C09–EE–605C

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BOARD DIPLOMA EXAMINATION, (C–09)
OCT/NOV—2017
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 any three advantages of electric traction.

2. Draw the speed time curve of sub urban service and note all the parameters.

3. Define specific energy consumption.

4. List any three methods of improving coefficient of adhesion.

5. Give any three advantages of renewable energy sources.

6. Define solar constant and give its value.

7. Write any three disadvantages of PV cells.

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8. Explain isovents and isodynes with respect to wind data.

9. Draw a sketch of single basin tidal power plant and name the parts.

10. What are the applications of combined cycle 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)* What are the factors that affect the schedule speed of a train? Explain.   4

(b) An electric train has an average speed of 42 kmph on a level track of 1·4 km between two stations. The acceleration and braking retardation are 1·7 kmphps and 3·3 kmphps. Find its maximum speed assuming trapezoidal speed time curve.   6

12. *(a)* Derive an expression for tractive effort required by a train.   6

(b) A 300 ton train attains a maximum speed of 50 kmph in 25 seconds up a gradient of 2 in 100. The trac resistance is 45 N/ton and the rotational inertia is 10% of the train weight. Find the tractive effort required.   4

13. The average speed of an electric train is 40 kmph on a level track between two stops of 2·5 km. Find the specific energy consumption if the acceleration is 2 kmphps and retardation is 3·1 kmphps. Take the rotational inertia as 15%, track resistance as 60 N/ton, the overall efficiency as 88%. Also draw the speed time curve.   10

14. *(a)* Write any five requirements for a motor used for traction.   5

(b) Explain the control of a traction motor using an auto-transformer with a neat diagram.   5

15. *(a)* Explain a solar cooker with advantages and disadvantages. 5

  (b) Explain a solar water pumping system with a neat sketch. 5

16. Draw the block diagram of a wind-electric system and explain each component. 10

17. *(a)* Write any three advantages of a fixed dome bio-gas plant. 3

  (b) Draw a neat sketch of any floating dome bio-gas plant and explain its working in detail. 7

18. Explain the working of a combined cycle power plant with a neat sketch. State its advantages. 7+3

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