C20-EE-506

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BOARD DIPLOMA EXAMINATION, (C-20)

DECEMBER—2022

DEEE - FIFTH 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. State Lambert's cosine law of illumination.

2. Define lamp efficiency and write its units.

3. List any three applications of the dielectric heating.

4. Write any three requirements of good heating elements.

5. State the necessity of power saving devices.

6. Compare CFL lamps with tungsten filament lamps in any three aspects.

7. Define *(a)* crest speed, *(b)* average speed and *(c)* schedule speed.

8. List the types of services in electrical traction.

9. Define end on generation.

10. Mention any three requirements of train lighting.

PART—B

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)* Explain different types of lamp fittings with neat diagrams. 8

(OR)

(b) A lamp having MSCP of 800 is suspended at the height of 10 m. Calculate *(i)* total flux of the light, *(ii)* the illumination directly below the lamp at the working plane and *(iii)* illumination at a point 2·5 m away on the horizontal plane from vertically below the lamp. 8

12. *(a)* Explain the working of direct arc furnace with neat sketch. 8

(OR)

(b) What is induction heating? Explain the core-less type induction heating with a neat sketch. 8

13. *(a)* With the help of a neat figure, explain speed-time curve for main line service. 8

(OR)

(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 is braked at 3·3 kmphps. Calculate maximum speed, acceleration period, free running period and draw the speed-time curve for the run. 8

14. *(a)* Derive an expression for total tractive effort for acceleration to overcome gravity pull and train resistance. 8

(OR)

(b) Explain the suitability of different motors DC, 1-phase AC, 3-phase AC and composite systems for electric traction. 8

15. *(a)* *(i)* Explain the automatic temperature control circuit with neat sketch. 4

(ii) Explain mid-on generation with neat sketch. 4

(OR)

(b) *(i)* List the advantages of LED lamps over other types of lamps. 4

(ii) Explain the circuit breaker used at traction substation. 4

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. Two arc lamps of 1000 CP and 500 CP respectively (assumed same in all directions) are suspended 15 m above the ground level and are 30 m apart. Find the intensity of illumination at mid-point on the ground in line with the two lamps.

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