



Zeal Education Society's  
**ZEAL POLYTECHNIC, PUNE**

NARHE | PUNE -41 | INDIA

DEPARTMENT OF ELECTRICAL ENGINEERING

**SECOND YEAR (SY)**

**SCHEME: I**

**SEMESTER: IV**

**NAME OF SUBJECT: DC MOTORS &  
TRANSFORMERS**

**Subject Code: 22418**

**UNIT WISE MULTIPLE CHOICE  
QUESTIONS BANK**



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**Question Bank for Multiple Choice Questions**

<b>Program: Diploma in Electrical engineering</b>	<b>Program Code:- EE</b>
<b>Scheme:-I</b>	<b>Semester:- 4</b>
<b>Course:- DC Motors &amp; Transformers</b>	<b>Course Code:- 22418</b>

<b>01 – Introduction to Electric Motors</b>	<b>Marks:-10</b>
<b>Content of Chapter:-</b> 1.1 Electrical principles and of operation of different types of motors 1.2 Construction and representation: parts of with their materials schematic diagrams. 1.3 Function of parts the various parts of different electric motors	

**1. What will happen if DC shunt motor is connected across AC supply?**

- a) Will run at normal speed
- b) Will not run
- c) Will Run at lower speed
- d) Burn due to heat produced in the field winding**

**2. What will happen if the back emf of a DC motor vanishes suddenly?**

- a) The motor will stop
- b) The motor will continue to run
- c) The armature may burn**
- d) The motor will run noisy

**3. What will happen, with the increase in speed of a DC motor?**

- a) Back emf increase but line current falls.**
- b) Back emf falls and line current increase.
- c) Both back emf as well as line current increase.
- d) Both back emf as well as line current fall.

**4. Which part will surely tell that given motor is DC motor and not an AC type?**

- a) Winding
- b) Shaft
- c) Commutator**
- d) Stator

5. In DC motor, which of the following part can sustain the maximum Temperature rise?

- a) Field winding
- b) Commutator
- c) Slip rings
- d) Armature winding

6. Direction of rotation of motor is determined by \_\_\_\_\_

- a) Faraday's law
- b) Lenz's law
- c) Coulomb's law
- d) Fleming's left-hand rule

7. The current drawn by the armature of DC motor is directly proportional to \_\_\_\_\_

- a) Torque
- b) Speed
- c) The voltage across the terminals
- d) cannot be determined

8. Which power is mentioned on a name plate of a motor?

- a) Gross power
- b) Power drawn in kVA
- c) Power drawn in kW
- d) Output power available at the shaft

9. An electric motor is having constant output power. So, motor will have a torque speed characteristic \_\_\_\_\_

- a) Circle about the origin.
- b) Straight line parallel to the speed axis.
- c) Straight line through the origin.
- d) Rectangular hyperbola

10. Which of the following quantity will decrease if supply voltage is increased?

- a) Starting torque
- b) Operating speed
- c) Full-load current
- d) cannot be determined

11. In which of the following case we will get maximum power?

- a)  $E_a = 2 \times \text{supply voltage}$
- b)  $E_a = \text{supply voltage}$
- c) Supply voltage =  $2 \times E_a$
- d) supply voltage =  $4 \times E_a$

**12. Sometimes motor has to be de-rated.**

- a) True
- b) False

**13. The armature shaft of a DC motor must be able to withstand \_\_\_\_\_**

- a) Bending moment due to weight of the armature.
- b) Any unbalanced magnetic pull on the armature core.
- c) Twisting strains due to transmission of torque.
- d) Bending moment, unbalanced magnetic pull and twisting strains**

**14. In DC machines the residual magnetism is present. The order of residual magnetism is \_\_\_\_\_**

- a) 2 to 3 per cent**
- b) 10 to 15 per cent
- c) 20 to 25 per cent
- d) 50 to 75 per cent

**15. Sparking is discouraged in a DC motor.**

- a) True
- b) False

**16. Which power is mentioned on a name plate of a motor?**

- a) Gross power
- b) Power drawn in kVA
- c) Power drawn in kW
- d) Output power available at the shaft**

**17. An electric motor is having constant output power. So, motor will have a torque speed characteristic \_\_\_\_\_**

- a) Circle about the origin.
- b) Straight line parallel to the speed axis.
- c) Straight line through the origin.
- d) Rectangular hyperbola**

**18. Which of the following quantity will decrease if supply voltage is increased?**

- a) Starting torque
- b) Operating speed
- c) Full-load current**
- d) cannot be determined

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**02 – DC Machines**

**Marks:-14**

**Content of Chapter:-**

- 2.1 Types of DC machines , Flemings right hand rule, principles of operation of dc generators and motor, back emf and its significance, voltage equation of dc motor
- 2.2 torque and speed : Armature Torque , shaft torque, BHP, Brake test ,losses, efficiency
- 2.3 DC motor starters: necessity ,two point and three points Starters
- 2.4 Speed control of DC shunt and series motors flux and Armature Control.
- 2.5 Brushless DC motors : Construction and working.

