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BOARD DIPLOMA EXAMINATION, (C–09)
MARCH/APRIL—2017
DEEE—SIXTH SEMESTER EXAMINATION

ELECTRICAL UTILISATION AND AUTOMATION

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 plane angle, solid angle and illumination.

2. Define glare. How can it be minimized?

3. What are the applications of dielectric heating?

4. State the methods of temperature control in resistance heating.

5. State the advantages of electrical drive.

6. Explain the methods of adopted to reduce the noise.

7. State the factors affecting schedule speed.

8. State the methods of improving the coefficient of adhesion.

9. List the applications of PLC.

10. Distinguish between relay based and PLC based control panels.

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

11. *(a)* State and explain inverse square law of illumination. 5
  (b) The luminous intensity of a lamp is 200 candela and is mounted at a height of 5 m from the centre of a circular area 4 m dia. Find the maximum and minimum illumination on circular area. 5

12. *(a)* Explain direct arc furnace with a neat sketch. 5
  (b) Explain core less-type induction heating with a neat sketch. 5

13. *(a)* List any four types of enclosures for an electric drive. 2
  (b) Draw and explain each part of the electric circuit of a refrigerator. 8

14. *(a)* Explain rheostatic breaking of a DC shunt motor. 5
  (b) Briefly explain about SCADA. 5

15. *(a)* Write a short note on Bow Collector. 4
  (b) An electric train has an average speed of 42 kmph on a level track between stop 1·4 km apart. It is accelerated at 1·7 kmphps and braked at 3·3 kmphps. Draw the speed time curve for the run. 6

16. An electric locomotive is required to haul a train having 10 coaches each 25 tonne on a main line track. The initial acceleration of 1·2 kmphps up a gradient of 1·5 in 100, the permissible axle loading is 18 tonne per axle. Take rotational inertia to be 5% for coaches and 10% for locomotive. Find the adhesive weight and number of axles on locomotive, if tractive resistance is 40 N/tonne and coefficient of adhesion is 0·2. 10

17. Derive an expression for the specific energy consumption for a trapezoidal speed-time curve. 10

18. *(a)* Explain different memories used in PLC. 5
  (b) Draw the ladder diagrams for AND, OR and NOT gates. 5

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