



C09-EE-605 A

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BOARD DIPLOMA EXAMINATION, (C-09)

APRIL/MAY—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. Define (a) MHCP and (b) MSCP. 1½+1½=3

2. State the requirements of good lighting. 3

3. List the materials for heating elements for electrical heating. 3

4. Write down any six applications of dielectric heating. ½×6=3

5. List the merits and demerits of individual drive. 3

6. State the need for load equalization. 3

7. Define (a) maximum speed and (b) scheduled speed. 1½+1½=3

8. What are the factors affecting the coefficient of adhesion? 3

9. State the applications of PLC's. 3

10. Draw the ladder diagrams for (a) AND gate and (b) OR gate.
1½+1½=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. Two lamps of 200 candle power are arranged at a distance of 100 m from each other and at a height of 15 m and 30 m respectively. Calculate the illumination below each lamp and in the middle of the lamps. 5+5=10

12. (a) Explain indirect resistance heating with a neat sketch. 3+2=5

(b) Compare high frequency and power frequency coreless induction furnace. 5

13. Draw a neat sketch of electrical circuit diagram of refrigerator and explain its working. 10

14. (a) List different overhead current collectors in electric traction. 5

(b) Draw the connection diagram of a booster transformer in traction system and explain its working. 5

15. (a) Explain the mechanics of power transfer and derive the equation $F_t = 2T / D$. 5

(b) A 200 tonne motor coach having 4 motors each developing 600 N-m torque during acceleration starting from rest. If the up gradient is 30 in 1000, gear ratio is 4, gear transmission efficiency is 90%, wheel radius is 45 cm, train resistance is 40 N per tonne and rotational inertia is 10%, calculate the time taken to attain a speed of 50 kmph. 5

- 16.** Define specific energy consumption and derive an equation for specific energy consumption. 2+8=10
- 17.** (a) Explain the operation of timers T_{on} and T_{off} . 5
(b) Draw the ladder diagram for star-delta starter. 5
- 18.** (a) Compare relay-based and PLC-based control panels. 5
(b) Explain the regenerative braking of DC shunt motor. 5

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