A   **Reg. No. :**

Duration: Three hours   Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. According to Fleming's left-hand rule if the forefinger points in the   CO2- R
    direction of the field than the middle finger will point in the direction of.

    (a) Current in the conductor   (b) Resultant force on the conductor

    (c) Movement of the conductor   (d) None of the above

2. An air gap is usually inserted in magnetic circuits to   CO2- R

    (a) increase m.m.f   (b) increase the flux   (c) Prevent saturation   (d) none of the above

3. If the number of conductors and speed of a lap wound generator is doubled   CO1- R
    then the generated emf will be

    (a) Remains same   (b) Twice of the former

    (c) Four times of former emf   (d) Half of the former emf

4. The armature reaction in d.c. machine causes distortion in the main field   CO1- U
    flux. This effect of armature reaction can be reduced by

    (a) Increasing the length of air gap   (b) Decreasing the length of air gap

    (c) Increasing the number of poles   (d) Decreasing the number of poles

5. Which of the following type of d.c. motor is used for electric traction?   CO4- U

    (a) Series motor   (b) Compound motor   (c) Shunt motor   (d) None of the above.

6. Which starter is suitable for controlling the speed of DC motor in field side CO4- U

    (a) two point   (b) three point   (c) four point   (d) any of the above

7. The condition for the maximum efficiency of the transformer is that   CO6- R

(a) Copper losses are half of the iron losses

(b) Copper losses are equal to iron losses

(c) Copper losses are negligible in comparison to iron losses

(d) Iron losses are zero

8. A transformer has 500 turns in the primary and 1,000 turns in the secondary   CO5- App
windings. The transformation ratio is

(a) 2   (b) 4   (c) 5   (d) 6

9. Iron loss in transformer is measured by   CO5- R

(a) OC Test   (b) SC Test   (c) Swinburne's test   (d) BDV test

10. Copper loss in transformer is measured by   CO6- R

(a) OC Test   (b) SC Test   (c) Swinburne's test   (d) BDV test

PART – B (5 x 2= 10 Marks)

11. State Faraday's law of electromagnetic induction   CO2-R

12. Define armature reaction. What are the effects of armature reaction?   CO1-R

13. DC series motor is used to start heavy loads - Identify?   CO4-U

14. Why transformer rating is expressed in terms of KVA? (OR) Why don't use   CO5-U
transformer ratings in KW?

15. Define all day efficiency. Explain why all day efficiency is lower than commercial   CO6-U
efficiency

PART – C (5 x 16= 80Marks)

16. (a) Apply the electromagnetic induction principle to derive statically CO2-App   (16)
and dynamically induced e.m.f. and give suitable example.

Or

(b) Apply the concepts of co-energy and field energy to develop the CO2-App   (16)
expression for the magnetic force in a multi excited magnetic
systems.

17. (a) With neat sketch explain the following constructional components CO1- U   (16)
of DC Machine and its principle (i) Magnetic Frame or Yoke (ii)
Pole Core (iii) Field Coils (iv) Armature (v) Armature Winding (vi)
Commutator (vii) Brushes and Bearings.

Or

93303

(b) Explain the different methods of excitation and characteristics of DC Generators with suitable diagram.   CO3- U   (16)

18. (a) Explain the working of a dc machine starter with a neat sketch   CO1- U   (16)

Or

(b) Draw and explain the characteristic of DC series motor and shunt motor   CO1- U   (16)

19. (a) Explain the constructional details and working of core type and shell type transformers with neat sketches.   CO5- U   (16)

Or

(b) A 40 KVA transformer has iron loss of 450W and full load copper loss of 850W. If the power factor of the load is 0.8 lagging, Calculate (i) full load efficiency (ii) the load at which maximum efficiency occurs and (iii) the maximum efficiency.   CO6- App   (16)

20. (a) A single phase transformer has $Z1 = 1.4 + j5.2\Omega$ and $Z2 = 0.0117 + j0.465\Omega$. The input voltage is 6600 V and the turn ratio is 10.6 : 1. The secondary feeds a load which draws 300 A at 0.8 power factor lagging. Find the secondary terminal voltage and the KW output. Neglect no-load current.   CO5- U   (16)

Or

(b) Obtain the equivalent circuit of a 200/400V 50 Hz single phase transformer from the following test data.
O.C.test: 200V, 0.7A, 70W – on L .V Side
S.C. test: 15V, 10A, 85W – on H.V side
Calculate the secondary voltage when delivering 5 kW at 0.8 p.f. lagging. The primary voltage being 200V.   CO6- App   (16)

93303