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C16-EE-403

**6442**

**BOARD DIPLOMA EXAMINATION, (C-16)**

**JUNE/JULY—2022**

**DEEE - FOURTH SEMESTER EXAMINATION**

**ELECTRICAL UTILISATION 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. State the laws of illumination.
2. Define utilisation factor and depreciation factor.
3. List the applications of direct and indirect resistance heating.
4. State the applications of dielectric heating.
- \* 5. State the need for power saving devices.
6. Compare LED lamps and tungsten filament lamps in any three aspects.
7. Define (a) maximum speed, (b) average speed and (c) schedule speed.
8. State the factors which affect the schedule speed.
9. State any three requirements of train lighting.
10. List the major equipment used in a traction substation.

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## PART—B

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

11. (a) State the requirements of good lighting. 5  
(b) A lamp is taking a current of 0.5 A at 230 V and 125 MHCP. Find its efficiency in MHCP per watt and lumen per watt if spherical reduction factor is 0.75. 5
12. (a) Explain the production of light by fluorescence and phosphorescence. 5  
(b) The uniform luminous intensity of a lamp is 250 candela. The illumination directly below the lamp is 150 lux. Find the mounting height of the lamp and the illumination at a distance of 2 m away from the vertical axis of the lamp. 5
13. (a) Explain the working of core type induction furnace. 6  
(b) Write the applications of core type induction heating. 4
14. Explain the concept of energy audit and management. 10
15. (a) Define co-efficient of adhesion and list the factors affecting the coefficient of adhesion. 5  
(b) A 250 tonne train with 10% rational inertia effect is started with uniform acceleration and reaches a speed of 50 kmph in 30 seconds on level track. Assume simplified trapezoidal speed-time curve and find the specific energy consumption if braking retardation is 3 kmphs. Distance between stops is 2.5 km, efficiency of motor is 0.9 and track resistance is 5 kg per tonne. 5
16. (a) Define tractive effort and derive the expression for tractive effort. 7  
(b) Draw the speed time curves of urban and sub-urban services. 3

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- 17.** (a) A piece of plywood is to be heated by dielectric heating. The area of cross section of the piece is 0.5 sq meters and the thickness is 2.5 cm. If the frequency of 25 mega cycle per second is used and the power absorbed is 1000 W. Find the voltage employed necessary for heating. The relative permittivity of wood is 2.5 and power factor is 0.046. 5
- (b) Explain the method of obtaining constant output. 5
- 18.** (a) Explain end-on generation. 5
- (b) Explain the methods of obtaining unidirectional polarity. 5

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