

Total No. of Questions : 8]

SEAT No. :

**P2395**

**[4758]-555**

[Total No. of Pages : 3

**T.E. (Electrical)**

**UTILIZATION OF ELECTRICAL ENERGY**

**(2012 Course) (Semester - II) (303148) (End - Semester)**

*Time :3 Hours]*

*[Max. Marks :70*

*Instructions to the candidates:*

- 1) *Answer Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.*
- 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) Describe the construction and working of core type induction furnace. [6]
- b) Explain the factors affecting quality of Electro-Deposition. [6]
- c) A lamp of L is at the height of 10 meters from the horizontal plane. The point B is at the vertically down the lamp and B is away from the lamp on the same plane. Find the distance between AB if illumination at B = 0.1 of that of at A. [8]

OR

- Q2)** a) With suitable diagram explain Dielectric heating. State application of dielectric heating. [6]
- b) Explain electric circuit used in summer type Air conditioner. [6]
- c) Define: [8]
- i) Illumination
  - ii) Space height Ratio
  - iii) Depreciation Factor
  - iv) Reflection Factor.

**P.T.O.**

- Q3)** a) Explain advantages of Electric traction. [8]  
b) Draw typical layout of traction substation. Label all parts and describe it in brief. [8]

OR

- Q4)** a) Write a note on following systems of track electrification: [8]  
i) D.C System.  
ii) Single phase low frequency A C system  
b) State advantages of 25 kv AC system. [8]

- Q5)** a) Draw Trapezoidal speed - time curve and obtain expression for maximum velocity. [8]  
b) A 250 tonne motor coach having four motors, each developing 5000 N-M torque during acceleration starts from rest. If up gradient is 25 in 1000, gear ratio is 5, gear transmission efficiency is 88%, wheel radius is 44 cm, train resistance is 50 N/tonne, addition of rotational inertia 10%. Calculate the time taken to reach a speed of 45 kmph. If the supply voltage were 1500 V DC and efficiency of motor 83.4%. Determine the current drawn per motor during notching period. [8]

OR

- Q6)** a) Define tractive effort. Elaborate the parts of total tractive effort with usual notations. [8]  
b) The speed time curve of a train consists of uniform acceleration of 6 kmphs for 25 sec, free running for 10 minutes, uniform deceleration of 6 kmphs to stop the train, a stop of 5 minutes. Find the distance between stations, average speed and schedule speed. [8]
- Q7)** a) Explain suitability of D.C. series motor for traction service. [6]  
b) Derive the expression for energy lost and efficiency for series parallel control of two DC series motors. [6]  
c) Write a note on Anti - collision system. [6]

OR

- Q8)** a) What is Transition? Explain shunt and bridge transition in detail. [6]
- b) Two D.C. series motor coach have resistance of  $0.1\Omega$  each. These motors draw a current of 500 A from 600 V mains during series - parallel starting period of 20 sec. If the acceleration during starting period remains uniform, determine [6]
- i) Time during which the motors operate in series, parallel.
- ii) Speed at which the series connection are to be changed if the speed just after starting period is 70 kmph.
- c) Explain how regenerative braking is used in electric traction. [6]

*EEE*