Code: 9A02802

1

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) State and explain laws of illumination.
  (b) If a lamp of 200 cp is placed 1m below a plane mirror which reflects 90% of light falling on it, determine illumination at a point 3 m away from the foot of the lamp which is hung 4 m above ground.

2 (a) Explain the method of resistance heating in detail.
  (b) A slab of insulating material 150 sq cm in area and 1 cm thick is to be heated by dielectric heating. The power required is 400 W at 30×10^6 cps. Materials has permittivity of 5 and power factor of 0.05. Determine voltage necessary.

3 (a) Explain briefly the type of Gas welding.
  (b) Make a comparison between resistance welding and arc welding.

4 (a) Briefly discuss the electro deposition.
  (b) State and explain Faraday's laws of electrolysis.

5 (a) What factors govern the selection of a motor for particular application?
  (b) A 3-phase 4 pole 50 Hz induction motor has a resistance of 0.25 Ω ph and runs at 1440 rpm at full load. Determine the external resistance to be connected to the rotor circuit to lower down the speed to 1200 rpm. Assume torque to remain constant.

6 (a) Explain the type of regenerative braking in detail.
  (b) What are the advantages of electric breaking?

7 (a) Discuss the speed-time curves for main line services.
  (b) A train has schedule speed of 60 km/hr between the stops which are 6 km apart. Determine the crest speed over the run assuming trapezoidal speed time curve. The train accelerates at 2 km/hr/sec and retards at 3 km/hr/sec. Duration of stops is 60 sec.

8 What do you understand by the specific energy consumption and what factors affect the specific energy consumption.

*****

Code: 9A02802

2

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours　　　　　　　　　　　　　　　　　　　　　　　　Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain with sketch the principle and operation of incandescent lamp and enumerates its advantages and disadvantages.
　(b) A lamp with MSCP of 1000 is suspended at a height of 1.2 m. Determine (i) Total flux emitted by the lamp. (ii) Illumination just below the lamp.

2　Explain the different methods of electric heating and their advantages and disadvantages.

3 (a) Explain briefly the type of electric arc welding.
　(b) Briefly discuss the welding electrodes of various metals.

4 (a) Discuss briefly the power supply for electrolysis.
　(b) What is polarization and how its bad effects on electro deposition process can be reduced?

5 (a) What are the various methods employed for speed control of DC motors?
　(b) A 200 V, 10 HP motor has shunt and armature resistance of 100 Ω and 0.25 Ω respectively. Calculate the resistance to be inserted in the armature circuit to reduce the speed by 20%. Assuming that torque remains constant the efficiency of the motor is 80%.

6 (a) Make a comparison between AC and DC traction.
　(b) How the electric traction system is classified? Briefly discuss.

7 (a) Discuss the speed-time curves for urban service.
　(b) A sub urban electric train has a maximum speed of 70 km/hr. The schedule speed including a station stop of 30 sec in 45 km/hr. If the acceleration is 1.5 km/hr/sec. Find the value of retardation when the average distance stops is 6 m.

8　What is specific energy consumption? Derive the expression for specific energy consumption.

*****

Code: 9A02802

3

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Explain with sketch the principle and working of sodium vapour lamp and enumerate its advantages and disadvantages.

(b) A 250 V lamp takes a current of 1 A and produces a total flux of 4000 lumens. Determine (i) MSCP of the lamp. (ii) The efficiency of the lamp.

2 (a) What are the specific advantages and applications of dielectric heating?

(b) A piece of an insulating material is to be heated by dielectric heating. The side of the piece is $10 \times 10 \times 3$ cm^3. A frequency of 20 MHz is used and power absorbed is 400 Watts. Calculate the voltage necessary for heating and current that flows in the material. The material has a permittivity of 5 and a power factor of 0.05.

3 Explain the different methods of electric welding and their relative advantages.

4 Discuss the various applications of electrolysis in detail.

5 (a) Write short notes on load equalization.

(b) A series motor with series field and armature resistance of 0.06 Ω and 0.04 Ω respectively is connected across 220 V mains. The armature takes 40 A and its speed is 900 rpm. Determine its speed when the armature takes 75 A from this machine and excitation is increased by 15%.

6 (a) What are the special features of traction motors?

(b) What are the advantages and disadvantages of electric traction?

7 (a) Write short notes on mechanism of train movement.

(b) A train has schedule speed of 30 km/hr over a level track distance between stations being 1 cm. Duration of stop is 20 sec. Assuming braking retardation of 3 km/hr/sec and maximum speed 25% greater than average speed, calculate acceleration required to run the service.

8 What is coefficient of adhesion? How the value of coefficient of adhesion affects the slipping and skidding of the driving wheels of traction unit?
*****

Code: 9A02802

4

B.Tech IV Year II Semester (R09) Regular Examinations, March/April 2013
UTILIZATION OF ELECTRICAL ENERGY
(Electrical and Electronics Engineering)

Time: 3 hours   Max Marks: 70

Answer any FIVE questions
All questions carry equal marks
*****

1 (a) Briefly explain the requirements of good lighting scheme.
   (b) A 250 cp lamp is hung 4 m above the centre of a circular area of 6 m diameter. Calculate the illumination at the (i) Centre of area. (ii) Periphery of the area. (iii) Average illumination.

2 (a) Explain any one method of electric heating in detail.
   (b) The power required for dielectric heating of a slab of 150 sqcm in area and 2 cm thick is 200 W at frequency of 30 MHz. The material has relative permittivity of 5 and power factor of 0.05. Determine the voltage necessary and current flowing through the material.

3 (a) Explain briefly the type of resistance welding.
   (b) Write short notes on defects in welding.

4 (a) Discuss the various laws of electrolysis.
   (b) Discuss the advantages of reverse current process of electro plating.

5 (a) What are relative advantages and disadvantages of DC and AC electric drives?
   (b) A 200 V shunt motor having armature resistance of 0.4 ohm takes armature current of 20 A on full load and runs at 600 rpm. If resistance of 0.5 ohm is placed in the armature circuit find the speed at (i) Full load torque. (ii) Half full load torque. (iii) What is the ratio of starting torque to full load torque?

6 (a) Explain the type of rheostatic braking in detail.
   (b) What is electric braking? Explain the need electric breaking.

7 (a) Briefly discuss speed-time curve for sub-urban service.
   (b) An electric train is to have acceleration and breaking retardation of 0.8 km/hr/sec and 3.2 km/hr/sec respectively. If the ratio of maximum to average speed is 1.3 and time for stop is 26 sec, find the schedule speed for a run of 1.5 km. Assume simplified trapezoidal speed time curve.

8   Write short notes on:
   (a) Specific energy consumption.
   (b) Adhesive weight.

*****