KUMARAGURU
college of technology
character is life

Register Number:……..

B.E DEGREE EXAMINATIONS: NOV / DEC 2014

(Regulation 2009)

Sixth Semester

ELECTRICAL AND ELECTRONICS ENGINEERING

EEE113**:** Generation and Utilization of Electrical Energy

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Size of the distributed generation system is
   a) 1-2 MW b) 1-2 KW
   c) Above 5MW d) None of the above
2. Cogeneration is the simultaneous generation of
   a) Heat and power b) Steam and condensate
   c) Mechanical energy and power d) All the above
3. High frequency induction heating is used for
   a) Ferrous metals only b) Non-Ferrous metals only
   c) Both Ferrous & non-Ferrous metals d) None of the above
4. Glare is reduced by
   a) Using diffusers b) Increasing the height of the lamp
   c) Using reflectors to cut-off the light at certain angle d) All of the above
5. Which of the following is the advantage of electric braking?
   a) It avoids wear of track b) Motor continues to remain loaded during braking
   c) It is instantaneous d) More heat is generated during braking
6. Which of the following traction system is latest used in the world?
   a) 3 phase 3.7 kV b) 20 kV, 50 Hz. single phase
   c) 600 V, DC d) 3 kV, DC

7. What mass (in grams) of nickel could be electroplated from a solution of nickel(II) chloride by a current of 0.25 amperes flowing for 10 hours

a) 12 g b) 5.5 g

c) 0.046 g d) 2.7 g

8. Which substance functions as the electrolyte in an automobile battery

a) PbO_2 b) $PbSO_4$

c) H_2SO_4 d) H_2O

9. An over-excited synchronous motor on no load is known as

a) Synchronous condenser b) Static capacitor

c) Phase advancer d) Asynchronous condenser

10. Decrease in voltage for short duration in power system is

a) Voltage swell b) Voltage sag

c) Under voltage d) Voltage dip

PART B (10 x 2 = 20 Marks)

11. What is the principle of MHD power generation?
12. Outline the merits of distributed generation system.
13. Define waste light factor.
14. Give the opinion for Sodium vapour lamps not preferred for indoor lighting.
15. List out the demerits of electric traction system?
16. What is schedule speed of a train and list out its affecting factors?
17. Choose the properties of a heating material.
18. What is a welding transformer and label its types?
19. Why do we go for green building?
20. What are the factors that influence fixing up of tariff to the consumers?

PART C (5 x 14 = 70 Marks)

21. a) (i) Discuss about principle and operation of solar cell. (8)

(ii) Assess about distributed generation. (6)

(OR)

b) Explain with neat sketch, the principle of working of geothermal power plant.

22. a) (i) Derive an expression to find illumination at a point away from the lamp post. (6)

(ii) A 27 kW, 3-phase, 400 V resistance oven is to employ nickel-chrome strip 0.25 (8)

mm thick for the three star-connected heating elements. If the temperature of the strip is to be 1000º C and that of the charge be 600º C, estimate a 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 x 10^{-8} Ωm.

(OR)

b) An illumination on the working plane of 32 lux is required in a room 80m x 15metres.The lamps are required to be hung 4.5 m above the work bench. Assume a utilization factor of 0.5, lamp efficiency of 14 lumens per watt, and candle power depreciation of 0.2, Estimate the number rating and disposition of the lamps. Assume a maximum permissible value of spacing to height ratio of 1.5 and 200 watt lamp.

23. a) The distance between two stations is 1.6 kms.and the average speed of a train is 40 kmph.the acceleration, retardation during coasting and breaking are 2kmphps. 0.16kmphps and 3.2 kmphps respectively. Assume quadrilateral approximation of speed time curve, determine the duration of the accelerating, coasting and breaking periods and distance covered during these periods.

(OR)

b) (i) Explain different methods of traction motor control system. (8)

(ii) Compare various arrangements of current collectors used in electric traction. (6)

24. a) (i) Explain in detail about the different methods of charging batteries. (10)

(ii) State the factors that influence the quality of electro-deposition. (4)

(OR)

b) (i) Describe electroplating and list its applications. (6)

(ii) Nickel coating of 1mm thickness is to be built on a cylindrical surface 20 cm diameter and 30 cm long in 2 hours. Calculate the electrical energy needed if E.C.E of nickel is 0.3043 mgm/coulomb, specific gravity 8.9 and voltage used in electroplating is 10 V. (8)

25. a) (i) A factory works for 16 hours a day 300 days a year. The following two tariffs are available. (i) HV supply at Rs.1 per unit plus Rs.50 per month per KVA of maximum demand. (ii) LV supply at Rs. 1.10 per unit plus Rs.60 per month per KVA of maximum demand. The factory has an average load of 250 KW at 0.8 (10)

p.f and a maximum demand of 300 KW at the same power factor.HV equipment costs Rs 500 per kVA and losses can be taken as 5 %. Interest and depreciation charges are 12 %. Find the annual costs of the two systems and the difference in the annual costs of the two systems.

(ii) Elaborate on the impact of power quality in HT billing (4)

(OR)

b) Discuss in detail the various methods for power factor improvement.

****