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C16-EE–403

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BOARD DIPLOMA EXAMINATION, (C-16)

AUGUST/SEPTEMBER—2021

DEEE - FOURTH SEMESTER EXAMINATION

ELECTRICAL UTILIZATION 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. Define MSCP and lamp efficiency.

2. Define utilization factor and waste light factor.

3. State any three advantages of electric heating.

4. Give any three applications of dielectric heating.

5. Give any three reasons why LED lamps are preferred over fluorescent lamps.

6. An air conditioner is available with 2-star and 5-star ratings. Which one consumes lesser power?

7. Differentiate between main line and urban traction services in terms of free running duration.

8. Define average speed of a train and give its formula.

9. What is a feeding post in traction system?

10. What happens if the traction is supplied from single phase between two stations without using sectioning arrangement?

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 drawing hall of 20 m × 25 m has to be provided lighting of 150 lux. Assuming a utilization factor of 0.5 and depreciation factor of 1.5, find the number of lamps required, their spacing and total wattage. Assume a mounting of height of 4 m, space height ratio between 0.8 and 1.2 and luminous efficiency of lamps as 75 lumen/watt. Draw the layout of lamps. 10

12. Draw and explain direct, semidirect, indirect and general lamp fittings. 10

13. Explain core type induction furnace with a neat diagram. State the principle on which it works. 8+2

14. *(a)* Explain direct arc furnace with a neat diagram. 5

(b) Explain a sectioning arrangement with a neat layout diagram. 5

15. *(a)* Explain the need for energy saving devices. 5

(b) Explain automatic temperature control circuit using a neat block diagram. 5

16. Draw the speed time curve of a general main line traction service and explain each term in detail. 10

17. The speed time curve of an electric train on a uniform raising gradient of 1 in 100 has the following parts :

(a) Uniform acceleration from rest at 2 kmphps for 30 seconds

(b) Coasting with power turned off for 70 seconds

(c) Braking at 3 kmphps to stop

The weight of the train is 250 tons, track resistance on level track is 5 kg/ton and a rotary inertia of 10%. Assuming a transmission efficiency of 97%, find the maximum power developed by the motors and the total distance travelled by the train. 5+5

18. *(a)* Explain mid-on generation in train electrification.

(b) Explain the method of obtaining uni-direction polarity in dynamo used for train lighting. 5+5

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