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C09–EE–**605A**

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BOARD DIPLOMA EXAMINATION, (C–09)

OCT/NOV—2017

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 utilisation factor and space-height ratio.

2. State the requirements of good lighting.

3. State any six requirements of good heating material.

4. List any six applications of resistance heating.

5. State the use of fly wheel in electric drives.

6. Give the motors used for the following load :

(a) Paper mills

(b) Lath machine

(c) Flour mills

7. Distinguish between urban and sub-urban services.

8. State the factors affecting specific energy consumption.

9. State any three advantages of PLC.

10. State 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)* State the laws of illumination. 4

(b) Two street lamps 20 m apart and are fitted with a 500 CP lamp at a height of 8 m above the ground. Find the illumination at a point *(i)* under the each lamp and *(ii)* mid-way between the lamps. 6

12. Explain different methods of temperature control of resistance heating with neat sketches. 10

13. *(a)* What are the types of enclosures for an electric drive? 5

(b) Explain load curves. 5

14. *(a)* Explain plugging of DC shunt motor with a neat sketch. 5

(b) Explain jump (JMP) and return (RET) instructions used in ladder diagram. 5

15. An electric train has an average speed of 45 kmph on a level track between stops 1·5 km apart. It is accelerated at 1·8 kmphps and braked at 3·4 kmphps. Determine *(a)* maximum speed and *(b)* schedule speed and also draw the speed-time curve. Assume duration of stop as 20 sec. 10

16. A 500 tonne goods train is to be hauled by an electric locomotive up a gradient of 2 in 100 with an acceleration of 1·2 kmphps. Determine the adhesive weight and number of axles on locomotive, if the axle load is not exceed to 21 tonnes. Take rotational inertia to be 5% for coaches and 10% for locomotive, tractive resistances is 40 N/tonne and coefficient of adhesion is 0·25. 10

17. Derive an expression for the specific energy consumption in electric traction. 10

18. *(a)* Draw a neat ladder diagram for DOL starter. 5

(b) Explain the following COUNTER instructions : 5

(i) Count-up (CTU)

(ii) Count-down (CTD)

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