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DEPARTMENT OF ELECTRICAL ENGINEERING

FIRST YEAR (FY)

SCHEME: I **SEMESTER: II**

NAME OF SUBJECT: FUNDAMENTALS OF ELECTRICAL ENGINEERING

SUBJECT CODE: 22212

UNIT WISE MULTIPLE CHOICE QUESTIONS BANK

Question Bank for Multiple Choice Questions

Program: Diploma in Electrical engineering	**Program Code:- EE**
Scheme:-I	**Semester:- 2**
Course:- Fundamentals of Electrical Engineering	**Course Code:- 22212**

01 – Basic Electrical Parameters	**Marks:-12**

Content of Chapter:-

1.1 Alternating Current, Direct Current, Ideal & Practical Voltage & Current Source
1.2 Electrical Current, Potential, Potential Difference, EMF
1.3 Electrical Work Power Energy
1.4 Resistance, resistivity, conductivity, effect of temp on resistance
1.5 Types of Resistors & applications
1.6 Heating effect, magnetic effect, chemical effect of electric current

Q.1. In general in an alternating current circuit
(a) the average value of current is zero
(b) the average value of square of the current is zero
(c) average power dissipation is zero
(d) the phase difference between voltage and current is zero

Q.2. The frequency of A.C. mains in India is
(a) 30 c/s
(b) 50 c/s
(c) 60 c/s
(d) 120 c/s

Q.3. A.C. power is transmitted from a power house at a high voltage as
(a) the rate of transmission is faster at high voltages
(b) it is more economical due to less power loss
(c) power cannot be transmitted at low voltages
(d) a precaution against theft of transmission lines

Q.4. The electric mains supply in our homes and offices is a voltage that varies like a sine function with time such a voltage is called … A… and the current driven by it in a circuit is called the … B… Here, A and B refer to
(a) DC voltage, AC current
(b) AC voltage, DC current
(c) AC voltage, DC voltage
(d) AC voltage, AC current

Q.5. Alternating currents can be produced by a
(a) dynamo
(b) choke coil
(c) transformer
(d) electric motor

Q.6. The peak value of the a.c. current flowing throw a resistor is given by
(a) $I_0 = e_0/R$
(b) $I = e/R$
(c) $I_0 = e_0$
(d) $I_0 = R/e_0$

Q.7. The alternating current can be measured with the help of
(a) hot wire ammeter
(b) hot wire voltmeter
(c) moving magnet galvanometer
(d) suspended coil type galvanometer

Q.8. Alternating current cannot be measured by D.C. ammeter, because
(a) A. C. is virtual
(b) A. C. changes its direction
(c) A. C. cannot pass through D.C. ammeter
(d) average value of A. C for complete cycle is zero

Q.9. The heat produced in a given resistance in a given time by the sinusoidal current $I_0 \sin\omega t$ will be the same as that of a steady current of magnitude nearly
(a) 0.71 I_0
(b) 1.412 I_0
(c) I_0
(d) $\sqrt{I_0}$

Q.10. An A.C. source is connected to a resistive circuit. Which of the following is true?
(a) Current leads ahead of voltage in phase
(b) Current lags behind voltage in phase
(c) Current and voltage are in same phase
(d) Any of the above may be true depending upon the value of resistance.

Q.11. In which of the following circuits the maximum power dissipation is observed?
(a) Pure capacitive circuit
(b) Pure inductive circuit
(c) Pure resistive circuit
(d) None of these

Q.12. With increase in frequency of an A.C. supply, the inductive reactance
(a) decreases
(b) **increases directly with frequency**
(c) increases as square of frequency
(d) decreases inversely with frequency

Q.13. If the frequency of an A.C. is made 4 times of its initial value, the inductive reactance will
(a) **be 4 times**
(b) be 2 times
(c) be half
(d) remain the same

Q.14. A capacitor acts as an infinite resistance for
(a) DC
(b) AC
(c) DC as well as AC
(d) neither AC nor DC

Q.15. The capacitive reactance in an A.C. circuit is
(a) effective resistance due to capacity
(b) effective wattage
(c) effective voltage
(d) None of these

Q.16. Of the following about capacitive reactance which is correct
(a) The reactance of the capacitor is directly proportional to its ability to store charge
(b) Capacitive reactance is inversely proportional to the frequency of the current
(c) Capacitive reactance is measured in farad
(d) The reactance of a capacitor in an A.C. circuit is similar to the resistance of a capacitor in a D.C. circuit

Q.17. Phase difference between voltage and current in a capacitor in an ac circuit is
(a) π
(b) π/2
(c) 0
(d) π/3

Q.18. A capacitor has capacitance C and reactance X, if capacitance and frequency become double, then reactance will be
(a) 4X
(b) X/2
(c) X/4
(d) 2X

Q.19. When an AC voltage of 220 V is applied to the capacitor C, then
(a) the maximum voltage between plates is 220 V.
(b) the current is in phase with the applied voltage.
(c) the charge on the plate is not in phase with the applied voltage.
(d) Power delivered to the capacitor per cycle is zero.

Q.20. In LCR circuit if resistance increases quality factor
(a) increases finitely
(b) decreases finitely
(c) remains constant
(d) None of these

Q.21. An inductor, a resistor and a capacitor are joined in series with an AC source. As the frequency of the source is slightly increased from a very low value, the reactance of the
(a) inductor increases
(b) resistor increases
(c) capacitor increases
(d) circuit increases

Q.22. With increase in frequency of an A.C. supply, the impedance of an L-C-R series circuit
(a) remains constant
(b) increases
(c) decreases
(d) decreases at first, becomes minimum and then increases.

