

# Question Bank (I-Scheme)

Name of course: Electric Motors and Transformers

Unit Test: I

Subject code: 22418 (CNE)

Semester: IV

Program: EE

## Chapter 1: Introduction to electric motors

### 2 Marks

1. Classification of Electric Motors
2. Define an electric motor
3. Name two materials used for construction of stator cores of motors.
4. Name the parts of the motors that are built of electromagnetic stampings.

### 4 Marks

5. Explain the principle of working of an three phase induction motor.
6. List the types of Single phase induction and two applications of each type.

## Chapter 2: DC Machines

### 2Marks

7. State Fleming's right hand rule.
8. State the working principle of d.c generator.
9. "DC series motor should never be started at no load". Justify.
10. State significance of back emf.
11. Define armature torque and shaft torque of D.C. motor
12. A dc motor operating on a supply voltage of 200V dc has armature resistance of 0.5W. If its armature current is 25A, Calculate the back emf.

### 4Marks

13. State functions and materials used for the following parts of d.c motor: (i) Pole shoe (ii) Commutator (iii) Brushes (iv) Yoke.
14. Draw a neat labeled sketch of three point starter.
15. Draw and Write any two applications for: (i) D.C shunt motor (ii) D.C series motor
16. Describe with suitable diagram speed control of d.c shunt motor by field current control method.

17. A 4. pole, 220 V shunt motor has 540 lap wound conductor. It takes 32A from the supply mains and develops output power of 5.595 KW. The field winding takes 1A. The armature resistance is  $0.09\ \Omega$  and the flux per pole is 30 mwb. Calculate: (i) the speed and (ii) the torque developed in N-M.
18. Explain with simple sketch the working of the brushless DC motor.
19. A dc series motor draws a current of 44 A at 220 V running at 820 RPM. The armature and field resistances are 0.2 ohm and 0.1 ohm respectively. The total of iron and friction losses at this load condition is 0.5 kW. Determine the armature torque and efficiency of the motor.
20. Identify the part of the DC machine, name the material used for it and state its function in case of motor and generator.



### **Chapter 3: Single Phase Transformers**

#### **2Marks**

21. State principle operation of a transformer.
22. List the various losses take place in transformer.
23. Draw a neat experimental set up to conduct OC test on a single phase transformer.

#### **4 Marks**

24. Explain with circuit diagram, the direct loading tests on single phase transformer. How the efficiency and regulation at given load condition is determined ?
25. A 250/125 V, 5 KVA single- phase transformer has primary resistance of  $0.2\ \Omega$  and reactance of  $0.75\ \Omega$ . The secondary resistance is  $0.05\ \Omega$  and reactance of  $0.2\ \Omega$ . Determine its regulation while supplying full load on 0.8 leading P.F.

26. Derive the EMF equation for the single phase transformer. State the clearly the terms/symbols used there in.

27. A 40 kVA, single phase transformer with a ratio of 2000 V / 250 V has a primary resistance of  $1.15\Omega$  and a secondary resistance of  $0.01555\Omega$ . If the transformer is designed for maximum efficiency at 85% of full load. Find its efficiency when delivering full load at 0.9 power factor lag.

28. A 3300/250V, 50Hz single phase transformer is built on a core having an effective cross sectional area of  $125\text{ cm}^2$  and 70 turns on the low voltage winding. Calculate: i) The value of max. flux density. ii) Number of turns on high voltage windings.

29. Draw the equivalent circuit of transformer referred to primary. State the meaning of each term related to equivalent circuit.

30. In 20 kVA, 1000/400 V, 1-ph, 50Hz transformer, iron and full load copper losses are 300W and 500W respectively. Calculate the efficiency at  $\frac{3}{4}$  full load at unity power factor.