Total No. of Questions : 8] [Total No. of Printed Pages : 3

Roll No. .....

EX–501(O)

B. E. (Fifth Semester) EXAMINATION, Dec., 2009

(Old Scheme)

(Electrical & Electronics Engg. Branch)

UTILIZATION OF ELECTRICAL ENERGY

[EX–501(O)]

Time : Three Hours

Maximum Marks : 100

Minimum Pass Marks : 35

Note : Attempt any *five* questions. All questions carry equal marks.

1. (a) (i) Compare tungsten filament lamp with fluorescent tubes.

(ii) Discuss effect of voltage variation on efficiency and life of lamp. 10

(b) A room 20 m × 10 m is to be illuminated by fluorescent lamp. The average illumination over the floor is about 250 lux. Estimate the number of lamps required and plan their arrangement. Height of lamp from the floor is 4 m and coefficient of utilization can be taken as 0·65. Depreciation factor of lamp is 0·85. Take luminous efficiency of fluorescent tube as 40 lumens per watt. 10

P. T. O.

2. (a) What are the desirable properties of heating element ? Discuss and give the name of one heating element. 10

   (b) What are the various types of resistance welding ? Explain any *two* with suitable diagram. 10

3. (a) What is electroplating ? Elaborate its uses and types. 10

   (b) A 35 kW, three-phase, 400 V resistance oven is to employ a heating element of 0·25 mm thickness. The heating element is star connected. If the heating element temperature is to be 1100°C and that of charge is to be 700°C, estimate the suitable width and length of heating strip. Take radiation efficiency 65%, specific resistance of heating strip $1 \cdot 03 \times 10^{-6}$ ohm–m and emissivity 0·9. 10

4. (a) What are the different systems of electric traction ? Explain. 10

   (b) Explain the mechanics of train movement. 10

5. (a) Compare the use of D. C. series motor and A. C. series motor in electric traction. Discuss the controllers used for such motors. 10

   (b) A D. C. series motor drives a load. The torque of the motor varies as the square of the speed. The motor takes a current of 12 A when the speed is 600 r. p. m. Calculate the motor speed and current drawn when the field winding is shunted by diverter of same resistance as that of field winding. Neglect all losses and assume magnetic circuit is unsaturated. 10

6. (a) Explain with necessary diagram the difference between regenerative braking and plugging with d. c. shunt motor. 10

(b) A 25 h. p., 220 V d. c. shunt motor with full-load speed of 600 r. p. m. is to be braked by plugging. Estimate the value of resistance which should be placed in series with it to limit the current to 130 amp. What should be the initial value of electric braking torque and value when the speed has fallen to its half of full-load value ? Given armature resistance of motor is 0·5 ohm and full-load armature current is 65 amp. 10

7. (a) Explain method of calculation of electrical loads for refrigeration and airconditioning. 10

(b) Describe the factors to be taken into account for selection of drives. 10

8. Write short notes on any *two* of the following : 20

(i) Polar Curves

(ii) Laws of Illumination

(iii) Methods of extraction of refinery metal

(iv) Adhesive weight and coefficient of adhesion

(v) 25 kV A. C. traction