Q.23. If an LCR series circuit is connected to an ac source, then at resonance the voltage across
(a) R is zero
(b) R equals the applied voltage
(c) C is zero
(d) L equals the applied voltage

Q.24. In an L.C.R. series a.c. circuit, the current
(a) is always in phase with the voltage
(b) always lags the generator voltage
(c) always leads the generator voltage
(d) None of these

Q.25. An LCR series circuit, connected to a source E, is at resonance. Then the voltage across
(a) R is zero
(b) R equals applied voltage
(c) C is zero
(d) L equals applied voltage

Q.26. At resonance frequency the impedance in series LCR circuit is
(a) maximum
(b) minimum
(c) zero
(d) infinity

Q.27. At resonant frequency the current amplitude in series LCR circuit is
(a) maximum
(b) minimum
(c) zero
(d) infinity

Q.28. In tuning, we vary the capacitance of a capacitor in the tunning circuit such that the resonant frequency of the circuit becomes nearly equal to the frequency of the radio signal received. When this happens, the …A… with the frequency of the signal of the particular radio station in the circuit is maximum. Here A refers to
(a) resonant frequency
(b) impedance
(c) amplitude of the current
(d) reactance

Q.29. The power factor in a circuit connected to an A.C. The value of power factor is
(a) unity when the circuit contains an ideal inductance only
(b) unity when the circuit contains an ideal resistance only
(c) zero when the circuit contains an ideal resistance only
(d) unity when the circuit contains an ideal capacitance only

Q.30. Current in a circuit is wattless if
(a) inductance in the circuit is zero
(b) resistance in the circuit is zero
(c) current is alternating
(d) resistance and inductance both are zero

Q.31. Power factor is one for
(a) pure inductor
(b) pure capacitor
(c) pure resistor
(d) either an inductor or a capacitor.

Q.32. Power factor of the A. C. circuit varies between
(a) 0 to 0.5
(b) 0.5 to 1
(c) 0 to 1
(d) 1 to 2

Q.33. The graph between inductive reactance and frequency is
(a) parabola
(b) straight line
(c) hyperbola
(d) an arc of a circle

Q.34. For minimum dissipation of energy in the circuit the power factor should be
(a) large
(b) small
(c) moderate
(d) can not say

Q.35. The opposition offered by ohmic and non ohmic components is
(a) inductive reactance
(b) capacitive reactance
(c) impedance
(d) all of these

Q.36. The transformer voltage induced in the secondary coil of a transformer is mainly due to
(a) a varying electric field
(b) a varying magnetic field
(c) the vibrations of the primary coil
(d) the iron core of the transformer

Q.37. A transformer is employed to
(a) convert A.C. into D.C.
(b) convert D.C. into A.C.
(c) obtain a suitable A.C. voltage
(d) obtain a suitable D.C. voltage

Q.38. Transformers are used
(a) in DC circuit only
(b) in AC circuits only
(c) in both DC and AC circuits
(d) neither in DC nor in AC circuits

Q.39. The loss of energy in the form of heat in the iron core of a transformer is
(a) iron loss
(b) copper loss
(c) mechanical loss
(d) None of these

Q.40. A transformer is based on the principle of
(a) mutual induction
(b) self induction
(c) Ampere's law
(d) X-ray crystallography

Q.41. Quantity that remains unchanged in a transformer is
(a) voltage
(b) current
(c) frequency
(d) None of these

Q.42. Eddy currents in the core of transformer can't be developed by
(a) increasing the number of turns in secondary coil
(b) taking laminated transformer
(c) making step down transformer
(d) using a weak a.c. at high potential

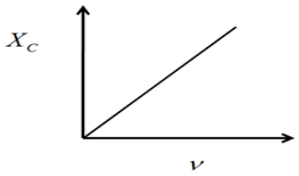
Q.43. The core of transformer is laminated to reduce
(a) flux leakage
(b) hysteresis
(c) copper loss
(d) eddy current

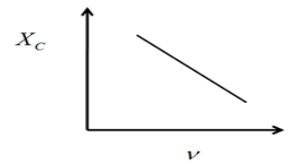
Q.44. The transformation ratio in the step-up transformer is
(a) one
(b) greater than one
(c) less than one
(d) the ratio greater or less than one depends on the other factor

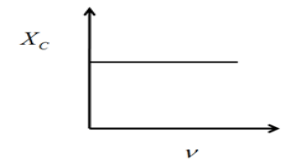
Q.46. The parallel combination of inductor and capacitor is called as
(a) rectifier circuit
(b) tank circuit
(c) acceptor circuit
(d) filter circuit

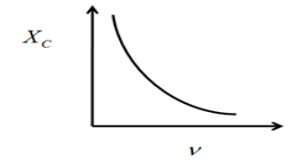
Q.47. Consider the following statements and then select the correct statements.
I. Most of the electrical device we use require AC voltage.
II. Most of the electrical energy sold by power companies is transmitted and distributed as alternating current.
III. AC voltage can be easily and efficiently converted from one to the other by means of transformers.
(a) I is correct, II and III are incorrect
(b) I III are correct, II is incorrect
(c) I II are correct, III is incorrect
(d) I, II and III are correct

. **Q.48. The correct variation of capacitive reactance of a capacitor with frequency is represented by**

(a) 

(b) 

(c) 

(d) 

Ans:- D

Q.49. The correct formula to determine the *Q* factor of series resonance circuit is

(a) $Q = \frac{1}{R}\sqrt{\frac{C}{L}}$

(b) $Q = \frac{1}{2}\sqrt{\frac{C}{L}}$

(c) $Q = \frac{1}{C}\sqrt{\frac{R}{L}}$

(d) $Q = \frac{1}{R}\sqrt{\frac{L}{C}}$

Answer -(d)

50. Which of the following equation shows the relation between Voltage, current and resistance?

a) V=IR

b) V=I/R

c) R=V/I

d) Both A and C

51. If current increases than voltage_____.

a) Increases

b) decreases

c) stable

d) All of the above

52. What is the relation between electric conductance and electric resistance?

a. C=1/R

b. R=C

c. C=V/R

d. None of the above

Prepared By Mr. Mandale R. K.	**Verified By** Mr. Lavhate V. J. Module Coordinator	**Re-Verified By** Mr. Patil S. S. Academic Coordinator	**Approved By** Mr. Mandale R.K. HoD EE