**1. Where is field winding mounted in a DC machine?**

- a) **Stator**
- b) Rotor
- c) Absent
- d) Anywhere on stator or rotor

**2. What are the materials used for brushes in dc machines?**

- a) Iron
- b) **Carbon**
- c) Aluminum
- d) Steel

**3. Function of yoke is to provide the return path for magnetic flux.**

- a) **True**
- b) false

**4. The angle (electrical) made by brushes with axes of adjoining filed poles is \_\_\_\_\_**

- a) 450
- b) 1800
- c) **900**
- d) 300

**5. In a DC machine, rectification process is carried out in order to get unidirectional output (DC).**

**This rectification process is carried out by \_\_\_\_\_**

- a) Half wave rectifier
- b) Full wave rectifier
- c) **Mechanical rectification**
- d) Centre tapped rectifier

**6. Which of the following part is used in construction of DC machine but not in AC machine?**

- a) Armature Winding
- b) Field winding
- c) Commutator**
- d) Shaft

**7. In a DC machine fractional pitch winding is used to \_\_\_\_\_**

- a) To improve cooling
- b) To reduce sparking**
- c) To reduce copper losses
- d) To increase generated EMF

**8. In normal dc machines operating at full-load conditions, the most powerful electromagnet is \_\_\_\_\_**

- a) Field winding**
- b) Interpole Winding
- c) Interpole and compensating winding together
- d) Armature winding

**9. If a DC motor is connected to AC supply what will happen then?**

- a) Not run
- b) Burn
- c) Run at normal speed
- d) Run at extremely low speed**

**10. The armature of DC motor is laminated to \_\_\_\_\_**

- a) To reduce mass
- b) To reduce hysteresis loss
- c) To reduce eddy current loss**
- d) To reduce inductance

**11. Armature winding is mounted on a \_\_\_\_\_**

- a) Stator
- b) Rotor**
- c) Can be mounted anywhere on stator or rotor
- d) Not required

**12. In a DC machine, how coil-side emf varies towards the outer side of poles?**

- a) Decreases**
- b) remains same
- c) Increases
- d) First increases then decreases

**13. Commutator performs rectification so that output of the machine is unidirectional.**

- a) True
- b) False

**14. What is the difference of DC voltages in the adjoining Brushes?**

- a) Depends on the Shaft speed
- b) Zero**
- c) Non-zero
- d) Depends on the various other parameters

**15. What is the effect of armature coils at points where brushes are located?**

- a) Induces positive emf**
- b) Induces negative emf
- c) Induces zero emf**
- d) Depends on the speed of rotor

**16. As the armature rotates, the number of coils in series tapped by the brush pairs\_\_\_\_\_**

- a) Remains same**
- b) Increases
- c) Decreases
- d) Depends on rotor speed and direction of torque

**17. Coil span for 4-pole, 12-slot armature winding is\_\_\_\_\_**

- a) 24
- b) 48**
- c) 8
- d) 3

**18. What is the nature of the coils when YCS value is non-integral?**

- a) Long-pitched
- b) Medium-pitched
- c) Short-pitched**
- d) Can't be determined by YCS value

**19. For a 2-pole DC machine with coil span equal to 6, what are the number of commutator segments?**

- a) 3
- b) 12**
- c) 4
- d) 8

**20. When coil sides are pole pitch apart, the DC armature winding is called as \_\_\_\_\_**

- a) Multiplex

- b) Fractional-pitch
- c) Full-pitch**
- d) Pole-pitch

**21. In which mode machine is operating, given that conductor current is in the same direction of conductor emf?**

- a) Motoring
- b) Generating**
- c) Can't be determined using directions
- d) In both modes for different cycles

**22. Nature of the flux density wave in the air gap is (for armature current equal to 0)**

- a) Flat topped with quarter wave symmetry**
- b) Point topped with quarter wave symmetry
- c) Flat topped with half wave symmetry
- d) Point topped with half wave symmetry

**23. In a DC machine, average energy stored in the magnetic field remains constant independent of the armature rotation.**

- a) True**
- b) False

**24. Emf produced by DC machine, for zero armature current ( $E_1$ ) and non-zero armature current ( $E_2$ ) can be related as \_\_\_\_\_**

- a)  $E_1 = E_2$**
- b)  $E_1 > E_2$
- c)  $E_1 < E_2$
- d) Can't be determined

**25. Average coil emf for 20 coil turns ( $E_1$ ) and 40 coil turns ( $E_2$ ), will have ratio  $E_1/E_2 =$  \_\_\_\_\_ (assuming all other parameters same for both machines)**

- a)  $\frac{1}{2}$**
- b)  $\frac{2}{1}$
- c)  $\frac{1}{4}$
- d)  $\frac{4}{1}$

**26. What is the average coil emf generated in a 4-pole DC machine having flux/pole equal to 0.1 wb rotating at 1500 rpm? (No. of coil sides = 100)**

- a) 19 kV**
- b) 1.9 kV
- c) 190 V
- d) 19 V



27. Emf and torque produced in a DC machine are proportional to \_\_\_\_\_ and \_\_\_\_\_ respectively.

- a) Armature speed and armature emf
- b) Armature emf and armature speed
- c) Armature current and armature emf
- d) Armature speed and armature current**

28. What is the value of  $N_p$  in an average coil emf equation, for 10 armature conductors with 2 parallel paths?

- a) 2
- b) 3
- c) 2.5**
- d) 4

29. What is the torque equation in terms of  $B$ ,  $l_c$ ,  $I$ ,  $Z_r$  ( $r$  = mean air gap radius)?

- a)  $B_{av} \cdot l_c \cdot I \cdot Z_r$**
- b)  $B_{av} \cdot l_c \cdot I / Z_r$
- c)  $B_{av} \cdot l_c \cdot Z_r / I$
- d) Can't be expressed

