C09–EE–605A

3766

BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2013

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) Answer should be brief and straight to the point and shall not exceed *five* simple sentences.

1. Define illumination and lamp efficiency.

2. 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.

3. Mention any six requirements of good heating element.

4. List any six applications of dielectric heating.

5. Give three differences between group drive and individual drive.

6. List various types of electric braking.

7. What is tractive effort? Explain briefly.

8. Mention any six advantages of electric traction.

9. Write any three advantages of PLC-based control panel over relay-based control panel.

10. What is SCADA? List any three applications of SCADA.

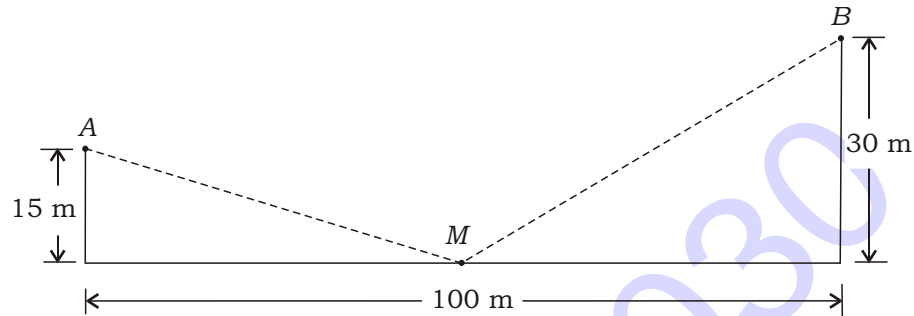**PART—B**   10×5=50

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)* Define MHCP and MSCP.   4

(b) Two lamps *A* and *B* of 200 CP and 400 CP respectively are arranged as shown in the figure below :

Calculate the illumination on the floor midway between the lamps.   6

12. What is induction heating? Explain the core-type induction heating with a neat sketch.   10

13. *(a)* Explain regenerative braking applied to d.c. shunt motor.   5

(b) A 50-HP, 440-V d.c. series motor is braked by plugging. Calculate the value of resistance to be placed in series with the armature to limit the initial braking current to 140 A. Assume armature resistance as 0·1 Ω, series field resistance 0·2 Ω, full-load current 100 A.   5

14. *(a)* Explain the load equalisation.   5

(b) Explain any four mathematical instructions of PLC.   5

15. *(a)* A train has a schedule speed of 60 kmph between two stops which are 4 km apart. Find the maximum speed over the run if the duration of stop is 60 seconds. Acceleration and retardation are 2 kmphps and 3 kmphps. Assume a Trapezoidal speed-time curve.   6

(b) Write a short note on pantograph collector.   4

16. A 400-tonne goods train is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmphps, coefficient of adhesion is 20%, track resistance is 40 N/tonne and effect of rotational masses is 10% of the dead weight. Find the weight of the locomotive and the number of axles if axle load is not to exceed 22 tonnes.   10

17. Derive an expression for the maximum speed of a Trapezoidal speed-time curve.   10

18. Draw a neat block diagram of PLC and explain its each part.   10

★ ★ ★