



C09-EE-605C

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**BOARD DIPLOMA EXAMINATION, (C-09)
MARCH/APRIL—2016
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. List the different systems of track electrification.
2. What is the importance of speed-time curves?
3. Draw the connection diagram of a booster transformer.
4. Define (a) maximum speed, (b) average speed and (c) schedule speed.
5. What is the necessity of developing non-conventional sources of energy?
6. Briefly explain (a) direct radiation, (b) diffused radiation and (c) reflected radiation.

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7. What are the applications of solar air heater?
8. Mention the advantages of wind energy.
9. Briefly explain the process of biogas generation.
10. Write the advantages of combined cycle power plant (CCPP).

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 the suitability, advantages and disadvantages of DC series motor for electric traction. 5
 (b) An electric train has a schedule speed of 24 kmph between stations 800 m apart. The duration of stops is 20 seconds, the maximum speed is 20% greater than the average speed and the braking retardation is 3 kmphs. Calculate the acceleration required for the run. 5
12. (a) Deduce an expression for tractive effort in terms of wheel diameter, motor torque, gear ratio and efficiency of transmission. 5
 (b) Derive the equation for V_m for trapezoidal speed-time curve. 5
13. (a) Define coefficient of adhesion and suggest the methods to improve it. Also mention the factors affecting it. 5
 (b) Explain the purpose and material used for (i) bow collector and (ii) pantograph collector. 2½+2½
14. (a) With a neat diagram, explain how a traction motor will be controlled using autotransformer. 5
 (b) Write a short note on train lighting systems. 5

15. (a) Explain the working of solar pond with a neat sketch. 5
(b) Explain the working of solar cells. 5
16. Explain the vertical axis windmill with neat sketch and necessary equations. 10
17. (a) Write the advantages and limitations of tidal power plant. 5
(b) Explain the construction and working of fixed dome-type biogas plant. 5
18. (a) What do you understand by combined cycle power plant? 2
(b) Explain the working of combined cycle power plant with a neat block diagram. 8

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