30. What is the value of pole pitch (in SI unit) for mean air gap radius = 0.5mm and  $P=4$ ?

- a)  $0.785 \cdot 10^{-6}$
- b)  $0.785 \cdot 10^{-3}$**
- c)  $0.785 \cdot 10^{-2}$
- d)  $0.785 \cdot 10^{-4}$

31. Why are the DC motors preferred for traction applications?

- a) Torque and speed are inversely proportional to armature current
- b) Torque is proportional to armature current
- c) Torque is proportional to square root of armature current
- d) The speed is inversely proportional to the torque and the torque is proportional to square of armature current**

32. Which of the following load application normally needs starting torque more than the rated torque?

- a) Blowers
- b) Conveyors**
- c) Air compressors
- d) Centrifugal pumps

33. Which of the following motors can be used to drive the rotary compressor?

- a) DC shunt motor

- b) DC series motor
- c) Universal motor
- d) Synchronous motor**

**34. Which DC motor is used with flywheel for intermittent light and heavy loads?**

- a) Series motor
- b) Shunt motor
- c) Cumulatively compounded motor**
- d) differentially compounded motor

**35. Separately excited DC generators are still used in \_\_\_\_\_**

- a) Thermal power plants
- b) Ward Leonard speed control system**
- c) Hydro power plant
- d) In all fields

**36. In world today, around 25% of the motors are manufactured are DC motors.**

- a) True**
- b) False

**37. Maximum torque in a DC machine is limited by \_\_\_\_\_**

- a) Commutation**
- b) Heating
- c) Losses other than heating
- d) Stability

**38. Which of the following motor can replace DC series motor?**

- a) DC shunt motor
- b) Cumulative compound motor
- c) Wound-rotor induction motor**
- d) Synchronous motor

**39. Which motor has almost replaced DC shunt motor from its applications?**

- a) Wound-rotor induction motor
- b) Differential compound motor
- c) Air motor
- d) Squirrel caged induction motor**

**40. DC shunt motor is still used instead of synchronous motor in \_\_\_\_\_**

- a) High speed applications
- b) Low speed applications**

- c) Medium and high-speed applications
- d) Everywhere

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**03 – SINGLE PHASE TRANSFORMER**

**Marks:- 21**

**Content of Chapter:-**

- 3.1 Types of transformers : Shell type and core type , Construction : parts and Functions, materials used for different parts
- 3.2 principles of operation , EMF equation of Transformer
- 3.3 Significance of transformer rating
- 3.4 Transformer NO-load and on-load phasor diagrams
- 3.5 Equivalent Circuits of transformer

**1. The majority of power transformers in use throughout the world are oil filled using a mineral oil.**

- a) **True**
- b) False

**2. Dielectric mineral oil is used in \_\_\_\_\_**

- a) Small transformers
- b) Medium transformers
- c) **Large transformers**
- d) In all transformers

**3. The purpose of the transformer core is to provide \_\_\_\_\_**

- a) High reluctance path
- b) **Low reluctance path**
- c) High inductive path
- d) High capacitive path

**4. Transformer core is designed to reduce \_\_\_\_\_**

- a) Hysteresis loss
- b) Eddy current loss
- c) **Hysteresis loss and Eddy current loss**
- d) Cannot be determined

**5. Transformers windings are generally made of \_\_\_\_\_**

- a) Steel
- b) Iron
- c) **Copper**
- d) Steel iron alloy

**6. Before using oil in transformers, insulation material was \_\_\_\_\_**

- a) Asbestos
- b) Cotton
- c) Low grade pressboard in air
- d) Kraft paper**

**7. Which transformer insulation material is best compare to Kraft paper?**

- a) Oil**
- b) Asbestos
- c) Low grade pressboard
- d) Cotton

**8. Which of the following is not the property of oil that should be fulfilled before using in transformer?**

- a) Low viscosity
- b) High flash point
- c) Low electrical strength**
- d) High chemical stability

**9. Transformer ratings are given in \_\_\_\_\_**

- a) kW
- b) kVAR
- c) HP
- d) kVA**

**10. Function of transformer is to \_\_\_\_\_**

- a) Convert AC to DC
- b) Convert DC to AC
- c) Step down or up the DC voltages and currents
- d) Step down or up the AC voltages and currents**

**11. What is the dielectric strength of a transformer oil?**

- a) 1 kV
- b) 35 kV**
- c) 100 kV
- d) 330 kV

**12. Which of the following is not a part of transformer installation?**

- a) Conservator
- b) Breather
- c) Buchholz relay
- d) Exciter**

**13. The insulating material that can withstand the highest temperature safely is \_\_\_\_\_**

- a) Cellulose
- b) Asbestos
- c) Mica**
- d) Glass fibre

**14. The part of a transformer which is visible from outside \_\_\_\_\_**

- a) Bushings**
- b) Core
- c) Primary winding
- d) Secondary winding

**15. Transformer core is generally made of \_\_\_\_\_**

- a) Single block of core material
- b) By stacking large number of sheets together**
- c) Can be made with any of the above method
- d) Cannot be determined