02 – D.C Circuit	Marks:-12

Content of Chapter:-

2.1 Ohm's Law and related terms, Internal resistance of source ,Concept of internal voltage drop Terminal Voltage.
2.2 Resistance in Series ,Resistance in Parallel
2.3 Active and Passive Circuit Parameters, Linear Circuit and Non-linear Circuit, Unilateral Circuit and Bi-lateral Circuit, Electric Network, Passive and Active Network, Node, Branch, Loop, Mesh
2.4 Kirchhoff's Current Law , Kirchhoff's Voltage Law

1. The S.I. unit of power is
(a) Henry
(b) coulomb
(c) watt
(d) watt-hour
Ans: c

2. Electric pressure is also called
(a) resistance
(b) power
(c) voltage
(d) energy
Ans: c

3. The substances which have a large number of free electrons and offer a low resistance are called
(a) insulators
(b) inductors
(c) semi-conductors
(d) conductors
Ans: d

4. Out of the following which is not a poor conductor?
(a) Cast iron
(b) Copper
(c) Carbon
(d) Tungsten
Ans: b

5. Out of the following which is an insulating material?
(a) Copper
(b) Gold
(c) Silver
(d) Paper
Ans: d

6. The property of a conductor due to which it passes current is called
(a) resistance
(b) reluctance
(c) conductance
(d) inductance

7. Conductance is reciprocal of
(a) resistance
(b) inductance
(c) reluctance
(d) capacitance
Ans: a

8. The resistance of a conductor varies inversely as
(a) length
(c) area of cross-section
(c) temperature
(d) resistivity
Ans: b

9. With rises in temperature the resistance of pure metals
(a) Increases
(b) Decreases
(c) First increases and then decreases
(d) remains constant
Ans: a

10. With rise in temperature the resistance of semi-conductors
(a) decreases
(b) increases
(c) first increases and then decreases
(d) remains constant
Ans: a

11. The resistance of a copper wire 200 m long is 21 Q. If its thickness (diameter) is 0.44 mm, its specific resistance is around
(a) 1.2 x 10~8 Q-m
(b) 1.4 x 10~8 Q-m
(c) 1.6 x 10""8 Q-m
(d) 1.8 x 10"8 Q-m
Ans: c

12. Three resistances of 10 ohms, 15 ohms and 30 ohms are connected in parallel. The total resistance of the combination is
(a) 5 ohms
(b) 10 ohms
(c) 15 ohms
(d) 55 ohms
Ans: a

13. An instrument which detects electric current is known as
(a) voltmeter
(b) rheostat
(c) wattmeter
(d) galvanometer
Ans: d

14. In a circuit a 33 Q resistor carries a current of 2 A. The voltage across the resistor is
(a) 33 V
(b) 66 v
(c) 80 V
(d) 132 V
Ans: b

15. A light bulb draws 300 mA when the voltage across it is 240 V. The resistance of the light bulb is
(a) 400 Q
(b) 600 Q
(c) 800 Q
(d) 1000 Q
Ans: c

16. The resistance of a parallel circuit consisting of two branches is 12 ohms. If the resistance of one branch is 18 ohms, what is the resistance of the other?
(a) 18 Q
(b) 36 Q
(c) 48 Q
(d) 64 Q
Ans: b

17. Four wires of same material, the same cross-sectional area and the same length when connected in parallel give a resistance of 0.25 Q. If the same four wires are connected is series the effective resistance will be
(a) 1 Q
(b) 2 Q
(c) 3 Q
(d) 4 Q
Ans: d

18. A current of 16 amperes divides between two branches in parallel of resistances 8 ohms and 12 ohms respectively. The current in each branch is
(a) 6.4 A, 6.9 A
(b) 6.4 A, 9.6 A
(c) 4.6 A, 6.9 A
(d) 4.6 A, 9.6 A
Ans: b

19. Current velocity through a copper conductor is
(a) the same as propagation velocity of electric energy
(b) independent of current strength
(c) of the order of a few ^.s/m
(d) nearly 3 x 108 m/s
Ans: c

20. Which of the following material has nearly zero temperature co-efficient of resistance?
(a) Manganin
(b) Porcelain
(c) Carbon
(d) Copper
Ans: a

21. You have to replace 1500 Q resistor in radio. You have no 1500 Q resistor but have several 1000 Q ones which you would connect
(a) two in parallel
(b) two in parallel and one in series
(c) three in parallel
(d) three in series
Ans: b

22. Two resistors are said to be connected in series when
(a) same current passes in turn through both
(b) both carry the same value of current
(c) total current equals the sum of branch currents
(d) sum of IR drops equals the applied e.m.f.
Ans: a

23. Which of the following statement is true both for a series and a parallel D.C. circuit?
(a) Elements have individual currents
(b) Currents are additive
(c) Voltages are additive
(d) Power are additive
Ans: d

24. Which of the following materials has a negative temperature co-efficient of resistance?
(a) Copper
(b) Aluminum
(c) Carbon
(d) Brass
Ans: c

25. Ohm's law is not applicable to
(a) vacuum tubes
(b) carbon resistors
(c) high voltage circuits
(d) circuits with low current densities
Ans: a

26. Which is the best conductor of electricity?
(a) Iron
(b) Silver
(c) Copper
(d) Carbon
Ans: b

27. For which of the following 'ampere second' could be the unit ?
(a) Reluctance
(b) Charge
(c) Power
(d) Energy
Ans: b

28. All of the following are equivalent to watt except
(a) (amperes) ohm
(b) joules/sec.
(c) amperes x volts
(d) amperes/volt
Ans: d

29. A resistance having rating 10 ohms, 10 W is likely to be a
(a) metallic resistor
(b) carbon resistor
(c) wire wound resistor
(d) variable resistor
Ans: c

30. Which one of the following does not have negative temperature co-efficient ?
(a) Aluminium
(b) Paper
(c) Rubber
(d) Mica
Ans: a

31. Varistors are
(a) insulators
(6) non-linear resistors
(c) carbon resistors
(d) resistors with zero temperature coefficient
Ans: b

32. Insulating materials have the function of
(a) preventing a short circuit between conducting wires
(b) preventing an open circuit between the voltage source and the load
(c) conducting very large currents
(d) storing very high currents
Ans: b

