

17637

21415

3 Hours / 100 Marks

Seat No.

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- 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) Use of Non-programmable Electronic Pocket Calculator is permissible.
 - (7) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.
 - (8) Use of Steam tables, logarithmic, Mollier's chart is permitted.

Marks

1. a) **Attempt any THREE of the following:** **12**
 - (i) State the factors on which severity of shock depends.
 - (ii) Explain preventive maintenance of induction motor.
 - (iii) State the method of measurement of insulation resistance and explain any one method.
 - (iv) Explain the use of filler guage.

P.T.O.

b) Attempt any ONE of the following:

6

- (i) List the tests to be carried out on transformer as per IS-2026. Also state the objective of heat run test on transformer.
- (ii) A 3-phase induction motor has the following data:
Stator resistance, $R_1 = 1 \Omega$, Reactance, $X_1 = 3 \Omega$
Rotor standstill, $R_2 = 1 \Omega$, Reactance $X_2 = 2 \Omega$
No load exciting circuit impedance is $(10 + j 50) \Omega$,
voltage per phase $V_1 = 250$ volts, stator to rotor turns ratio = 1, i.e. $K = 1$, Slip = 0.05
Show these values in equivalent circuit and work out:
1) Stator current (I_1)
2) Equivalent rotor current (I'_2)
3) Output (Mechanical)
4) Motor efficiency.

2. Attempt any TWO of the following:

16

- a) Which types of precautions to be taken while working on electrical installation? (any eight)
- b) List the eight factors affecting preventive maintenance schedule.
- c) List the mechanical, magnetic and electrical faults in the electrical equipments.

3. Attempt any FOUR of the following: 16

- a) Explain the trouble shooting chart of 3 ϕ transformer.
- b) Explain routine test for measurement of D.C. resistance of winding.
- c) State and explain the properties of transformer oil.
- d) Explain any four method of cleaning of insulation of electrical machines.
- e) What data/parameters do we get from no load test and blocked rotor test on 3- ϕ induction motor.
- f) Explain factors affecting earth resistance.

4. a) Attempt any THREE of the following: 12

- (i) Explain the open delta (delta-delta) test on transformer.
- (ii) Which electrical tests are carried out before commissioning of transformer.
- (iii) State factors involved in designing the machine foundation.
- (iv) State which precautions to be taken to avoid fire due to electrical reasons.

b) Attempt any ONE of the following: 6

- (i) State the classification of insulating material as per IS.
- (ii) A 1- ϕ transformer of 100 KVA, 11000/2200 volts, 50 Hz, gave the following results:
 - 1) O.C. test : $V_O = 2200$ V, $I_O = 1.59$ A, $W_O = 980$ W
- L.V. side
 - 2) S.C. test : $V_{SC} = 580$ V, $I_{SC} = 9.1$ A, $W_{SC} = 1100$ W
- H.V. side (with L.V. shorted)

Calculate the efficiency and regulation of transformer at full load 0.8 p. f. (lagging).

5. Attempt any TWO of the following: 16

- a) State and explain the factors affecting the life of insulating material.
- b) State the method of neutral grounding. Explain the solid grounding and state advantages of grounding.
- c) A 3-phase, 500 V squirrel cage. Induction motor gave the following test results:

No load test : 500 V, 4 A, 750 Watts.

Blocked rotor test : 100 V, 16 A, 800 Watts.

Draw the circle diagram and determine:

- (i) efficiency
- (ii) p.f. when motor is supplying 25 H.P.

6. Attempt any FOUR of the following: 16

- a) What are the effects of misalignment on the performance of machine.
 - b) Explain importance and purpose of earthing.
 - c) Draw the experimental set up of the Sumpner's test on 1- ϕ transformer. Also write its procedure.
 - d) Explain routine preventive maintenance of transformer.
 - e) Explain how S.C. test is performed on single phase transformer.
 - f) State four safety signs and symbols used in industry.
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