3767

BOARD DIPLOMA EXAMINATION, (C–09)
OCT/NOV—2016
DEEE—SIXTH SEMESTER EXAMINATION

ELECTRIC 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. State any three advantages of 25 kV, 1- AC system over DC system.

2. Draw the modified speed-time curve for main line and sub-urban services.

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

4. A sub-urban electric train has the distance between stops 3 km, total time for run 100 sec and a station stop of 30 sec. Determine the average speed of the train.

5. Define specific energy consumption.

6. Mention the materials used for *(a)* catenary, *(b)* droopers and *(c)* trolley wire.

7. List different SCADA softwares used with PLCs.

8. List out the three timer instructions.

9. Draw the ladder diagram for OR gate.

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

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. The average speed of an electric train on level track is 35 kmph between two stations which are 1·5 km apart. If it is accelerated at 2 kmphps and braked at 3 kmphps, calculate—

(a) actual time of run;

(b) maximum speed;

(c) time for acceleration;

(d) time for retardation. 2+4+2+2=10

12. Derive an expression for the tractive effort developed by electrical motor in electrical traction. 10

13. Explain the suitability of different motors for electric traction. 10

14. An electric train weighing 200 tonne has a rotational inertia of 12%. The train has run between two stations which are 3 km apart and has an average speed of 45 kmph. The acceleration and braking retardation respectively are 1·5 kmphps and 2·5 kmphps. The percentage up-gradient is 2%. The track resistance and overall efficiency are 50 N/tonne and 85% respectively. Estimate *(a)* maximum power at driving axel and *(b)* specific energy consumption. 5+5=10

15. Draw the connection diagram of a booster transformer in traction system and explain the working. 10

16. Explain the different memories used in PLC. 10

17. Draw the ladder diagram for STAR-DELTA starter and explain. 10

18. *(a)* Explain about rotary encoder. 5

(b) Explain about CAN bus. 5

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