

**Central Public Works Department
Department Examination for
Assistant Executive Engineer (E)
Electrical Engineering Paper- II
(With Books)**

December, 2022

Time: 3 Hours

Maximum Marks: 100

Note: Attempt any FIVE questions. All questions carry equal marks.

(Make your own assumptions wherever required and indicate them clearly.)

1. a) Calculate I) the full load efficiency at unity power factor; II) the voltage at the secondary terminals when supplying full load secondary current at power factors i) unity, ii) 0.8 lagging, iii) 0.8 leading for the 4 kVA, 200/400 V, 50Hz, single-phase transformer, of which the following are the test figures: Open-circuit with 200 V applied to primary winding, current 0.8 A, power 70 W. Short-circuit with 17.5V applied to secondary (high voltage) side: current 9 A, power 50 W. [Marks : 15]
- b) What happens when the neutral conductor is open circuited? Elaborate all situations. [Marks : 5]
2. a) What are considerations for Selection of Lifts and also elaborate Energy Efficiency and Sustainability options available nowadays? [Marks : 8]
- b) Design for providing Lifts in a multi storey residential complex having 4 towers of 10 storey each with 4 houses on each floor. What will be the Number of Lifts, Lift speed and capacity of Lift? [Marks : 12]
3. a) Describe selection and operation of Pneumatic Tube Transport System used in buildings. [Marks : 10]
- b) Prepare Preliminary Estimate of E&M services for a 500 bedded super specialty hospital having 15 floors with 2 basements, typical floor area as 50 mtr x 50 mtr . [Marks : 10]

4. a) Define means of egress and also describe various active and passive fire protection systems used in buildings. Also calculate water requirement of sprinkler system of a 500 sq mtr office building with moderate hazard.

[Marks : 10]

- b) List out provisions of Firefighting installation in a fully air-conditioned Non-Residential building of 12 floors with one basement as per provisions of NBC giving all required details. The typical floor area is 40mtr X 40mtr and plot size is 100x100 sq mt.

[Marks : 10]

5. a) Define CT Burden and also calculate max error in a 50/5A CT with 0.2 accuracy.

[Marks : 8]

- b) What are the factors considered for designing a Sub Station? Work out rating/ capacity of sub-station equipments i/c DG Set for a fully air-conditioned Non-Residential building of 10 floors with 2 basements as per provisions of NBC and also draw a schematic diagram.

[Marks : 12]

6. a) Design Energy Efficient Central air conditioning system for OT and post operative care having a net area of 5,00 sq mtr (25 mtr X 20 mtr) of a hospital as per provisions of NBC 2016. Provide Scheme, layout as well as requisite details like type of chiller plant, number and type of Pumps, capacity and number of cooling towers, No and type of AHUs etc.

[Marks : 15]

- b) Also design energy efficient lighting for the above OT and post operative care unit including preparation of inventory, bill of quality, wiring diagram and conduit layout.

[Marks : 5]
