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C23-EE–505

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BOARD DIPLOMA EXAMINATION, (C-23)

MARCH/APRIL—2026

DEEE – FIFTH 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. A lamp of MSCP 800 is at a height of 10 metres. Find the total flux and illumination directly below the lamp on the working plane. 1.5+1.5

2. Define the terms *(a)* utilisation factor and *(b)* depreciation factor. 1.5+1.5

3. State any three advantages of electrical heating. 3

4. List any three applications of direct arc furnace. 3

5. List any three applications of dielectric heating. 3

6. State the necessity of power saving devices. 3

7. State the factors affecting the scheduled speed. 3

8. Define coefficient of adhesion. 3

9. State the important requirements of traction motors. 3

10. State the requirements of train lighting. 3

PART—B

10×5=50

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. Explain the different types of lamp fittings with neat diagrams. 10

12. Two lamps of 500 watts each with an efficiency of 25 lumens per watt are mounted on two lamp posts 10 meters apart. The posts are 3 meters and 5 meters height. Find the illumination *(i)* just below the lamps and *(ii)* at a point mid way between the lamps. 5+5

13. Explain the principle of operation of core type induction furnace with a neat sketch and state its applications. 8+2

14. *(a)* Explain indirect resistance heating with a neat sketch. 5

(b) Explain END-ON generation with a neat sketch. 5

15. Explain automatic illumination control circuits using LDR's with a neat sketch. 10

16. An electric train is to have acceleration and braking retardation of 0.8 kmphps and 3.2 kmphps respectively. If the ratio of maximum to average speed is 1.3 and time for stop is 26 seconds, find schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed-time curve. 10

17. Derive the expression for total tractive effort for acceleration to overcome gravity pull and train resistance. 10

18. Explain the major equipment used in traction substations. 10

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