



C09-EE-605 A

3766

BOARD DIPLOMA EXAMINATION, (C-09)

OCT/NOV—2014

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 and solid angle. 1½+1½
2. Define candle power and brightness. 1½+1½
3. State the materials employed for heating element. 3
4. List the applications of dielectric heating. 3
5. State the advantages of electric braking. 3
6. Define electric drive and list the types of electric drives. 2+1
7. Define coefficient of adhesion and list any two factors affecting the coefficient of adhesion. 2+1
8. Draw a neat sketch of bow collector and write its purpose. 2+1
9. Define programmable logic controller. 3
10. Draw the ladder diagram for DOL starter. 3

*

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) State and explain laws of illumination. 6
(b) A room 9 m × 12 m is illuminated by twelve 100-watt lamps. The luminous efficiency of the lamp is 30 lumens per watt and the coefficient of utilisation as 0.45. Find the average illumination. 4
- 12.** Explain different methods of temperature control of resistance heating. 10
- 13.** (a) State the factors governing the selection of electric drive. 5
(b) Briefly explain rheostatic braking of DC series motor. 5
- 14.** (a) A motor operates continuously on the following duty cycle :
40 kW for 10 seconds, 80 kW for 10 seconds, 120 kW for 6 seconds, 100 kW for 20 seconds and idle for 14 seconds
Draw the load diagram and compute the size of motor required. 5
(b) List any five mathematical instructions from PLC instruction set and give their purpose. 5
- 15.** (a) Draw the ladder diagram for AND gate and NOT gate. 5
(b) Briefly explain about SCADA. 5
- 16.** Derive the expression for the maximum speed, acceleration and retardation of a trapezoidal speed-time curve. 10

- * **17.** A 300-tonne electric train is started with a uniform acceleration and reaches a speed at 40 kmph in 24 seconds on a level track. Find the specific energy consumption, assuming a simplified trapezoidal curve, with rotational inertia as 8%, retardation as 3 kmphs, the distance between two stations as 3 km, efficiency of motor as 0.9 and train resistance 49 newton per tonne. 10
- 18.** (a) Derive the expression for tractive effort. 5
- (b) Briefly explain about the specific energy consumption. 5