33. The rating of a fuse wire is always expressed in
(a) ampere-hours
(b) ampere-volts
(c) kWh
(d) amperes
Ans: d

34. The minimum charge on an ion is
(a) equal to the atomic number of the atom
(b) equal to the charge of an electron
(c) equal to the charge of the number of electrons in an atom
(d) zero
Ans: b

35. In a series circuit with unequal resistances
(a) the highest resistance has the most of the current through it
(b) the lowest resistance has the highest voltage drop
(c) the lowest resistance has the highest current
(d) the highest resistance has the highest voltage drop
Ans: d

36. The filament of an electric bulb is made of
(a) carbon
(b) aluminium
(c) tungsten
(d) nickel
Ans: c

37. A 3 Q resistor having 2 A current will dissipate the power of
(a) 2 watts
(b) 4 watts
(c) 6 watts
(d) 8 watts
Ans: c

38. Which of the following statement is true?
(a) A galvanometer with low resistance in parallel is a voltmeter
(b) A galvanometer with high resistance in parallel is a voltmeter
(c) A galvanometer with low resistance in series is an ammeter
(d) A galvanometer with high resistance in series is an ammeter
Ans: c

39. The resistance of a few meters of wire conductor in closed electrical circuit is
(a) practically zero
(b) low
(c) high
(d) very high
Ans: a

40. If a parallel circuit is opened in the main line, the current
(a) increases in the branch of the lowest resistance
(b) increases in each branch
(c) is zero in all branches
(d) is zero in the highest resistive branch
Ans: c

41. If a wire conductor of 0.2 ohm resistance is doubled in length, its resistance becomes
(a) 0.4 ohm
(b) 0.6 ohm
(c) 0.8 ohm
(d) 1.0 ohm
Ans: a

42. Three 60 W bulbs are in parallel across the 60 V power line. If one bulb burns open
(a) there will be heavy current in the main line
(b) rest of the two bulbs will not light
(c) all three bulbs will light
(d) the other two bulbs will light
Ans: d

43. The four bulbs of 40 W each are connected in series swift a battery across them, which of the following statement is true ?
(a) The current through each bulb in same
(b) The voltage across each bulb is not same
(c) The power dissipation in each bulb is not same
(d) None of the above
Ans: a

44. Two resistances Rl and Ri are connected in series across the voltage source where Rl>Ri. The largest drop will be across

(a) Rl
(b) Ri
(c) either Rl or Ri
(d) none of them
Ans: a

45. What will be energy used by the battery if the battery has to drive 6.28 x 1018 electrons with potential difference of 20 V across the terminal ?

(a) 5 joules
(b) 10 joules
(c) 15 joules
(d) 20 joules
Ans:

46. A closed switch has a resistance of

(a) zero
(b) about 50 ohms
(c) about 500 ohms
(d) infinity
Ans: a

47. The hot resistance of the bulb's filament is higher than its cold resistance because the temperature co-efficient of the filament is

(a) zero
(b) negative
(c) positive
(d) about 2 ohms per degree
Ans: c

48. Heat in a conductor is produced on the passage of electric current due to

(a) reactance
(b) capacitance
(c) impedance
(d) resistance
Ans: d

49. The insulation on a current carrying conductor is provided

(a) to prevent leakage of current
(b) to prevent shock
(c) both of above factors
(d) none of above factors
Ans: c

50. The thickness of insulation provided on the conductor depends on

(a) the magnitude of voltage on the conductor
(b) the magnitude of current flowing through it
(c) both (a) and (b)
(d) none of the above
Ans: a

51. Which of the following quantities remain the same in all parts of a series circuit ?
(a) Voltage
(b) Current
(c) Power
(d) Resistance
Ans: b

52. A 40 W bulb is connected in series with a room heater. If now 40 W bulb is replaced by 100 W bulb, the heater output will
(a) decrease
(b) increase
(c) remain same
(d) heater will burn out
Ans: b

53. In an electric kettle water boils in 10 m minutes. It is required to boil the boiler in 15 minutes, using same supply mains
(a) length of heating element should be decreased
(b) length of heating element should be increased
(c) length of heating element has no effect on heating if water
(d) none of the above
Ans: a

54. An electric filament bulb can be worked from
(a) D.C. supply only
(b) A.C. supply only
(c) Battery supply only
(d) All above
Ans: d

55. Resistance of a tungsten lamp as applied voltage increases
(a) decreases
(b) increases
(c) remains same
(d) none of the above
Ans: b

56. Electric current passing through the circuit produces
(a) magnetic effect
(b) luminous effect
(c) thermal effect
(d) chemical effect
(e) all above effects
Ans: c

57. Resistance of a material always decreases if (
a) temperature of material is decreased
(6) temperature of material is increased
(c) number of free electrons available become more
(d) none of the above is correct
Ans: c

58. If the efficiency of a machine is to be high, what should be low ?
(a) Input power
(b) Losses
(c) True component of power
(d) kWh consumed (
e) Ratio of output to input
Ans: b

59. When electric current passes through a metallic conductor, its temperature rises. This is due to
(a) collisions between conduction electrons and atoms
(b) the release of conduction electrons from parent atoms
(c) mutual collisions between metal atoms
(d) mutual collisions between conducting electrons
Ans: a

60. Two bulbs of 500 W and 200 W rated at 250 V will have resistance ratio as
(a) 4 : 25
(b) 25 : 4
(c) 2 : 5
(d) 5 : 2
Ans: c

61. A glass rod when rubbed with silk cloth is charged because
(a) it takes in proton
(b) its atoms are removed
(c) it gives away electrons
(d) it gives away positive charge
Ans: c

62. Whether circuit may be AC. or D.C. one, following is most effective in reducing the magnitude of the current.
(a) Reactor
(b) Capacitor
(c) Inductor
(d) Resistor
Ans: d

63. It becomes more difficult to remove
(a) any electron from the orbit
(6) first electron from the orbit
(c) second electron from the orbit
(d) third electron from the orbit
Ans: d

