

FACULTY OF ENGINEERING
B.E. 4/4 (EEE) II-Semester (Main) Examination, April / May 2013

Subject : Utilization

Time : 3 Hours

Max. Marks: 75

Note: Answer all questions of Part - A and answer any five questions from Part-B.

PART – A (25 Marks)

1. Mention the advantages of coreless induction furnaces. (3)
2. Name the various resistance welding processes. (2)
3. Explain processes of starting of synchronous motor. (3)
4. What is meant by limit switch? (2)
5. Define Luminance. (2)
6. What do you understand by glare? (3)
7. What are the factors to be considered for street lighting? (3)
8. Define scheduled speed. (2)
9. Mention electrical and mechanical features of traction motors. (3)
10. Mention the application of lead acid batteries. (2)

PART – B (5x10=50 Marks)

11. Estimate the energy required to melt 500kg of brass in a 1-phase Ajax -Wyatt furnace. If the melt is to be carried out in 3/4 hour, what must be the average power input to the furnace. (10)
 Specific heat of brass = $393 \text{ J kg}^{-1} \text{ }^\circ\text{C}^{-1}$
 Latent heat of fusion of brass = $163 \times 10^3 \text{ J/kg}$
 Melting point of brass = 920°C
 Furnace efficiency = 70%
12. (a) Explain the float switches with neat schematic diagrams. (5)
 (b) Explain jogging operation of 3-phase induction motor with neat schematic diagram. (5)
13. (a) Explain the construction of Rouseau diagram. (5)
 (b)(i) A Lamp emits a total flux of light of 1500 Lumens. What is its MSCP.
 (ii) A plane surface is placed 3 metres from a 200 cp uniform source of light. Calculate the intensity of illumination on the surface when it is normal and inclined at 60° . (5)
14. An electric train weighing 400 tonnes runs along an upgradient of 1% with following speed time curve.
 Uniform acceleration of 1.5 kmphps for 30 sec
 Free running for 36 secs
 Coasting for 25 secs
 Braking at 2.6 kmphps to rest
 If tractive resistance is 45N/Tonne, rotational inertia effect 10%, overall efficiency of transmission and motor 75%. Determine the specific energy consumption. (10)
15. A multiple unit train weighs 391000 kg and is equipped with 12 motors giving a total tractive effort of 171000N. The line voltage is 600 V and the average current per motor during acceleration is 380 A. Series parallel control is used for starting, the full line voltage being applied to the motors when the speed reaches 41.8 km/h. The total resistance of each motor is 0.158Ω . Determine the total energy supplied during the starting period, the energy lost in the starting resistances, the energy lost in the motor, resistance and the useful energy applied to the train. (10)
16. (a) Explain dielectric heating with neat diagram and derive necessary equations. (5)
 (b) Derive the expression for simplified trapezoidal speed time curve. (5)
17. Write short notes on the following: (3+4+3)
 (a) Advantages of electric traction
 (b) Discharge lamps
 (c) Rating of batteries