

**Electrical Installation Design**

P. Pages : 2

Time : Three Hours



**NRJ/KW/17/4605**

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
  2. Solve Question 1 OR Questions No. 2.
  3. Solve Question 3 OR Questions No. 4.
  4. Solve Question 5 OR Questions No. 6.
  5. Solve Question 7 OR Questions No. 8.
  6. Solve Question 9 OR Questions No. 10.
  7. Solve Question 11 OR Questions No. 12.
  8. Due credit will be given to neatness and adequate dimensions.
  9. Assume suitable data whenever necessary.
  10. Illustrate your answers whenever necessary with the help of neat sketches.

1. a) Write short note on 7  
i) Load Factor ii) Demand Factor  
iii) Diversity Factor and iv) Connected Load.

- b) What are different category of load? Explain in detail. 6

**OR**

2. a) Explain in details various factors for selection of cables. 7

- b) Compare overhead and underground Transmission and Distribution systems. 6

3. a) Explain vacuum circuit Breaker giving construction, principle, working and application with neat diagram. 7

- b) Write short note on HRC fuse and its characteristics. Also explain "Cut Off" and "Prospective Current" as referred to an HRC fuse. 6

**OR**

4. a) Write short note on current limiting Reactor and its types. 7

- b) Two  $3\phi$  generators of ratings 1000 kVA and 1500 kVA, 3.3 kV having percentage reactances of 10% and 20% respectively with respect to their ratings are connected to bus-bars. A  $3\phi$  short circuit occurs on the bus. Find the short circuit current. 6

5. a) What information is required to correctly select a contactor? 7

- b) A cage type induction motor when started by means of a star-Delta starter takes 180% of full load current and develops a 35% of full load torque. at starting. Calculate the starting torque and current in terms of full load values, if an Auto-Transformer with 80% tappings were employed? 7

**OR**

6. a) Explain how Reactive power is compensated in Industries using static capacitors. 6
- b) The load of an Installation is 800 kW, the 0.8 lag power factor works for 3000 Hrs per year. The tariff is Rs. 100/kVA + 20 paise per kWh. If the p. f. is improved to 0.9 p. f. lag by means of loss free capacitor, costing Rs. 60 per kVAR. Calculate the annual saving and monthly electricity bill. 8
7. a) Explain preliminary tests carried out on transformer before installation. 7
- b) Write short note on Buchholz Relay and Explosion Vent. 7
- OR**
8. a) What is the purpose of substation Earthing system? 7
- b) Give classification of substation with the help of neat flowchart. 7
9. a) How size of electrical transformer, cable, C. T. & P. T, fuse rating is calculated if Demand factor and Diversity factor is given? Explain with an example. 7
- b) Explain terms Maximum Demand, Duty cycle, Demand factor, Diversity factor, Load factor, utilization factor. 6
- OR**
10. a) Explain various factors considered for selection of transformer. 6
- b) Explain various electrical characteristics of motor. 7
11. a) With the help of neat graph, explain the effect of percentage of moisture and salt content on soil resistivity? 7
- b) Discuss various methods for measurement of earth electrode resistance. 6
- OR**
12. a) Explain the I. E. rules pertaining to the various interlocks in the electrical system. 7
- b) Explain in brief:
- i) Point of commencement of Supply. 3
- ii) Provision as per I. E. Rules, pertaining to use of linked switch with fuses of circuit breaker for transformer. 3

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