64. When one leg of parallel circuit is opened out the total current will
(a) reduce
(b) increase
(c) decrease
(d) become zero
Ans: c

65. In a lamp load when more than one lamp are switched on the total resistance of the load
(a) increases
(b) decreases
(c) remains same
(d) none of the above
Ans: b

66. Two lamps 100 W and 40 W are connected in series across 230 V (alternating). Which of the following statement is correct ?
(a) 100 W lamp will glow brighter
(b) 40 W lamp will glow brighter
(c) Both lamps will glow equally bright
(d) 40 W lamp will fuse
Ans: b

67. Resistance of 220 V, 100 W lamp will be
(a) 4.84 Q
(b) 48.4 Q
(c) 484 ft
(d) 4840 Q
Ans: c

68. In the case of direct current
(a) magnitude and direction of current remains constant
(b) magnitude and direction of current changes with time
(c) magnitude of current changes with time
(d) magnitude of current remains constant
Ans: a

69. When electric current passes through a bucket full of water, lot of bubbling is observed. This suggests that the type of supply is
(a) A.C.
(b) D.C.
(c) any of above two
(d) none of the above
Ans: b

70. Resistance of carbon filament lamp as the applied voltage increases.
(a) increases
(b) decreases
(c) remains same
(d) none of the above
Ans: b

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04 – Magnetic Circuits	Marks:-14

Content of Chapter:-

1.1.Magnetic lines of force, flux density, Magnetic flux density
1.2 MMF, magnetic force, permeability, Ampere turn (AT).
1.3 Electric &Magnetic circuit , series Magnetic & parallel magnetic circuit,
1.4 Magnetization Curve (B-H Curve)
1.5 Magnetic hysteresis loop & hysteresis loop Application.

1. The Unit of Magnetic Flux is

(A) Tesla
(B) Weber
(C) Weber - metre
(D) None of the above
Answer: - Option B

2. EMF Stands for

(A) Electromechanical force
(B) Electromagnetic I force
(C) Electromotive force
(D) None of the above
Answer: - Option C

3. Volt is equal to

(A) Joule/Coulomb
(B) Ampere/Seconds
(C) Joule/Seconds
(D) Coulomb/Seconds
Answer: - Option A

4. B in B-H curve is known as

(A) Reluctance
(B) Magnetizing Force
(C) Magnetic flux density
(D) Magnetic Intensity
Answer: - Option C

5. The Unit of Magnetic Flux Density is

(A) Tesla
(B) Weber
(C) Weber - metre
(D) None of the above
Answer: - Option A

6. MMF stands for

(A) Magnetic Memory field
(B) Magnetic Material Force
(C) Magneto Motive Force
(D) None of the above
Answer: - Option C

7. H in B-H curve is known as
(A) Reluctance
(B) Magnetizing Force
(C) Magnetic flux density
(D) Magnetic Intensity
Answer: - Option B

8. Watt is equal to
(A) Joule/Coulomb
(B) Ampere/Seconds
(C) Joule/Seconds
(D) Coulomb/Seconds
Answer: - Option C

9. Hysteresis in magnetic circuit is phenomenon of
(A) Lagging of B behind H
(B) Lagging of H behind B
(C) Setting up constant flux
(D) None of the above
Answer: - Option A

10. The SI Unit of Actual Permeability of free space is
(A) Henry
(B) Henry/Metre
(C) Weber - metre
(D) Farad/Metre
Answer: - Option B

11. Magnetic flux passes more readily through
(A) Wood
(B) Air
(C) Iron
(D) Vacuum
Answer: - Option C

12. MMF in magnetic circuit corresponds to _____ in electric circuit
(A) Potential Difference
(B) EMF
(C) Current
(D) Resistance
Answer: - Option B

13. The B-H curve of _____ will not be a straight line
(A) Wood
(B) Air
(C) Soft Iron
(D) Copper
Answer: - Option C

14. Direction of induced EMF can be found out from
(A) Faradays law
(B) Amperes law
(C) Fleming left hand Rule
(D) Lenz´s law
Answer: - Option D

15. Which of the following material has least area of Hysteresis loop
(A) Wrought Iron
(B) Hard Steel
(C) Soft Iron
(D) Silicon Steel
Answer: - Option D

16. Ampere is equal to
(A) Joule/Coulomb
(B) Ampere/Seconds
(C) Joule/Seconds
(D) Coulomb/Seconds
Answer: - Option D

17. Flux in magnetic circuit corresponds to _____ in electric circuit
(A) Potential Difference
(B) EMF
(C) Current
(D) Resistance
Answer: - Option C

18. Reluctance in magnetic circuit corresponds to _____ in electric circuit
(A) Potential Difference
(B) EMF
(C) Current
(D) Resistance
Answer: - Option D

19. Magnitude of induced EMF is found out from
(A) Faradays law
(B) Amperes law
(C) Fleming left hand Rule
(D) Lenz´s law
Answer: - Option A

20. Direction of induced EMF can be found out from
(A) Faradays law
(B) Fleming right hand Rule
(C) Lenz´s law
(D) Both B & C
Answer: - Option D

21. If charge Q is 4 coulombs and time t is 1 seconds then current I is
(A) 1 Ampere
(B) 5 Ampere
(C) 3 Ampere
(D) 4 Ampere
Answer: - Option D
Explanation: - I = Q/t

22. If 3 joules work is done to charge a body to one coulomb Q then voltage V is
(A) 1 Volt
(B) 2 Volt
(C) 3 Volt
(D) 4 Volt
Answer: - Option C

23. If current I is 7 amperes and time is 1 seconds then charge Q is
(A) 6 coulombs
(B) 7 coulombs
(C) 8 coulombs
(D) 1 coulombs
Answer: - Option B
Explanation: - Q = I*t

24. If charge Q is 8 coulombs and time t is 8 seconds then current I is
(A) 1 Ampere
(B) 5 Ampere
(C) 3 Ampere
(D) 4 Ampere
Answer: - Option A
Explanation: - I = Q/t