**16. Transformer core is constructed for \_\_\_\_\_**

- a) Providing least effective magnetic linkage between two windings
- b) providing isolation between magnetic linkages of one coil from another
- c) Providing most effective magnetic linkage between two windings**
- d) cannot be determined

**17. Which of the following statements is/are correct?**

- a) High frequency power supplies are light weight
- b) Transformer size gets reduced at high frequency
- c) Transformer size is more at higher frequency
- d) High frequency power supplies are light weight and transformer size gets reduced at high frequency**

**18. Transformer operating at 25-400 Hz frequency contain core made of \_\_\_\_\_**

- a) Highly permeable iron
- b) Steel alloy
- c) Air core
- d) Highly permeable iron and Steel alloy**

**19. In various radio devices and testing instruments we use \_\_\_\_\_**

- a) Iron core transformer**
- b) Air core transformer
- c) W/O core transformer
- d) Any transformer can be used

**20. Which type of flux does transformer action need?**

- a) Constant magnetic flux
- b) Increasing magnetic flux
- c) Alternating magnetic flux**
- d) Alternating electric flux

**21. Different core construction is required for core type and shell type transformer.**

- a) True**
- b) False

**22. There is only one magnetic flux path in the circuit. The transformer is definitely**

- 
- a) Core type**
  - b) Shell type
  - c) Can be any of the above
  - d) Depends on other parameters

**23. Which of the following is correct statement?**

- a) Core type transformer has more output than shell type
- b) Core type transformer has higher efficiency compare to shell type
- c) Core type transformer has lower efficiency than shell type**
- d) Can't predict

**24. Core type transformer is with** \_\_\_\_\_

- a) Large size**
- b) Small size
- c) High voltage
- d) Everywhere

**25. Which of the following is the correct statement?**

- a) Shell type has more mechanical protection
- b) Cooling is more in shell type
- c) In core type sandwiched wiring is used
- d) In core type concentric winding is used**

**26. What is the purpose of providing an iron core in a transformer?**

- a) Provide support to windings
- b) Reduce hysteresis loss
- c) Decrease the reluctance of the magnetic path**
- d) Reduce eddy current losses

**27. What is the thickness of laminations used in a transformer?**

- a) 0.1 mm to 0.5 mm**

- b) 4 mm to 5 mm
- c) 14 mm to 15 mm
- d) 25 mm to 40 mm

**28. Which of the following is not considered in the standard voltage scale for power supply in India?**

- a) 11kV
- b) 33kV
- c) 66kV
- d) 122kV**

**29. The maximum load that a power transformer can carry is limited because of its \_\_\_\_\_**

- a) temperature rise
- b) dielectric strength of oil
- c) voltage ratio**
- d) copper loss

**30. The voltage transformation ratio of a transformer is defined as ratio of \_\_\_\_\_**

- a) primary turns to secondary turns
- b) secondary current to primary current
- c) secondary induced emf to primary induced emf**
- d) secondary terminal voltage to primary applied voltage

**31. If a transformer is made to run on to a voltage which is more than the rated voltage**

- a) its power factor will deteriorate**
- b) its power factor will increase
- c) its power factor will remain unaffected
- d) its power factor will be zero

**32. Which of the following equation correctly represents the exact phasor diagram of transformer?**

- a)  $V_1 = E_1 + I_1 R_1 + j I_1 X_1$**
- b)  $V_1 = E_1 + I_1 R_1 + j I_2 X_2$
- c)  $V_2 = E_2 + I_1 R_1 + j I_1 X_1$
- d)  $V_1 = E_1 - I_1 R_1 + j I_1 X_1$

**33. Approximate phasor diagram of a transformer is based on \_\_\_\_\_**

- a)  $V_1 = E_1 + I_1 R_1 + j I_1 X_1$
- b)  $V_2 = E_2 + I_2 R_2 + j I_2 X_2$
- c)  $V_1 = V_2 + I R + j I X$**
- d)  $V_1 = E_1 + I_1 R_1 + j I_1 X_2$

**34. Hysteresis loss and eddy current loss is directly proportional to \_\_\_\_\_**



- a)  $f$  and  $f_2$
- b)  $f_2$  and  $f$
- c)  $f$  and  $f$
- d)  $f_2$  and  $f_2$

**35. What will happen to hysteresis loss if voltage is doubled, load is doubled and frequency is halved?**

- a) Will be twice
- b) Will be halved
- c) Will remain same**
- d) Will be four times

**36. When does transformer breath in?**

- a) load on it increases
- b) load on it decreases**
- c) load remains constant
- d) cannot be determined

**37. A transformer transforms \_\_\_\_\_**

- a) voltage**
- b) current
- c) power
- d) frequency

**38. Greater the secondary leakage flux \_\_\_\_\_**

- a) less will be the secondary induced emf**
- b) less will be the primary induced emf
- c) less will be the primary terminal voltage
- d) cannot be determined

**39. Which of the following is not the purpose of iron core in a step-up transformer?**

- a) to provide coupling between primary and secondary
- b) to increase the magnitude of mutual flux
- c) to decrease the magnitude of magnetizing current**
- d) to provide all above features

**40. In a transformer the tapings are generally provided on**

- a) Primary side
- b) Secondary side
- c) Low voltage side
- d) Can be connected to any side**

**41. Helical coils can be used at \_\_\_\_\_**

- a) low voltage side of high kVA transformers
- b) high frequency transformers
- c) high voltage side of small capacity transformer
- d) high voltage side of high kVA rating transformers

