

CENTRAL PUBLIC WORKS DEPARTMENT  
Departmental Exam for Assistant Executive Engineer(E&M)  
Electrical Engineering Paper-I  
(Without Book)  
December, 2022

Time: 3 Hrs.

Max. Marks:100

**Note: Attempt any five questions.**

Q1. Answer any EIGHT of the following questions: [8x2.5=20 Marks]

- (i) Define Point wiring, Circuit wiring and Submain wiring.
- (ii) Define twin control wiring. Whether recovery to be made for not providing another ceiling rose in this case?
- (iii) How much light points & connected load can be put on one lighting circuit?
- (iv) What is the minimum size for copper conductor wire to be used for Light and Power circuit wiring?
- (v) What is the relevance and significance of Degree of Ingress Protection and how is it specified?
- (vi) How many copper conductor wire of 4 sq mm can be drawn in 32 mm steel conduit of straight run?
- (vii) Prepare the sectional view with dimensions of cable trench for laying of XLPE UG Cable up-to 1.1 KV and above 1.1 KV in two tier Horizontal formation.
- (viii) What is % reduction in Load Current and Transformer Losses when Power Factor of an electrical system improved from 0.7 to 1 ?
- (ix) What should be typical height of ceiling fan blades from the floor level ? Write empirical equation in terms of height of the room and height of work plane.

Q2. Answer any EIGHT of the following questions: [8x2.5=20 Marks]

- (i) Define Light Power Density (LPD) and explain methods to calculate it. What is interior LPD value for ECBC+ office building, as per Building Area Method?
- (ii) What is Luminous Efficacy and its unit? Why Luminous Efficacy of warm LED Light is usually lesser than white LED Light? Explain.
- (iii) What is the Colour Rendering Index of a light source and its significance?
- (iv) Write brief note on selection & installation of Solar PV system for Rooftop.
- (v) Write brief note on Lift ride quality, Lift Nominal Travel & Round-Trip Time
- (vi) What are typical threshold minimum values of pressure at hydraulically remote hydrant and at the highest hydrant?
- (vii) What is brush less Alternator in DG set?
- (viii) What is the function of Automatic Voltage Regulator in DG set?
- (ix) What are effects of leading power factor?

Q3. Answer any FOUR of the following questions - [4 X 5=20 Marks]

- (i) Oil Type Vs Dry Type Transformers. Explain selection based on Life cycle cost, reliability & safety.
- (ii) Describe the functioning of Buchholz Relay.

- (iii) What are differences in design and construction of Indoor and Outdoor Transformers?
- (iv) What is the CT ratio for Incomer 11 KV HT panel suitable for 2000 KVA transformer? What is the Accuracy class for protection & metering CT in case of 11 KV Incomer HT panel?
- (v) How many earthing electrodes required for 2X 1500 KVA DG Set with LT panel board? Provide detailed breakup also.

Q4. Answer any FOUR of the following questions: - [4 X 5=20 Marks]

- (i) Explain the specific requirements under Accessible India Campaign for Lifts.
- (ii) Define RTT, Handling capacity & Waiting interval and list relevant formulae's in the context of Lifts.
- (iii) What is Machine Room Less Lift and it's advantages / limitations over the Lift with Machine Room.
- (iv) Briefly describe "night sky pollution and light trespass" and its impact on environment?
- (v) Prepare a typical schematic diagram of power distribution in a building?

Q5. Answer any FIVE of the following questions: - [5 X 4=20 Marks]

- (i) Explain the various components with schematic diagram of a Fire Fighting Pumping Station for a Multi-storey Building.
- (ii) What is the NPSH & cavitation w.r.t. Pumps?
- (iii) What is the theoretical maximum suction head (M) under which a Centrifugal Pump can lift water? How this can be enhanced?
- (iv) What are differences between Horizontal and Vertical split casing pump?
- (v) Which type of fire detector to be provided in Auditorium/Multiplexes & go-downs?
- (vi) What is the height of false ceiling voids, above which sprinklers are required to be provided? Also state reasons why minimum distance between two sprinklers shouldn't be less than 1.8 mtrs, as per NBC 2016?

Q6. Answer any EIGHT of the following questions: [8x2.5=20 Marks]

- (i) VRV/VRF vs Centralized HVAC System
- (ii) COP vs ISEER, What is the required value of ISEER for 5 star rating of unitary air conditioner?
- (iii) Air cooled vs water cooled HVAC System
- (iv) DX Type vs chilled water system
- (v) Mechanical Ventilation in buildings having double basement
- (vi) Computational Fluid Dynamics
- (vii) Dry bulb and wet bulb temperature
- (viii) Inverter compressor vs Constant speed compressor
- (ix) How capacity of ceiling fan is sized? Write the formula.

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