25. If current I is 2 amperes and time t is 4 seconds then charge Q is
(A) 6 coulombs
(B) 7 coulombs
(C) 8 coulombs
(D) 1 coulombs
Answer: - Option B
Explanation: - Q = I*t

26. If energy is 5 joules and time t is 1 seconds then power W is
(A) 5 Watts
(B) 4 Watts
(C) 6 Watts
(D) 1 Watt
Answer: - Option A
Explanation: - Energy = Power * time

27. If energy is 5 joules and time t is 5 seconds then power W is
(A) 5 Watts
(B) 4 Watts
(C) 6 Watts
(D) 1 Watt
Answer: - Option D
Explanation: - Energy = Power * time

28. The MMF of 75 turn coil of wire carrying 4 ampere current is
(A) 71 At
(B) 79 At
(C) 300 At
(D) 75 At
Answer: - Option C
Explanation: - MMF = Ampere-turns

29. The number of turns coil of wire carrying 2 ampere current having MMF of 100 At are
(A) 98
(B) 102
(C) 50
(D) 2
Answer: - Option C

30. The current through the wire having 200 number of turns and MMF of 200 At is
(A) 1 A
(B) 0 A
(C) 400 A
(D) 200 A
Answer: - Option C
Explanation: - MMF = Ampere-turns

31. The magnetic flux density in a magnetic field in which flux is 600 Micro-weber and area is 0.1 m^2
(A) 6000 microtesla
(B) 600 microtesla
(C) 6 tesla
(D) 0.6 tesla
Answer: - Option A
Explanation: - B= Flux/Area

32. The flux in a magnetic field in which magnetic flux density is 0.003 Tesla and area is 0.4 m^2
(A) 1.2 miliweber
(B) 1.2 weber
(C) 0.0012 miliweber
(D) 0.003 miliweber
Answer: - Option A
Explanation: - B= Flux/Area

33. When the length of the material increases reluctance
(A) Increases
(B) Decreases
(C) Remains the same
(D) Becomes Zero
Answer: - Option A

34. The area of a magnetic field in which magnetic flux density is 0.008 Tesla and flux is 1.4 miliweber
(A) 0.175 m^2
(B) 0.005 m^2
(C) 0.75 m^2
(D) 1.75 m^2
Answer: - Option A
Explanation: - B= Flux/Area

35. The MMF of 50 turn coil of wire carrying 4 ampere current is
(A) 71 At
(B) 79 At
(C) 200 At
(D) 75 At
Answer: - Option C
Explanation: - MMF = Ampere-turn

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03 – Capacitors	Marks:-12

Content of Chapter:-

3.1 Parallel Plate Capacitor
3.2 Various connections of capacitors
3.3 Energy Stored in Capacitor
3.4 Charging and Discharging of Capacitor
3.5 Concept of Breakdown Voltage and Di-electric strength
3.6 Types of Capacitors and their Applications

1. The correct statement of Ohm's law:

c) Voltage is inversely proportional to the power
d) Current is inversely proportional to the applied voltage
e) Power is a product of resistance times voltage
f) Increase in resistance decreases current for constant voltage

2. The effective capacitance of a capacitor is reduced when capacitors are connected in

a) series
b) parallel
c) series-parallel combination
d) none of the above

3. As the capacitor in the RC circuit above reaches its maximum charge:

a) **the rate at which the current changes decreases and the rate at which thecharge changes increase the rate at which the current changes increases and the rate at which the chargechanges increases**.
b) both rates decrease.
c) both rates increase.

4. As the capacitor in the RC circuit above reaches its maximum charge, which of thefollowing statements is FALSE:

a) the voltage across the capacitor is at its maximum.
b) the voltage across the resistor is zero.
c) the sum of the voltages across the capacitor and resistor is equal to the initialvoltage across the resistor.
d) the sum of the voltages across the capacitor and resistor is equal to the initialvoltage across the capacitor

5. You have a 1 mF capacitor with Q's worth of charge on it. A dielectric whose dielectric constant is 5 is carefully slipped between the plate of the capacitor. Whichstatement is FALSE.

a) the new capacitance will equal 5C.
b) the new charge on the plates is 5Q.
c) the new voltage across the plates is a fifth what it was.
d) the new electric field between the plates is a fifth what it was.

6. Capacitance is:

a) measure in farads.
b) the ratio of the magnitude of the charge on either conductor of a capacitor to themagnitude of the potential difference between the conductors.
c) constant for a parallel plate capacitor.
d) all three choices.

7. In a circuit, a capacitor has potential difference ΔV , charge Q, and capacitance C. Thepotential difference is doubled. The capacitance:

a) changes in ways impossible to predict with the given information.
b) doubles.
c) **does not change**.
d) is divided in half.

8. **To increase the capacitance of a parallel-plate capacitor, you can**:

a) increase the area of the plates.
b) increase the distance between the plates.
c) all of these choices.
d) none of these choices.

9. Given a set of capacitors C1 + C2 + ...+ Cn , where n is greater than 1, will a greaterequivalent capacitance result by adding them in parallel or in series?

a) in series.
b) in parallel.
c) they will be the same.
d) This cannot be determine without know the value of each capacitor and number ofcapacitors in the system.

10. **Given n capacitors with charge Q and capacitance C, will you get the greatest energystored**:

a) in series.
b) in parallel.
c) They will be the same.
d) This cannot be determine without knowing more about the situation.

11. Select the option that best describes a dielectric.

a) A dielectric is a non-conducting material.
b) A dielectric is the material when placed between the plates of a capacitor willincrease the electric field.
c) A dielectric is something that when placed between the plates decreases thecapacitance of the capacitor.
d) All of these choices are true.

