

Total No. of Questions : 8]

SEAT No. :

[Total No. of Pages : 3

**P2945**

**[5669]-534**

**T.E. (Electrical)**

**ELECTRICAL INSTALLATION, MAINTENANCE AND TESTING  
(2015 Pattern) (Semester - I)**

**Time : 2½ Hours]**

**[Max. Marks : 70**

**Instructions to the candidates:**

- 1) Answer Q1 or Q2, Q3 or Q4, Q5 or Q6., Q7 or Q8.
- 2) Neat diagrams must be drawn wherever necessary.
- 3) Figures to the right side indicate full marks.
- 4) Assume suitable data if necessary.

**Q1)** a) A single phase distributor 4 km long supplies a load of 150A at 0.85 p.f. lagging at its far end and a load of 90A at 0.9 p.f. lagging at its mid-point. Both power factors are referred to the voltage at the far end. The resistance and reactance per km (go and return) are 0.05 ohm and 0.1 ohm respectively. If the voltage at the far end is maintained at 230V, calculate:

- i) Voltage at the sending end
- ii) Phase angle between voltages at the two ends.

**b)** Classify the substations. List the various equipment used in substation with their specifications.

**c)** Define and explain its significance with respect to condition monitoring.

- i) Polarization Index
- ii) Dielectric Absorption Ratio.

OR

**Q2)** a) The cost of a 3-phase overhead transmission line is Rs(5000a+2500) per km where 'a' is the area of cross section of each conductor in cm<sup>2</sup>. The line is supplying a load of 6MW at 33kV and 0.85 p.f. lagging assumed to be constant throughout the year. Energy cost Rs. 5.5 per kWh and interest and depreciation total 10% per annum. Find the most economical size of conductor.

Given that specific resistance of conductor material is 10<sup>-6</sup> ohm.cm.

- b)** Explain the pipe earthing with diagram.
- c)** What are the faults that occur in Induction Motor? What are the causes?

**P.T.O.**

- Q3)** a) Explain Motor Current Signature Analysis (MCSA) of induction motor.
- b) Explain in detail the concept of degree of polymerization and dissolved gas analysis in case of transformer.

OR

- Q4)** a) Explain transformer oil contamination process. Explain the filtration of transformer oil with block diagram.
- b) State and explain the different failure modes of transformer.

**Q5)** a) A room is to be wired for single phase ac supply directly from mains which has a declared voltage of 200V. The length of the wire from the main switch to light and plug points is 30 meters. If the wire is to carry 5 amps, determine the size of the conductor. The following standard table may be used.

Size of Conductor		2 Cables D.C. or Single-phase A.C.		3 or 4 Cables of balanced 3-phase		4 Cables D.C.	
Normal area sq. mm.	Number and diameter of wire in mm.	Current rating in amperes	Approx. length of run for volt-drop in Metres	Current rating in Amperes	Approx. Length of run for 1 volt drop in meters	Current rating in Amperes	Approx. length of run for 1 volt drop in metres
1.5	1/1.40	10	2.3	9	2.9	9	2.5
2.5	1/1.80	15	2.5	12	3.6	11	3.4
4.0	1/2.24	20	2.9	17	3.9	15	4.1
6.0	1/2.80	27	3.4	24	4.3	21	4.3
10.0	1/3.55	34	4.3	31	5.4	27	5.4
16.0	7/1.70	43	5.4	38	7.0	35	6.8
25.0	7/2.24	59	6.8	54	8.5	48	8.5
35.0	7/2.50	69	7.2	62	9.3	55	9.0
50.0	7/3.0	91	7.9	82	10.1	69	10.0

- b) Explain the procedure of installation and estimation of underground LT service lines.

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OR

- Q6) a)** State the general factors that should be considered in estimation of HT or LT lines. **[8]**
- b)** Write down all rules for residential wiring work. **[8]**

- Q7) a)** Write any eight objectives of Electrical Safety. **[8]**
- b)** Explain the Act and Statutory Regulations for Electrical Safety. **[8]**

OR

- Q8) a)** Enumerate the danger arising out of faulty equipment with an example. **[8]**
- b)** Write short note on:
- i) Contents of first aid box
  - ii) Precautions to be taken to avoid accidents.

