GANPAT UNIVERSITY
B.TECH SEM-VI (ELECTRICAL)
REGULAR EXAMINATION April - June 2015
2EE614:-ELECTRICAL POWER UTILIZATION & TRACTION

Time: 3 Hours   Total Marks:-70

Instructions: - 1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

SECTION-I

Que.-1 **(A)** Explain construction and working of resistance furnace or oven. [04]

(B) Give the construction and working of coreless type induction furnace. Also state the advantages. [04]

(C) Explain different modes of transmission of heat with suitable example. [04]

OR

Que.-1 **(A)** Give the working principle of induction heating. Explain direct core type induction furnace. [04]

(B) Derive the condition for maximum output in arc furnace. [04]

(C) Explain Dielectric heating. [04]

Que.-2 **(A)** A 15 kW, 220 V, 1-Φ resistance oven employed with nickel-chrome wire for its heating element. If the wire temperature is not to exceed 1000^0C and the temperature of charge is to be 600^0C. Calculate the diameter and the length of wire. Assume radiating efficiency to be 0.6 and emissivity 0.9. For nickel-chromium, resistivity $\rho=1.016 \times 10^{-6}$ Ωm. [05]

(B) What is the working principle of resistance welding? State the advantages and disadvantages of resistance welding. [06]

OR

Que.-2 **(A)** Define depth of penetration. Give the equation of depth of penetration and determine the frequency required in case of hardening of a steel pulley having depth of penetration of 1.5 mm, unity relative permeability and specific resistance of steel is 5×10^{-7} Ωm. [05]

(B) Explain the projection welding with neat sketch. Also state the advantages of projection welding over spot welding. Enlist some applications of projection welding. [06]

Que.-3 **Attempt any three:** [12]

(A) Give the comparison between Resistance welding and Arc Welding.

(B) Explain MIG welding with its advantages and applications.

(C) What are the advantages of Coated electrodes over Bare electrodes?

(D) Explain Metal Arc welding. List the electrodes used in Metal Arc welding.

Que.-4   (A)   Define the following: [04]
1) Solid Angle
2) Luminous Flux
3) Candle Power
4) MSCP

(B)   Explain the working principle of incandescent lamp.   [04]

(C)   Explain different types of lighting schemes.   [04]

OR

Que.-4   (A)   Explain the following terms: [04]
1) Utilization factor
2) Maintenance factor
3) Depreciation factor

(B)   Which points should be considered while designing the lighting scheme?   [04]

(C)   Estimate the number and wattage of lamps which should be required to illuminate a workshop space 60 m x 15 m by means of lamps mounted 5 metres above the working plane. The average illumination required is 100 lux. Coefficient of utilization = 0.42, maintenance factor = 0.8, luminous efficiency = 16 lm/W, space-height ratio = unity. Draw the spacing layout also.   [04]

Que.-5   (A)   Derive expression for overall starting efficiency of Series-Parallel starting with 2 motors and also with 4 motors.   [05]

(B)   Which are the types of Track electrification? Compare A.C and D.C systems of railway electrification.   [06]

OR

Que.-5   (A)   A train run with an average speed of 50 kmph. Distance between stations is 3 km values of acceleration and retardation are 1.5 Kmphps and 2.5 Kmphps respectively. Find the maximum speed of train assuming trapezoidal speed time curve. Also, draw the curve and mentation all parameter's value in it.   [06]

(B)   What are the different steps of Electro-plating? Also, describe any three types of plating.   [05]

Que.-6   **Attempt any three:**   [12]

(A)   State and explain faraday's law of electrolysis.

(B)   Calculate the ampere hour require to deposit coating of silver 0.05mm thick on a shape of 8cm radius. Assume electromechanical equivalent of silver = 0.001118 and density of silver to be 7.5

(C)   Write down a short note on regenerative braking with advantages and disadvantages.

(D)   List different types of transition methods and explain any one of them.

END OF PAPER