



C09-EE-605 C

3768

BOARD DIPLOMA EXAMINATION, (C-09)

MARCH/APRIL—2014

DEEE—SIXTH SEMESTER EXAMINATION

**ELECTRIC TRACTION AND RENEWABLE
ENERGY SOURCES**

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. Classify the types of systems of track electrification.
2. List the factors affecting the schedule speed.
3. Which motor is suitable for traction duty? Why?
4. Define specific energy consumption and write its units.
5. Write the necessity of developing non-conventional energy sources.
6. Draw solar power generation diagram.
7. Briefly explain the working of PV cell.
8. State the different considerations for site selection for installing windmill.

- * 9. Differentiate between biomass and biogas.
10. State the advantages of combined cycle of power plants.

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) Explain speed-time curve of a mainline service. 4
- (b) The schedule speed of an electric train is 60 kmph. Determine the maximum speed between two stops which are 6 km apart. Duration of stops is 60 seconds. The acceleration and retardation are 2 kmphs and 3 kmphs respectively. Assume trapezoidal speed-time curve. 6
12. (a) Define coefficient of adhesion. List methods to improve it. 4
- (b) A 400 tonne goods train is to be hauled by a locomotive up a gradient of 2% with an acceleration of 1 kmphs, coefficient of adhesion is 20%, track resistance of 40 N/tonne and effect of rotational masses 10% of dead weight. Find the weight of locomotive and the no. of axles, if axle load is not to increase beyond 22 tonne. 6
13. (a) Explain with neat sketch the control of traction motor by autotransformer method. 5
- (b) State the need of booster transformer and draw the connection diagram of it. 5
- * 14. An average speed of an electric train is 40 kmph on a level track between two stops of 2.5 km. Determine the specific energy consumption if the acceleration and retardation are 2 kmphs and 3 kmphs. Take the rotational inertia as 10%, track resistance as 60 N/tonne and overall efficiency 85%. Also draw the speed-time curve. 10

- * 15. (a) Explain the function of flat plate collector. 5
(b) Explain about natural circulation solar water heater with sketch. 5
16. (a) List the advantages and disadvantages of PV cells. 4
(b) Identify the basic components of a windmill and explain the working principle of it. 6
17. Explain the construction and working of fixed dome type biogas plant with a neat sketch.
18. (a) List the applications of combined cycle power plants. 3
(b) Draw block diagram of combined working of power plants. Explain. 7
