



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

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1

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9. State the applications of PLC's. 3
10. Draw the ladder diagrams for (a) AND gate and (b) OR gate. $1\frac{1}{2}+1\frac{1}{2}=3$

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
