Approach
c) Wet-bulb temperature
d) Dry bulb temperature
Answer: a
Explanation: Range can be defined as the difference between entering water temperature and leaving water temperature. This is also an indicator of the performance of cooling tower but for the effective performance, a better indicator, i.e., the approach is used.

99.Mechanical Draft cooling towers do not depend on atmospheric air.
a) False
b) True
Answer: b
Explanation: One of the advantages of mechanical draft cooling towers is that they do not depend upon the atmospheric air. Fans do the operation. Due to the fact of independence, this type of cooling towers can be even installed inside the building.

100.Which of the following represents sensible cooling on the psychrometric chart?
a) Inclined line
b) Curve
c) Horizontal line
d) Vertical line
Answer: c
Explanation: Sensible cooling is when DBT decreases. And as per the psychrometric chart, horizontal lines show the change in just DBT and represent sensible cooling.

101. How many major sources of solid waste are there based on their origin?
a) 10
b) 5
c) 9
d) 6
Answer: c
Explanation: There are broadly 9 sources of solid waste. They are residential, industrial, commercial, institutional, construction & demolition areas, municipal services, treatment plants, agriculture and biomedical.

102. Which of the below is not an idea behind solid waste management?
a) Control of waste generation
b) Storage and collection
c) Disposal
d) Stop waste generation
Answer: d
Explanation: The generation of solid waste cannot be stopped. The idea behind solid waste management is to reduce and eliminate the adverse effects of these on the environment and human health.

103. The number of functional components of solid waste management is:
a) 5
b) 3
c) 6
d) 4
Answer: c
Explanation: The six functional components in order are waste generation (identification of waste), onsite handling & storage (at site of waste), waste collection (collecting from different sources), waste transfer (local to regional site), waste processing (sorting of reusable/recyclable) and disposal (at landfills/waste to energy).

104. The term ISWM refers to:
a) International Solid Waste Management
b) Integrated Solid Waste Management
c) Integrated Solid Waste Machine
d) International Solid Waste Mechanism
Answer: b
Explanation: It stands for Integrated Solid Waste Management. It refers to the selection and use of appropriate techniques for the disposal of solid waste.

105. Under which rule of Government, guidelines for solid waste management are followed today?
a) Municipal Solid Waste Rules, 2000
b) Municipal Solid Waste Rules, 2016
c) Solid Waste Rules, 2000
d) Solid Waste Rules, 2016
Answer: d
Explanation: At present, we have to follow the Solid Waste Management Rules, 2016. This new rule was notified on 8th April 2016 and it supersedes the Municipal Solid Waste Rules, 2000. This new sets of rules have been extended to all Indian local bodies.

106. The average composition of Municipal solid waste is:
a) 41% organic, 40% inert & 19% recyclable
b) 20% organic, 60% inert & 20% recyclable
c) 30% organic, 20% inert & 50% recyclable
d) 19% organic, 41% inert & 40% recyclable
Answer: a
Explanation: The bulk of organic waste arrives from households and agriculture. The inert waste is generated from construction sites, demolitions, public places, etc.

107. There are _____ ways to treat waste thermally.
a) 5
b) 3
c) 2
d) 6
Answer: b
Explanation: The process which use heat to treat the waste are referred to as a thermal treatment. These include incineration (combustion of waste & recover energy for electricity/heating), pyrolysis (decomposition of organic waste with low oxygen and high temperature), and open burning (environmentally harmful and mostly practical).

108. How many types of landfills are there?
a) 3
b) 2
c) 5
d) 4
Answer: a
Explanation: They are sanitary landfills, controlled dumps and bioreactor landfills. Sanitary landfills are the most common and are situated where the land features aid in decomposition. Controlled dumps are well planned sites and bioreactor landfills use a superior microbiological process for decomposition.

109. Bio-medical waste can be effectively managed by the thermal process.
a) True
b) False
Answer: a
Explanation: The thermal process uses heat in varying temperatures to disinfect the pathogens present. Autoclave & microwave process uses low heat whereas incinerator and hydroclaring use high heat to render the waste pathogen free.
110. The WHO has classified the bio-medical waste into _____ categories.
a) 5
b) 4
c) 3
d) 2
Answer: b
Explanation: The WHO has classified these into 4 categories- infectious (waste from surgeries and any material containing pathogens), pathological (tissues/organs/drugs, etc which are not required), radioactive (contaminated with a radioactive substance) and others (waste from hospital housekeeping/kitchen).

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