

Total No. of Questions : 8]

SEAT No. :

P1332

[Total No. of Pages : 3

[4858] - 1070

T.E. (Electrical) (Semester - II)
UTILIZATION OF ELECTRICAL ENERGY
(2012 Pattern) (End Sem.)

Time : 3 Hours]

[Max. Marks : 70

Instructions to the candidates:

- 1) *Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.*
- 2) *Neat diagrams must be drawn wherever necessary.*
- 3) *Figures to the right side indicate full marks.*
- 4) *Assume suitable data if necessary.*

- Q1)** a) Write a short note on float switches and relays. [6]
- b) Explain with neat diagram electric arc welding. [6]
- c) A low frequency induction furnace operating at 12V takes 480 kW at 0.5 power factor when hearth is full. If the secondary voltage be maintained at 12V, estimate the power factor and power absorbed when hearth is half full. Assume the resistance of secondary circuit is to be halved and reactance to remain the same. [8]

OR

- Q2)** a) Draw electric circuit diagram used in Air conditioner and explain in brief. [6]
- b) Explain temperature control methods of resistance furnace in brief. [6]
- c) Calculate the time taken to melt 5 ton of steel in 3ph arc furnace having following data:- [8]

Current :- 8000A ; Resistance :- 0.003 Ω ; Arc voltage:-50V

Reactance:- .005 Ω ; Latent heat :- 8.89 kcal/kg; Specific heat: - 0.12

Initial temp:- 18°C; Melting Point:- 1370°C

If the overall efficiency is 50%, find power factor of the furnace.

P.T.O.

- Q3)** a) Sketch a neat block diagram and explain various equipment used in electric locomotive. [6]
- b) Write a short note on Street lighting. [6]
- c) Explain composite system of track electrification in detail. [6]

OR

- Q4)** a) A hall of 30*20 meter area with a ceiling height of 6m is to be provided with general illumination of 200 Lux, taking a coefficient of utilization of 0.6 and depreciation factor of 1.6. Determine the no. of tubes required considering suitable space to height ratio. Take luminous efficiency of tube 25 lumens/w for 300 W tube and show the arrangement. [6]
- b) Explain in detail interrupter and circuit breaker used in traction substation. [6]
- c) Write a short note on Pentagraph-current collecting device. [6]

- Q5)** a) A 200T motor coach having 5 motors each developing 5000Nm torque during acceleration, starts from rest. If up gradient is 30 in 1000, gear ratio is 4, gearing efficiency is 90%, wheel radius is 45cm, train resistance is 50 N/T, additional inertia is 10% then calculate time taken to attain speed of 55 km/hr. If line voltage is 3kVdc and efficiency of motor is 87%, find the current taken during notching period by each motor. [8]
- b) With a suitable diagram explain train lighting system. [8]

OR

- Q6)** a) Explain regenerative braking for DC series Motor. [8]
- b) What is meant by specific energy consumption? Derive the expression for specific energy consumption. [8]

- Q7) a)** An electric train uniformly accelerated at 6km/hr/sec for 21 sec on a level track, braked at 6km/hr/sec. the free running period for the train is 10 min and stop time of 5 min. Draw speed time curve and calculate distance between stations, average speed and schedule speed. [8]
- b) Explain Bridge transition process with suitable diagram. [8]

OR

- Q8) a)** An electric train has an average speed of 42 km/hr on level track between stops 1400m apart. It is accelerated at 1.7 km/hr/sec and braked at 3.3 km/hr/sec. Draw the speed time curve for the run and show all the timings. Estimate specific energy consumption of the train. Take tractive resistance as 50N/T and rotational inertia of 10%. [8]
- b) Write a short note on railway signaling system. [8]