**42. In real transformer, primary winding has \_\_\_\_\_**

- a) Infinite resistance
- b) Zero resistance
- c) **Some finite resistance**
- d) Cannot say

**43. Both resistances and leakage reactance's of the transformer windings are \_\_\_\_\_**

- a) **Series effects**
- b) Parallel effects
- c) Series-parallel effects
- d) Cannot say

**44. To convert an ideal transformer into a practical transformer we add \_\_\_\_\_**

- a) Primary winding resistance and secondary winding resistance
- b) Primary winding leakage reactance and secondary winding leakage reactance
- c) **Primary winding resistance, leakage and secondary winding leakage reactance**
- d) Cannot be determined

**45. Parallel parameters in a transformer equivalent circuit contains \_\_\_\_\_**

- a)  **$G_i$  and  $B_m$**
- b)  $R_1$  and  $X_1$
- c)  $R_2$  and  $X_2$
- d) Cannot be determined

**46. When does capacitor is included in equivalent circuit of transformer?**

- a) Transformer of very high VA rating
- b) **Transformer with very high frequency operation**
- c) Transformer with less VA
- d) Never

**47. The size of a transformer core will depend on \_\_\_\_\_**

- a) frequency
- b) area of the core
- c) flux density of the core material
- d) **frequency and area of the core**

**48. A single phase transformer has specifications as 250 KVA, 11000 V/415 V, 50 Hz. What are the values of primary and secondary currents?**

- a) Primary current = 602.4A, Secondary current = 22.7A
- b) Secondary current = 202.7A, Primary current = 602.4A
- c) Primary current = 22.7A, Secondary current = 602.4A**
- d) Primary current = 11.35A, Secondary current = 301.2A

**49. A 25 KVA transformer is constructed to a turns ratio of  $N_1/N_2 = 10$ . The impedance of primary winding is  $3+j5$  ohms and of secondary winding is  $0.5+j0.8$  ohms. What will be the impedance of transformer when referred to primary?**

- a)  $53j + 85$  ohms
- b)  $53 + 85j$  ohms**
- c)  $3.5 + 5.8j$  ohms
- d) Can't be calculated

**50. What is the no-load current drawn by transformer?**

- a) 0.2 to 0.5 per cent
- b) 2 to 5 per cent**
- c) 12 to 15 per cent
- d) 20 to 30 per cent

**51. Purpose of no-load test on a transformer is \_\_\_\_\_**

- a) Copper loss
- b) Magnetising current
- c) Magnetising current and loss**
- d) Efficiency of the transformer

**52. No-load current in a transformer \_\_\_\_\_**

- a) Lags behind the voltage by about  $75^\circ$**
- b) Leads the voltage by about  $75^\circ$
- c) Lags behind the voltage by about  $15^\circ$
- d) Leads the voltage by about  $15^\circ$

**53. Which of the following statement is true for no-load current of the transformer?**

- a) has high magnitude and low power factor
- b) has high magnitude and high power factor
- c) has small magnitude and high power factor
- d) has small magnitude and low power factor**

**54. In no-load test we keep secondary terminals \_\_\_\_\_**

- a) Shorted
- b) Shorted via fixed resistor
- c) Open**
- d) Shorted via variable resistors

55. Maximum value of flux established in a transformer on load is equal to \_\_\_\_\_

- a)  $E_1 / (4.44 \cdot f \cdot N_1)$
- b)  $E_1 / (4.44 \cdot f \cdot N_2)$
- c)  $E_2 / (4.44 \cdot f \cdot N_1)$
- d) Cannot define

56. Induced emf in the primary of transformer is equal to terminal voltage applied at primary.

- a) True
- b) False

57. For a linear B-H relationship, which option is correct?

- a) The exciting current is equal to core loss current
- b) The exciting current is equal to magnetizing current
- c) The exciting current is equal to de-magnetizing current
- d) The exciting current is equal to cross-magnetizing current

58. Third harmonic current in transformer at no-load is \_\_\_\_\_

- a) 3% of exciting current
- b) 10% of exciting current
- c) 25% of exciting current
- d) 35% of exciting current

59.  $I_0$  in no-load test is responsible for \_\_\_\_\_

- a) Production of flux
- b) Reactive power drawn from the supply
- c) Active power drawn from the supply
- d) No significance

60. The parallel circuit model is drawn because \_\_\_\_\_

- a) Conductance  $G_i$  accounts for core-loss current
- b) Inductive susceptance  $B_m$  accounts for magnetizing current
- c)  $G_i$  for core – loss current and  $B_m$  for magnetizing current
- d) Cannot say

61. There is only one magnetic flux path in the circuit. The transformer is definitely

- a) Core type
- b) Shell type
- c) Can be any of the above
- d) Depends on other parameters

62. Which of the following is correct statement?

- a) Core type transformer has more output than shell type
- b) Core type transformer has higher efficiency compare to shell type
- c) Core type transformer has lower efficiency than shell type**
- d) Can't predict

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ZEAL EDUCATION SOCIETY'S  
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**DEPARTMENT OF ELECTRICAL ENGINEERING**



**04 – THREE PHASE TRANSFORMER**

**Marks:-19**

**Content of Chapter:-**

- 4.1 Banks of three single phase transformers ,single unit of three phase transformer.
- 4.2 Distribution and power transformer
- 4.3 Three phase transformer connection
- 4.4 selection of transformer as per IS
- 4.5 Need of parallel operation of three phase transformer
- 4.6 Polarity tests on mutually inductive coils and single phase transformer, polarity tests
- 4.7 Harmonics and their effects on transformer.

