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**4th Sem. Branch : Elect., GE, Power Staion Engg., Elect.,
& Eltx. Engg., Fire Tech & Safety
Subject : Electrical Machines –I**

Time : 3 Hrs.

M.M. : 100

SECTION-A

Note: Multiple choice type Questions. All Questions are compulsory. (10x1=10)

Q.1 The EMF generated in a DC generator is directly proportional to (CO1)

- a) Flux/Pole
- b) Speed of armature
- c) Number of poles
- d) All of the above

Q.2 Differentially compound D.C. motors can find applications requiring. (CO2)

- a) High starting torque
- b) Low starting torque
- c) Variable speed
- d) Frequent on-off cycles

Q.3 Which of the following is not a part of transformer installation? (CO5)

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

Q.4 Which of the following protection is normally not provided on small distribution transformers? (CO5)

- a) Over-fluxing protection
- b) Buchholz relay
- c) Over-current protection
- d) All of the above

Q.5 Transformer breaths in when (CO5)
a) Load on it increases b) Load on it decreases
c) Load remains constant d) None of the above

Q.6 When secondary of a current transformer is open-circuited its iron core will be (CO7)

- a) Hot because of heavy iron losses taking place in it due to high flux density
- b) Hot because primary will carry heavy current
- c) Cool as there is no secondary current
- d) None of the above will happen

Q.7 Which D.C. motor will be preferred for machine tools? (CO4)

- a) Series motor
- b) Shunt motor
- c) Cumulative compound motor
- d) Differential compound motor

Q.8 The dielectric strength of transformer oil is expected to be (CO5)

- a) 1kV
- b) 33kV
- c) 100 kV
- d) 330 kV

Q.9 The value of flux involved in the e.m.f. equation of a transformer is (CO5)

- a) Average value
- b) r.m.s. Value
- c) Maximum value
- d) Instantaneous value

Q.10 Open delta transformers can be obtained from _____ (CO8)

- a) delta-delta
- b) star-delta
- c) delta-Star
- d) any of the mentioned

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SECTION-B

Note: Objective type questions. All questions are compulsory. **(10x1=10)**

- Q.11 What is step up transformer. (CO5)
Q.12 Name the two types of losses in transformer. (CO5)
Q.13 In lap winding number of parallel paths = _____. (CO2)
Q.14 What is EMF? (CO5)
Q.15 The brushes of commutator are made of _____. (CO1)
Q.16 Core of the transformer made of _____. (CO5)
Q.17 Can T/F work on DC (Yes/No.) (CO5)
Q.18 The best suited motor for electric traction is _____. (CO4)
Q.19 Why starter is necessary in DC motor. (CO3)
Q.20 Power transformers are designed for low losses. (CO5)

SECTION-C

Note: Short answer type Questions. Attempt any twelve questions out of fifteen Questions. **(12x5=60)**

- Q.21 State the various losses which take place in a transformer. Explain the steps taken to minimize these losses. (CO7)
Q.22 Why are the tap changing transformer required? Explain the operation of no load tap changing transformer. (CO6)
Q.23 Derive the e.m.f. of equation of a d.c. generator. (CO1)
Q.24 State the reasons for the drop in terminal voltage of a shunt generator when it is loaded. (CO1)
Q.25 Explain the principle of operation of DC motors. What is back emf in DC motors? What is its effect? (CO2)

- Q.26 Explain the working principle and construction of an auto transformer. (CO6)
Q.27 Explain the methods of improving commutation with relevant figures. (CO1)
Q.28 Draw a complete phasor diagram for a transformer when the load pf is lagging. (CO5)
Q.29 Write a short note on short-circuit test. (CO7)
Q.30 Draw the equivalent circuit of a transformer. (CO5)
Q.31 What are the different types of generator according to the ways in which fields are excited. Show the connection diagram of each type. (CO1)
Q.32 What is the difference between the power and distribution transformer. (CO5)
Q.33 Derive the expression for the back emf in a DC motor. (CO2)
Q.34 What is armature reaction? Describe the effects of armature reaction on the operation of D.C. machines. How the armature reaction is minimized? (CO1)
Q.35 Explain the Faraday's law of electromagnetic induction? (CO5)

SECTION-D

Note: Long answer questions. Attempt any two questions out of three Questions. **(2x10=20)**

- Q.36 What are the different types of three phase transformers on the basis of their connection? (CO8)
Q.37 Write down the constructional details of various parts of DC machines with neat diagram? (CO1)
Q.38 Explain the methods for calculating losses in a single phase transformer? (CO5)