



C20-EE-506

**7650**

**BOARD DIPLOMA EXAMINATION, (C-20)**

**OCTOBER/NOVEMBER—2023**

**DEEE – FIFTH SEMESTER EXAMINATION**

**ELECTRICAL UTILIZATION AND TRACTION**

Time : 3 Hours ]

[ Total Marks : 80

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**PART—A**

3×10=30

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **three** marks.  
(3) Answers should be brief and straight to the point and shall not exceed five simple sentences.

1. Define (a) glare and (b) illumination.
2. A 230 V lamp emits 2500 lumens by taking a current of 1 A. Calculate (a) lamp efficiency and (b) MSCP.
3. List any three applications of dielectric heating.
4. State the materials employed for heating element.
5. Compare CF lamps with tungsten filament lamps in any three aspects.
6. List any three advantages of LED lamps over other types of lamp.
7. Define specific energy consumption.
8. Define the tractive effort for acceleration.
9. What are the requirements of train lighting?
10. State the need for booster transformer in traction.

- Instructions :** (1) Answer **all** questions.  
(2) Each question carries **eight** marks.  
(3) Answers should be comprehensive and criterion for valuation is the content but not the length of the answer.

- 11.** (a) A corridor is illuminated by four lamps 8 m apart and suspended at a height of 4 m above the centre line of the floor. If each lamp gives 250 C.P. in all directions below the horizontal, then find the illumination at a point on the floor mid-way between the second and third lamps.

**(OR)**

- (b) State and explain the laws of illumination.

- 12.** (a) Explain the indirect resistance heating with neat diagram.

**(OR)**

- (b) Explain the principle of operation of coreless induction furnace with a neat sketch.

- 13.** (a) (i) Draw the automatic temperature control circuit.

- (ii) Explain Midon generation.

**(OR)**

- (b) (i) State the need for power saving devices.

- (ii) Write a brief note on interrupter used at traction sub station.

- 14.** (a) Derive an expression for the maximum speed of a trapezoidal speed-time curve.

**(OR)**

- (b) A 400 tonne goods train is to be hauled by a locomotive up a gradient of 1% with an acceleration of 1.5 kmphs. Coefficient of adhesion is 20%, track resistance 30 N/tonne and effect of rotating masses 10% of dead weight. Find the weight of locomotive and the number of axles if axle load is not to exceed 20 tonnes.

15. (a) List and explain any one service which is used in Indian Railways.

(OR)

(b) Explain the mechanics of transfer of power from motor to driving wheel.

**PART—C**

10×1=10

**Instructions :** (1) Answer the following question.  
(2) The question carries **ten** marks.  
(3) Answer should be comprehensive and the criterion for valuation is the content but not the length of the answer.

16. Explain the suitability of different motors for composite traction system.

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