**1. Which type of winding is used in 3-phase shell-type transformer?**

- a) Circular type
- b) Sandwich type**
- c) Cylindrical type
- d) Rectangular type

**2. 3-phase transformers compare to 1-phase transformers \_\_\_\_\_**

- a) More economical**
- b) Easy in construction
- c) Easy to construct
- d) Easy to handle

**3. How 3-phase transformers are constructed?**

- a) A bank of 3 single phase transformers
- b) A single 3-phase transformer with the primary and secondary of each phase wound on three legs of a common core
- c) Single 3-phase transformer or a bank of 3 1-phase transformers**
- d) By different method

**4. Three phase transformer compare to a bank of 3 single phase transformers is \_\_\_\_\_**

- a) Cheaper**
- b) Costlier
- c) More in space
- d) Can't be determined

**5. In mines we use \_\_\_\_\_**

- a) a single unit of 3-phase transformer
- b) a bank of 3 single phase transformers**

- c) use of 3-phase transformer is avoided
- d) a single unit or a bank

**6. In three phase bank phases are \_\_\_\_\_**

- a) the phases are electrically not connected and magnetically independent
- b) the phases are electrically not connected and magnetically dependent
- c) the phases are electrically connected and magnetically independent**
- d) the phases are electrically connected and magnetically dependent

**7. Where the tapings are provided in a transformer?**

- a) At the phase end of LV side
- b) At the phase end of HV side
- c) At the neutral side end of the HV side
- d) At the middle of HV side**

**8. Tapings are on \_\_\_\_\_**

- a) LV side of a transformer
- b) HV side of transformer**
- c) Not on any side
- d) On both sides

**9. In core type 3-phase transformer flux path chooses how many paths to return?**

- a) 2**
- b) Single
- c) 3
- d) Many

**10. Why shell type 3-phase transformer is used in large power transforming applications?**

- a) Can be made with more height
- b) Can be made with less height**
- c) More height and less height flexibility
- d) Due to other reasons

**11. A three-phase transformer generally has the three magnetic circuits interlocked.**

- a) True
- b) False**

**12. For very high voltage transformers which connection is cheaper on primary side?**

- a) Star**
- b) Delta
- c) Open delta
- d) Can be star/ delta/ open delta

13. In which of the circuit given positive and negative sequence currents will flow in primary?

- a) Star/delta
- b) Star/star
- c) Open delta/delta
- d) Delta/delta**

14. When star/star connection is used?

- a) Small HV**
- b) Small LV
- c) High HV
- d) High LV

15. When delta/delta connection is used?

- a) Small HV
- b) Small LV
- c) High HV
- d) High LV**

16. For using as a step-up transformer which connection is used?

- a) Star/star
- b) Delta/delta
- c) Delta/star**
- d) Star/delta

17. At distribution level transformer with which connection is used?

- a) Star/star
- b) Delta/delta
- c) Delta/star**
- d) Star/delta

18. Third-harmonic currents have phase difference of \_\_\_\_\_

- a) 0°**
- b) 90°
- c) 180°
- d) 270°

19. Core flux in the transformer is \_\_\_\_\_

- a) sinusoidal
- b) flat-topped**
- c) square wave
- d) triangular

20. In delta/delta connection flux is almost \_\_\_\_\_



- a) sinusoidal
- b) flat-topped
- c) triangular
- d) square wave

**21. Apart from connection which of the following is different in star/delta or delta/star compare to delta/delta?**

- a) Flux is flat-topped
- b) Impedance offered to third-harmonic currents in delta is less
- c) Impedance offered to third-harmonic currents in delta is constant
- d) Impedance offered to third-harmonic currents in delta is more**

**22. In star/star connection the voltage can be correctly expressed as \_\_\_\_\_**

- a)  $e_{aN} = e_a \sin 2\omega t + e_{a3} \sin 3\omega t$
- b)  $e_{aN} = e_a \sin \omega t + e_{a3} \sin 3\omega t$**
- c)  $e_{aN} = e_a \sin 3\omega t + e_{a3} \sin 3\omega t$
- d)  $e_{aN} = e_a \sin 6\omega t + e_{a3} \sin 3\omega t$

**23. Rate of change of voltage in star/star connection is \_\_\_\_\_**

- a)  $\omega$
- b)  $2\omega$**
- c)  $3\omega$
- d) Can't determine

**23. Voltage at the neutral point oscillates at frequency of  $2\omega$ , this phenomenon is called as \_\_\_\_\_**

- a) oscillating neutral**
- b) doubling voltage
- c) doubling current
- d) doubling neutral

**24. When does star/star transformers work satisfactorily?**

- a) Load is unbalanced only
- b) Load is balanced only**
- c) On balanced as well as unbalanced loads
- d) Independent of load type

**25. When does delta/star transformer work satisfactorily?**

- a) Load is balanced only
- b) Load is unbalanced only
- c) On balanced as well as unbalanced loads**
- d) Independent of load type

