C09–EE–605A

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BOARD DIPLOMA EXAMINATION, (C–09)
OCT/NOV—2015
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. State the requirements of good lighting.   3

2. Define *(a)* depreciation factor and *(b)* reduction factor.   1½×2=3

3. State any six advantages of electric heating.   ½×6=3

4. List the methods of temperature control in resistance heating.   3

5. State the disadvantages of group drive over individual drive.   3

6. State a suitable motor for the following drives :   3
    (a) Lathes
    (b) Flour mills
    (c) Rolling mills

7. Compare different types of train services in any three aspects.   3

8. What are the materials used for *(a)* catenary, *(b)* droppers and *(c)* bow collector?   3

9. What are the advantages of using PLCs?   3

10. Draw the ladder diagram for NOR gate.   3

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 the laws of illumination. 5

(b) A lamp is taking a current of 0·6 A at 230 V and 125 MHCP. Find its efficiency in MHCP per watt and lumen per watt, if the spherical reduction factor is 0·77. 5

12. Explain *(a)* core type and *(b)* core-less type induction heating.

5+5=10

13. *(a)* Draw and briefly explain load curves of different types of loads. 5

(b) State the methods employed for reduction in noise. 5

14. A 500 tonne goods train is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1·2 kmphps. Coefficient of adhesion is 25%, track resistance is 40 N per tonne and effect of rotational masses is 10% of dead weight. Find the weight of the locomotive and number of axles, if axle load is not to exceed 21 tonnes. 10

15. Draw quadrilateral speed–time curve and derive expression for distance travelled and V_1 and V_2. 10

16. A train weighing 120 T is to be driven up an incline of 2% at a speed of 36 kmph. If the train resistance at this speed is 2 kg/T, find the current required at 1500 V DC supply, if efficiency of motors and gearing unit is 88%. If current were cutoff, how long the train would take to come to rest? 10

17. *(a)* Explain the working of counters CTU and CTD with the help of ladder diagrams. 5

(b) How are PLC memories organized? 5

18. *(a)* Draw the ladder diagram of DOL starter and explain. 5

(b) Explain the regenerative braking of 3-phase induction motor. 5

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