C16–EE–**403**

6442

BOARD DIPLOMA EXAMINATION, (C–16)

OCTOBER—2020

DEEE—FOURTH SEMESTER EXAMINATION

ELECTRICAL UTILISATION AND TRACTION

Time : 3 hours] [*Total Marks* : 80

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. List the types of lamp fittings.

2. A 230 V lamp emits 6000 lumens by taking a current of 2 A. Calculate the lamp efficiency.

3. State the advantages of electric heating.

4. State the requirements of good heating element.

5. What are the benefits of LED lighting?

6. List the advantages of using energy efficient systems for electric motors.

7. Define coefficient of adhesion.

8. List the factors affecting the schedule speed.

9. State the requirements of railway coach air conditioning.

10. Write the requirements of train lighting.

PART—B

10×5=50

Instructions : (1) Answer *any* **five** questions.

(2) Each question carries **ten** marks.

(3) Answers should be comprehensive and the criteria for valuation are the content but not the length of the answer.

11. *(a)* State and explain laws of illumination. 5

(b) A hall 50 m × 30 m is to be illuminated by 40 W double tube fluorescent fitting. Find the number of fittings to give a uniform illunination of 50 lux. Take the efficiency of the lamps as 40 lumen per watt and utilisation factor as 0·5. 5

12. *(a)* Define *(i)* glare and *(ii)* utilisation factor. 4

(b) A corridor is lighted by four lamps 10 m apart and suspended at a height of 8 m above the centre line of the floor. If each lamp gives 150 CP in all directions below the horizontal, find the illumination at a point on the floor midway between the second and third lamps. 6

13. Explain the working of direct and indirect arc furnace with a legible sketch. 10

14. *(a)* Write the advantages of remote operated power devices. 5

(b) State the principles of energy efficient systems. 5

15. *(a)* Define specific energy consumption and derive expression for specific energy consumption. 6

(b) List any five signal boards in railway signalling system and mention the purpose of each. 4

16. *(a)* List the various overhead equipment (OHE) in traction. 4

(b) An electric train has an average speed of 42 kmph on a level track between stops 1400 m apart. It is accelerated at 1·7 kmphps and its braked at 3·3 kmphps. Draw the speed-time curve for the run. Estimate the energy consumption at the axis of the train per tonne per km. Tractive resistance constant is 50 newtons per tonne and rotational inertia is 10%. 6

17. *(a)* State the importance of isolator. 4

(b) A piece of plywood of $80 \times 40 \times 2$ cm is to be heated by dielectric heating from 30 °C to 150 °C in 25 minutes at a frequency of 25 MHz. Determine the power required for heating. Take the specific heat of wood as 1500 J/kg/°C, weight of wood is 600 kg/m^3 and the system efficiency as 70%. 6

18. List the major equipments at traction substation and explain them. 10

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