**26. Scott connections are used in \_\_\_\_\_**

- a) three-phase to single phase transformation
- b) three-phase to two-phase transformation**
- c) single phase to three-phase transformation
- d) all phase transformations

**27. In a three-phase star – delta transformer, what is the angle difference between primary and secondary phase voltages?**

- a) Delta side leads by 300**
- b) Delta side lags by 300
- c) Star side leads by 300
- d) Star side lags by 300

**28. Which can be also called as 00 /1800 connection?**

- a) Star/star**
- b) Direct star
- c) Delta/star
- d) Star/delta

**29. What is the ratio of transformation of star/star connection?**

- a) Phase transformation x:1, line transformation x:1**
- b) Phase transformation x:1, line transformation 2x:1
- c) Phase transformation x:1, line transformation x/3:1
- d) Can't say

**30. Delta/delta connection is also called as \_\_\_\_\_**

- a) 00-connection
- b) 900-connection
- c) 1800-connection
- d) 00/1800-connection**

**31. What is the ratio of transformation of delta/delta connection?**

- a) Phase transformation x:1, line transformation x:1**
- b) Phase transformation x:1, line transformation 2x:1
- c) Phase transformation x:1, line transformation x/3:1
- d) Can't determine

**32. Open delta connection has VA rating of \_\_\_\_\_**

- a)  $\sqrt{3}$  times delta/delta VA rating
- b)  $1/\sqrt{3}$  times delta/delta VA rating**
- c) 3 times delta/delta VA rating
- d)  $1/3$  times delta/delta VA rating

**33. Star/delta connection is also called as \_\_\_\_\_**

- a) 300-connection
- b) 00-connection
- c) -300-connection
- d) 300/-300-connection**

**34. What is the ratio of transformation of star/delta connection?**

- a) Phase transformation  $x:1$ , line transformation  $x:1$**
- b) Phase transformation  $x:1$ , line transformation  $\sqrt{3}x:1$
- c) Phase transformation  $x:1$ , line transformation  $3x:1$
- d) Can't determine with information available

**35.  $x/\sqrt{3}:1$  ratio is obtained in \_\_\_\_\_**

- a) Star/delta
- b) Delta/star**
- c) Delta/delta
- d) Star/star

**36. Which both connections have the same line transformation ratios?**

- a) Star/star and delta/delta
- b) Star/delta and delta/star
- c) Star/zig-zag star and delta/zig-zag star
- d) Star/star, delta/delta and star/delta, delta/star**

**37. In three-phase transformer, the harmonic fluxes are suppressed because of \_\_\_\_\_**

- a) high reluctance path**
- b) low reluctance path
- c) any reluctance paths
- d) independent on reluctance path

**38. Suppressing of harmonic fluxes becomes more prominent in \_\_\_\_\_**

- a) fifth harmonic currents**
- b) third harmonic currents
- c) fourth harmonic currents
- d) second harmonic currents

**39. To reduce effect of 5th harmonic current \_\_\_\_\_**

- a) separate path must be provided**
- b) no need of separate path
- c) add a resistor in series
- d) add a resistor in parallel

**40. For performing back to back test on 3-phase transformer, transformers should be**

- a) non-identical**
- b) identical
- c) they can be identical or non-identical
- d) they should not be identical nor non-identical

**41. In back to back test two secondaries are connected \_\_\_\_\_**

- a) in proper phase sequence
- b) in phase opposition
- c) in proper phase sequence and with phase opposition**
- d) in opposite phase sequence

**42. Auxiliary transformer is not needed in the back to back test.**

- a) True
- b) False**

**43. Where the auxiliary transformers are connected in back to back test of 3- phase transformer?**

- a) Primaries
- b) Secondaries
- c) In the middle
- d) Can be connected to primaries or secondaries as well**

**44. Auxiliary transformer connected to delta/delta transformer is of the type \_\_\_\_\_**

- a) single phase transformer**
- b) three-phase transformer
- c) two-phase transformers
- d) can be of any type

**45. If one of the transformers is removed from the bank of only delta-delta, then it will behave as power delivery transformer of \_\_\_\_\_**

- a) 58%**
- b) 78%
- c) 45%
- d) 100%

**46. Three units of single phase transformers and one single three-phase transformer \_\_\_\_\_**

- a) will be same for one rating**
- b) can never be made same
- c) may be same
- d) depends on other factors

**47. A V-V connected transformer can be connected in parallel to delta-delta connected transformer but not to \_\_\_\_\_**

- a) delta-star**
- b) star-delta
- c) star-V
- d) star-delta and star-V both

**48. Which type of winding is used in 3-phase shell-type transformer?**

- a) Circular type
- b) Sandwich type**
- c) Cylindrical type
- d) Rectangular type

**49. 3-phase transformers compare to 1-phase transformers \_\_\_\_\_**

- a) More economical**
- b) Easy in construction
- c) Easy to construct
- d) Easy to handle

