Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : Q 2221

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009.

Eighth Semester

(Regulation 2004)

Electrical and Electronics Engineering

EE 1451 — ELECTRIC ENERGY GENERATION UTILIZATION AND CONSERVATION

(Common to B.E. (Part-Time) Seventh Semester Regulation 2005)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1.   Mention any two advantages of non-conventional energy sources.

2.   Define co-efficient of performance with respect to wind mill.

3.   What is meant by load curve?

4.   Why is electrical energy conservation important?

5.   Define solid angle.

6.   Distinguish between direct lighting and indirect lighting.

7.   With respect to traction systems, explain the term 'free running'.

8.   What is the voltage level used in traction distribution network?

9.   Write the applications of DC shunt motor.

10. Name two types of loads, related to electrical drives.

PART B — (5 × 16 = 80 marks)

11. (a)   Explain with a neat sketch, the principle of MHD power generation.   (16)

Or

    (b)   Give the working of wind electric generating plant. Discuss the operational problems associated with this plant.   (16)

12. (a) Explain how energy conservation is carried out for a HT industry. (16)

Or

(b) (i) Discuss the various methods for power factor improvement. (10)

(ii) Write a brief note on power quality. (6)

13. (a) Draw a neat sketch of AJAX-WYATT induction furnace and explain its working. (16)

Or

(b) A 27 kW, three phase 400V resistance oven is to employ nickel-chrome strip 0.25 mm thick for the three star connected heating elements. If the temperature of the strip is to be 1000° C and that of charge to be 600° C, estimate suitable width for the strip. Assume emissivity = 0.9 and radiating efficiency to be 0.5 and resistivity of the strip material is 101.6×10^{-8} ohm-metre. (16)

14. (a) (i) What are the requirements of an ideal traction systems? (8)

(ii) An electric train has an average speed of 42 kmph on a level track between stops 1400 m apart. It is accelerated at 1.7 kmphps and is braked at 3.3 kmphps. Draw the speed time curve for the run. (8)

Or

(b) (i) What is specific energy consumption? Enumerate the factors which affect the specific energy consumption of trains operating at a given scheduled speed. (8)

(ii) The peripheral speed of railway traction motor can not be allowed to exceed 42m/s. If the gear ratio is 16/64, motor armature diameter 40cm and wheel diameter 88cm, calculate the limiting value of the train speed. (8)

15. (a) Discuss in detail the classification of electrical drives. (16)

Or

(b) (i) State the important factors on which the selection of electrical drive depends. (8)

(ii) Draw and explain different electrical and mechanical characteristics of various DC motors. (8)

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