12. Bakelite has a dielectric constant approximately twice that of silicone oil. The bakelite in a capacitor with capacitance C is replaced with silicone oil. What will the new capacitance be, approximately?

a) 2C
b) C/2.
c) C.
d) None the avove

13. Capacitor has capacitance C, charge Q, and potential difference with nothing betweenthe plates. While still connected to a battery, a dielectric is inserted with a dielectric constant of 2. How will each change?

a) Cnew = 2C, Qnew = Q, ΔVnew = ΔV .
b) Cnew = 2C, Qnew = 2Q, ΔVnew = 2ΔV.
c) Cnew = 2C, Qnew = Q, ΔVnew = 2ΔV
d) Cnew = 2C, Qnew = 2Q, ΔVnew = 2ΔV

14. capacitor has capacitance C, charge Q, and potential difference ΔV with nothing between the plates. The capacitor is then disconnected from the battery and a dielectricis inserted with a dielectric constant of 2. How will each of the values

C, Q, and V change?

a) Cnew = 2C, Qnew = Q, ΔVnew = ΔV

b) Cnew = 2C, Qnew = 2Q, ΔVnew = ΔV/2

c) Cnew = 2C, Qnew = Q, ΔVnew = ΔV/2 .

d) Cnew = 2C, Qnew = 2Q, ΔVnew = 2ΔV

15. A hollow metal sphere of radius 5 cm is charged such that the potential on its surfaceto 10 V. The potential at the centre of the sphere is

a) zero

b) 10 V

c) the same as that at a point 5 cm away from the surface

d) the same as that at a point 25 cm away from the surface

16. Two equal negative charges - q are fixed at points (0, a) and (0, - a) on the y-axis, Apositive charge Q is released from rest at a point (2a, 0) on the x-axis. The charge Qwill

a) execute simple harmonic motion about the origin

b) move to the origin and remain at rest there

c) move to infinity

d) execute oscillatory but not simple harmonic motion.

17. Two positive point charges of 12 and 8 microcoulornbs respectively are placed 10 cmapart in air. The work done to bring them 4 cm closer is

a) zero

b) 3.8 J

c) 4.8 J

d) 5.8 J

18. One thousand spherical water droplets, each of radius r and each carrying a charge q.coalesce to form a single spherical drop. If v is the electrical potential of each dropletand V that of the bigger drop, then

a) V/v =1 / 1000

b) V/v =1 / 100

c) v/V =1 / 1000

d) v/V =1 / 100

19. An electric dipole placed with its axis in the direction of a uniform electric fieldexperiences

a) a force but no torque

b) a torque but no force

c) a force as well as a torque

d) neither a force nor a torque

20. Parallel plate capacitor of capacitance 100 pF is to be constructed by using paper sheets of 1.0 mm thickness as dielectric. If the dielectric constant of paper is 4.0, thenumber of circular metal foils of diameter 2.0 cm each required for this purpose is

a) 10

b) 20

c) 30

d) 40

21. Three capacitors, each of capacitance C = 3 MicroF, are connected as shown in parallelThe equivalent capacitance between points P and S is

a) 1 MicroF

b) 3 MicroF

c) 6 MicroF

d) 9 MicroF

22. Two parallel plate capacitors of capacitances C and 2C are connected in parallel and charged to a potential difference V by a battery. The battery is then disconnected andthe space between the plates of capacitor C is completely filled with a material of dielectric constant K. The potential difference across the capacitors now becomes

a) V/ K +1
b) 2V /K +2
c) 3V /K +2
d) 3V/ K+ 3

23. The electric potential V (in volt) varies with x (in metre) according to the relation F = 5 + 4x2
The force experienced by a negative charge of 2 × 10-6 C located at x = 0.5 m is

a) 2 × 10-6N
b) 4 × 10-6 N
c) 6 × 10-6 N
d) 8 × 10-6N

24.A charge q is placed at the centre of the line joining two equal charges Q. The systemof the three charges will be in equilibrium if q is equal to

a) Q/-2
b) Q/-4
c) Q/2
d) Q/4

25. An electric dipole placed with its axis inclined at an angle to the direction of a uniformelectric field experiences

a) a force but no torque
b) a torque but no force
c) a force as well as a torque
d) neither a force nor a torque

26. An electric dipole placed in a non-uniform electric field experiences

a) a force but no torque
b) a torque but no force
c) a force as well as a torque
d) neither a force nor a torque.

28.**A neutral hydrogen molecule has two protons and two electrons. If one of the electrons is removed we get a hydrogen molecular ion (H2+). In the ground state of H2+ the twoprotons are separated by roughly 1.5 Å and the electron is roughly 1 Å from each proton. What is the potential energy of the system?**

a) -38.4 eV
b) **- 19.2 eV**
c) -9.6 eV
d) zero

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05 – Electromagnetic Magnetic Induction	Marks:-20

Content of Chapter:-

5.1 Development of Induced e.m.f. and Current, Faraday's Laws of Electromagnetic Induction.
5.2 Static & Dynamic E.M.F , Lenz's Law for statically induced e,m,f,
Fleming's Right Hand Rule for dynamically induced e.m.f.
5.3 Self induced e.m.f. and mutually induced e.m.f, Coefficient of Coupling
5.4 Inductances in series.
5.5 Types of inductors and their applications , Energy Stored in Magnetic Field

1. **What bond is formed when one or more electrons in the outermost energy orbit of anatom are transferred to another?**
   a) Ionic
   b) Covalent
   c) Metallic
   d) Van der Waals

2. **In electro-mechanical conversion devices like generators and motors the reason why asmall air gap is left between the rotor and stator is to**
   a) permit mechanical clearance
   b) increase flux density in air gap
   c) decrease the reluctance of magnetic path
   d) complete the magnetic path

3. **What is the coupling coefficient when all the flux of coil 1 links with coil 2?**
   a) 0
   b) 100
   c) 1
   d) None of the abone

4. **Why is it that the magnitude of magnetomotive force required for air gap is muchgreater than that required for iron part of a magnetic circuit?**
   a) Because air is a gas
   b) Because air has the highest relative permeability
   c) Because air is a conductor of magnetic flux
   d) Because air has the lowest relative permeability

5. The Unit of Magnetic Flux is
(A) Tesla
(B) Weber
(C) Weber - metre
(D) None of the above
Answer: - Option B

6. EMF Stands for
(A) Electromechanical force

(B) Electromagnetic I force
(C) Electromotive force
(D) None of the above
Answer: - Option C

