Reg. No. : [ ][ ][ ][ ][ ][ ][ ][ ][ ][ ][ ]

Question Paper Code : 71787

B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2017.

Eighth Semester

Electrical and Electronics Engineering

EE 6801 – ELECTRIC ENERGY GENERATION, UTILIZATION AND CONSERVATION

(Regulations 2013)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Suggest suitable drives for lifts and cranes.

2. What are the merits and demerits of D.C system of track electrification?

3. What do you understand by polar curves as applied to light source?

4. What is flood lighting where is it generally used?

5. State the properties of a heating element used in indirect resistance heating.

6. Compare A.C. and D.C. sources as source of supply for arc welding.

7. Write down the energy balance equation for solar collector.

8. What is solar constant?

9. Write down the condition for maximum power generation in wind energy conversion system.

10. List the types of wind turbines.

PART B — (5 × 16 = 80 marks)

11. (a) (i) What are the factors influencing the choice of electric drives?   (4)

    (ii) Sketch the typical speed-time curve for Main line service and to sub-urban services in electric Traction. Find the equation for distance travelled for main line system.   (12)

Or

(b) (i) State the principle of regenerative braking. Explain regenerative braking in respect of DC motors. (6)

(ii) A 250 tonnes train with 10% rotational inertia effect is started with uniform acceleration and reaches a speed of 50 km.p.h.p.s. in 25 sec. on a level road. Find the specific energy consumption if the journey is to be made according to simplified trapezoidal speed time curve, the acceleration is 2 km.p.h.p.s. Tracking retardation 3 km./hr./sec. and distance between the stations is 2.4 km. Efficiency of motors = 0.9, track resistance = 5 kg./tonne. (10)

12. (a) (i) Discuss laws of illumination and its limitations in actual practice. (6)

(ii) A drawing hall 30 * 15 meters with a ceiling height of 5 meters is to be provided with a general illumination of 120 lux. Taking a co-efficient of utilization of 0.5 and depreciation factor of 1.4, determine the number of fluorescent tubes required, their spacing mounting height and total wattage. Tasking luminous efficiency of fluorescent tube as 40 lumens/watt for 80 watt tube. (10)

Or

(b) (i) Explain the working of a sodium vapour lamp with in a neat sketch. (8)

(ii) Show different types of indoor and outdoor lighting with neat Sketches. (8)

13. (a) (i) What are the different types of resistance welding? Describe any one type. (6)

(ii) A 10 kW single phase 200 V resistance oven has a circular nickel chrome wire for its heating elements. The final temperature is to be limited to 927 C and temperature of the charge is to be 327 C. Determine the length and size of the wire required. Assume radiating efficiency = 80%, emissivity = 0.9 and specific resistance of nickel chrome = 100×10^{-6} ohm cm. (10)

Or

(b) (i) Describe the construction and operation of the coreless induction furnaces. (8)

(ii) Explain the process of dielectric heating and derive the expression for total heat energy. (8)

14. (a) (i) Explain the basic phenomenon of solar energy conversion with suitable diagram. (8)

(ii) Explain the solar radiation geometry at earth surface. (8)

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(b) (i) What are the main components of a flat plate solar collector, explain the function of each. (8)

(ii) What are the advantages and disadvantages of concentrating collectors over a flat plate collector? (8)

15. (a) (i) With the help of block diagram, describe the functions of various components of a WECS. (10)

(ii) Give some important factors that are considered for site selection of WECS. (6)

Or

(b) With the help of neat diagrams explain in detail about the construction and the working principle of different vertical axis wind turbines. (16)

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