

# 22418

**21819**

**3 Hours / 70 Marks**

Seat No.

--	--	--	--	--	--	--	--

- Instructions* – (1) All Questions are *Compulsory*.  
(2) Answer each next main Question on a new page.  
(3) Illustrate your answers with neat sketches wherever necessary.  
(4) Figures to the right indicate full marks.  
(5) Assume suitable data, if necessary.  
(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

**Marks**

- 1. Attempt any FIVE of the following:** **10**
- State any four parts of the d.c motor.
  - State the working principle of d.c generator.
  - State principle operation of a transformer.
  - List the various losses take place in transformer.
  - Draw circuit diagram for polarity test on single-phase transformer.
  - Define current transformer.
  - State the function of the isolation transformer.

P.T.O.

**2. Attempt any THREE of the following: 12**

- a) State functions of the following parts of d.c motor:
  - (i) Pole shoe
  - (ii) Commutator
  - (iii) Brushes and
  - (iv) Yoke.
- b) Explain the principle of working of an three phase induction motor.
- c) Draw a neat labeled sketch of three point starter.
- d) Select or suggest any two applications for:
  - (i) D.C shunt motor
  - (ii) D.C series motor

**3. Attempt any THREE of the following: 12**

- a) Describe with suitable diagram speed control of d.c shunt motor by field current control method.
- b) Compare core type and shell type transformer on any four parameters
- c) Draw a neat experimental set up to conduct OC test on a single phase transformer.
- d) Explain with circuit diagram , the direct loading tests on single phase transformer. How the efficiency and regulation at given load condition is determined ?

**4. Attempt any THREE of the following: 12**

- a) State the criteria of selection of power transformer as per IS:10028 (Part-I).
- b) List the conditions for parallel operation of three phase transformer.
- c) Explain polarity test of a transformer. Why it is necessary?
- d) A 20 KVA, 2200/220V, 50 Hz transformer. The O.C/S.C test result are as follows:  
O.C.test : 220V, 4.2 A, 148 W (l. v. side),  
S.C. test : 86V, 10.5 A, 360 W (h. v. side).  
Determine the regulation at 08 P.F lagging at full load.
- e) Describe the method for measurement of high voltage in a.c circuit using potential transformer.

**5. Attempt any TWO of the following: 12**

- a) 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.
- b) Give the specification of three phase transformer as per IS : 1180 (Port I).
- c) A 500 KVA, 3-phase, 50 Hz transformer has a voltage ratio (line voltages) of 33/11KV and is delta/star connected. The resistance per phase are: high voltage  $35 \Omega$  low voltage  $0.876 \Omega$  and iron loss is 3050W. Calculate the value of efficiency at full load.

6. Attempt any TWO of the following:

12

- a) Find the all-day efficiency of 500 KVA distribution transformer whose copper loss and iron loss at full load are 4.5 KW and 3.5 KW respectively. During a day of 24 hours, it is loaded as under:

No of hours	Loading in KW	Power factor
6	400	0.8
10	300	0.75
4	100	0.8
4	0	-

- b) Describe the method of converting three phase to two phase transformer by neat diagram. State any two applications.
- c) 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.

---