**50. How 3-phase transformers are constructed?**

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**54. Where the tapplings are provided in a transformer?**

a) At the phase end of LV side

b) At the phase end of HV side

**c) At the neutral side end of the HV side**

d) At the middle of HV side

**55. Tappings are on \_\_\_\_\_**

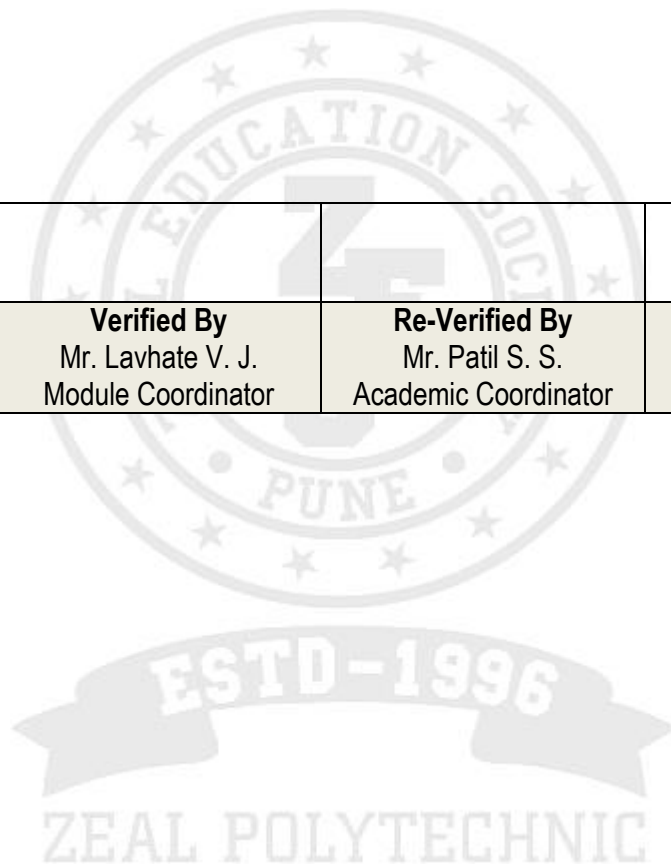
a) LV side of a transformer

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**05 – SPECIAL PURPOSE TRANSFORMER**

**Marks:-**

**Content of Chapter:-**

- 5.1 single phase transformer and three phase transformer working
- 5.2 Instrument Transformer :Features and application
- 5.3 Isolation transformer
- 5.4 Welding's transformer applications
- 5.5 Pulse Transformer : :Features and application
- 5.6 K factors of transformer :overheating due to non-loads and harmonics

**1. Where is field winding mounted in a DC machine?**

- a) **Stator**
- b) Rotor
- c) Absent
- d) Anywhere on stator or rotor

**2. What are the materials used for brushes in dc machines?**

- a) Iron
- b) **Carbon**
- c) Aluminum
- d) Steel

**3. Function of yoke is to provide the return path for magnetic flux.**

- a) **True**
- b) false

**4. The angle (electrical) made by brushes with axes of adjoining filed poles is \_\_\_\_\_**

- a) 450
- b) 1800
- c) **900**
- d) 300

**5. In a DC machine, rectification process is carried out in order to get unidirectional output (DC).**

**This rectification process is carried out by \_\_\_\_\_**

- a) Half wave rectifier
- b) Full wave rectifier
- c) **Mechanical rectification**
- d) Centre tapped rectifier

**6. Which of the following part is used in construction of DC machine but not in AC machine?**

- a) Armature Winding
- b) Field winding
- c) Commutator**
- d) Shaft

**7. In a DC machine fractional pitch winding is used to \_\_\_\_\_**

- a) To improve cooling
- b) To reduce sparking**
- c) To reduce copper losses
- d) To increase generated EMF

**8. In normal dc machines operating at full-load conditions, the most powerful electromagnet is \_\_\_\_\_**

- a) Field winding**
- b) Interpole Winding
- c) Interpole and compensating winding together
- d) Armature winding

**9. If a DC motor is connected to AC supply what will happen then?**

- a) Not run
- b) Burn**
- c) Run at normal speed
- d) Run at extremely low speed

**10. The armature of DC motor is laminated to \_\_\_\_\_**

- a) To reduce mass
- b) To reduce hysteresis loss
- c) To reduce eddy current loss**
- d) To reduce inductance

**11. Armature winding is mounted on a \_\_\_\_\_**

- a) Stator
- b) Rotor**
- c) Can be mounted anywhere on stator or rotor
- d) Not required

**12. In a DC machine, how coil-side emf varies towards the outer side of poles?**

- a) Decreases**
- b) Remains same
- c) Increases
- d) First increases then decreases



**13. Commutator performs rectification so that output of the machine is unidirectional.**

- a) True
- b) False

**14. What is the difference of DC voltages in the adjoining Brushes?**

- a) Depends on the Shaft speed
- b) Zero**
- c) Non-zero
- d) Depends on the various other parameters

**15. What is the effect of armature coils at points where brushes are located?**

- a) Induces positive emf
- b) Induces negative emf
- c) Induces zero emf**
- d) Depends on the speed of rotor

**16. For using as a step-up transformer which connection is used?**

- a) Star/star
- b) Delta/delta
- c) Delta/star**
- d) Star/delta

**17. At distribution level transformer with which connection is used?**

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- b) Delta/delta
- c) Delta/star**
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**18. Third-harmonic currents have phase difference of \_\_\_\_\_**

- a) 0°**
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- d)  $e_N = e_a \sin 6\omega t + e_{a3} \sin 3\omega t$

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- a)  $\omega$
- b)  $2\omega$
- c)  $3\omega$
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- c) Star side leads by 300
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**28. Which can be also called as 00 /1800 connection?**

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- b) 900-connection
- c) 1800-connection
- d) 00/1800-connection**

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