7. Volt is equal to
(A) Joule/Coulomb
(B) Ampere/Seconds
(C) Joule/Seconds
(D) Coulomb/Seconds
Answer: - Option A

8. B in B-H curve is known as
(A) Reluctance
(B) Magnetizing Force
(C) Magnetic flux density
(D) Magnetic Intensity
Answer: - Option C

9. The Unit of Magnetic Flux Density is
(A) Tesla
(B) Weber
(C) Weber - metre
(D) None of the above
Answer: - Option A

10. MMF stands for
(A) Magnetic Memory field
(B) Magnetic Material Force
(C) Magneto Motive Force
(D) None of the above
Answer: - Option C

11. H in B-H curve is known as
(A) Reluctance
(B) Magnetizing Force
(C) Magnetic flux density
(D) Magnetic Intensity
Answer: - Option B

12. Watt is equal to
(A) Joule/Coulomb
(B) Ampere/Seconds
(C) Joule/Seconds
(D) Coulomb/Seconds
Answer: - Option C

13. Hysteresis in magnetic circuit is phenomenon of
(A) Lagging of B behind H
(B) Lagging of H behind B
(C) Setting up constant flux
(D) None of the above
Answer: - Option A

14. The SI Unit of Actual Permeability of free space is

(A) Henry
(B) Henry/Metre
(C) Weber - metre
(D) Farad/Metre
Answer: - Option B

15. Magnetic flux passes more readily through

(A) Wood
(B) Air
(C) Iron
(D) Vacuum
Answer: - Option C

12. MMF in magnetic circuit corresponds to _____ in electric circuit

(A) Potential Difference
(B) EMF
(C) Current
(D) Resistance
Answer: - Option B

13. The B-H curve of _____ will not be a straight line

(A) Wood
(B) Air
(C) Soft Iron
(D) Copper
Answer: - Option C

14. Direction of induced EMF can be found out from

(A) Faradays law
(B) Amperes law
(C) Fleming left hand Rule

15. Which of the following material has least area of Hysteresis loop

(A) Wrought Iron
(B) Hard Steel
(C) Soft Iron
(D) Silicon Steel
Answer: - Option D

16. Ampere is equal to

(A) Joule/Coulomb
(B) Ampere/Seconds
(C) Joule/Seconds
(D) Coulomb/Seconds
Answer: - Option D

17. Flux in magnetic circuit corresponds to _____ in electric circuit

(A) Potential Difference
(B) EMF
(C) Current
(D) Resistance
Answer: - Option C

18. Reluctance in magnetic circuit corresponds to _____ in electric circuit

(A) Potential Difference
(B) EMF
(C) Current
(D) Resistance
Answer: - Option D

19. Magnitude of induced EMF is found out from

(A) Faradays law
(B) Amperes law
(C) Fleming left hand Rule
(D) Lenz´s law
Answer: - Option A

20. Direction of induced EMF can be found out from

A) Faradays law
(B) Fleming right hand Rule
(C) Lenz´s law
(D) Both B & C
Answer: - Option D

21. If charge Q is 4 coulombs and time t is 1 seconds then current I is

(A) 1 Ampere
(B) 5 Ampere
(C) 3 Ampere
(D) 4 Ampere
Answer: - Option D
Explanation: - I = Q/t

22. If 3 joules work is done to charge a body to one coulomb Q then voltage V is

(A) 1 Volt
(B) 2 Volt
(C) 3 Volt
(D) 4 Volt
Answer: - Option C
Explanation: - V = J/Q

23. If current I is 7 amperes and time is 1 seconds then charge Q is

(A) 6 coulombs
(B) 7 coulombs
(C) 8 coulombs
(D) 1 coulombs

Answer: - Option B
Explanation: - Q = I*t

24. If charge Q is 8 coulombs and time t is 8 seconds then current I is
(A) 1 Ampere
(B) 5 Ampere
(C) 3 Ampere
(D) 4 Ampere
Answer: - Option A
Explanation: - I = Q/t

25. If current I is 2 amperes and time t is 4 seconds then charge Q is
(A) 6 coulombs
(B) 7 coulombs
(C) 8 coulombs
(D) 1 coulombs
Answer: - Option B
Explanation: - Q = I*t

26. If energy is 5 joules and time t is 1 seconds then power W is
(A) 5 Watts
(B) 4 Watts
(C) 6 Watts
(D) 1 Watt
Answer: - Option A
Explanation: - Energy = Power * time

27. If energy is 5 joules and time t is 5 seconds then power W is
(A) 5 Watts
(B) 4 Watts
(C) 6 Watts
(D) 1 Watt
Answer: - Option D
Explanation: - Energy = Power * time

28. The MMF of 75 turn coil of wire carrying 4 ampere current is
(A) 71 At
(B) 79 At
(C) 300 At
(D) 75 At
Answer: - Option C
Explanation: - MMF = Ampere-turns

29. The number of turns coil of wire carrying
(A) 98
(B) 102
(C) 50
(D) 2
Answer: - Option C
Explanation: - MMF = Ampere-turns

30. The current through the wire having 200 number of turns and MMF of 200 At is

(A) 1 A
(B) 0 A
(C) 400 A
(D) 200 A

Answer:
- Option C

Explanation: - MMF = Ampere-turns

31. The magnetic flux density in a magnetic field in which flux is 600 Microweber and area is 0.1 m^2

(A) 6000 microtesla
(B) 600 microtesla
(C) 6 tesla
(D) 0.6 tesla

Answer: - Option A

Explanation: - B= Flux/Area

32. The flux in a magnetic field in which magnetic flux density is 0.003 Tesla and area is 0.4 m^2

(A) 1.2 miliweber
(B) 1.2 weber
(C) 0.0012 miliweber
(D) 0.003 miliweber

Answer: - Option A

Prepared By Mr. Mandale R. K.	**Verified By** Mr. Lavhate V. J. Module Coordinator	**Re-Verified By** Mr. Patil S. S. Academic Coordinator	**Approved By** Mr. Mandale R.K. HoD EE