C09–EE–**605B**

3767

BOARD DIPLOMA EXAMINATION, (C–09)

MARCH/APRIL—2017

DEEE—SIXTH SEMESTER EXAMINATION

ELECTRICAL TRACTION AND PLC

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. List any three advantages of electrical traction.

2. What is speed-time curve?

3. State the factor which affects the schedule speed.

4. Define coefficient of adhesion.

5. List any three factors affecting the specific energy consumption.

6. Define tractive effort.

7. List any three applications of PLC.

8. Draw the ladder diagram for logic AND gate.

9. List any three input and three output devices used with PLC.

10. List any three comparison instructions used in PLC.

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)* Describe the various stages of speed-time curve with neat sketch.   5

(b) Explain Booster transformer.   5

12. A train has a schedule speed of 40 kmph between two stops which are 4 km apart. Determine the maximum speed, average speed, distance travelled before applying brakes if the duration of stop is 60 sec and acceleration and retardation are both equal to 2 kmphps. Assume trapezoidal speed-time curve.   10

13. Explain different current collectors used in electric traction.   10

14. An electric locomotive is required to haul a train having 10 coaches each 25 tonne on a main line track. The initial acceleration is 1·2 kmphps up a gradient of 1·5 in 100. The permissible axle loading is 18 ton per axle. Take rotational inertia be 5% for coaches and 5% for locomotive. Find the adhesive weight and number of axles on locomotive if tractive resistance is 40 N/tonne and coefficient of adhesion is 0·21.   10

15. Derive the expression for specific energy consumption for a trapezoidal speed-time curve.   10

16. *(a)* Explain the ladder diagram for staircase lighting.   5

(b) Explain any two logical instructions used in PLC.   5

17. Explain the following timer instructions used in PLC :   5+5=10

(a) Timer on-delay (TON)

(b) Timer off-delay (TOFF)

18. *(a)* Define the sensor.   2

(b) Explain the features of inductive proximity sensor.   8

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