

Roll No.

Total No. of Pages : 02

Total No. of Questions : 09

B.Tech.(EE/Electrical & Electronics)
B.Tech.(Electronics & Electrical) (2011 Onwards)
B.Tech.(Electronics Engg.)/(Electrical Engg. & Industrial Control)
(2012 Onwards) (Sem.-6)

ELECTRIC POWER AND UTILIZATION

Subject Code : BTEE-601

Paper ID : [A2334]

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTION TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a. List the methods of improving the power factors of a system.
- b. Classify load torques depending on the speed.
- c. State the requirements of an ideal traction system.
- d. Give the general features of motors in traction service.
- e. Enumerate the factors affecting heating element.
- f. Give the demerits of eddy current heating.
- g. Define the term Annealing.
- h. State the laws of illumination.
- i. Define Utilization factor.
- j. Give the purpose of electroplating.

SECTION-B

2. Derive the relation between the principle quantities of trapezoidal speed time curve.
3. Discuss the various aspects of residential lighting, street lighting & flood lighting.
4. Explain the arc welding process with a schematic diagram.
5. Explain in-detail any one method of charging batteries.
6. Discuss different methods of heating of buildings.

SECTION-C

7. a. Explain the various method of electrical breaking.
b. A 50 HP, 440 V DC shunt motor is braked by plugging. Calculate the value of resistance to be placed in series with the armature circuit to limit the initial braking current to 150A. Calculate braking torque so obtained. Assume armature resistance as 0.1Ω ; full load armature current = 100 A, full load speed = 600 rpm.
8. a. A 25 hp, 3-phase, 10-pole, 50 Hz induction motor provided with a flywheel has to supply a load torque of 800 Nm for 10 seconds followed by a no-load period during which the flywheel regains the full speed. The full load slip of the motor is 4% and the torque speed curve may be assumed liner over the working range. Find the moment of inertia of the flywheel if the motor torque is not to exceed twice the full load torque.
b. An 20 kW induction motor has a final steady temperature of 40°C when running at its rated output. Calculate its half hour rating for the same temperature rise if the copper losses at the rated output are 1.25 times its constant losses. The heating time constant is 90 minutes. Derive the expression used.
9. a. What is dielectric heating? How is this different?
b. A laminated plywood board $40 \text{ cm} \times 25 \text{ cm} \times 1.8 \text{ cm}$ is to be heated from 25°C to 160°C in 12 minutes, using 25 MHz supply, specific heat of wood is to be taken as 0.32, density is 0.6 g / cm^3 , relative permittivity of wood is 6 and power factor 0.05. Find the supply voltage, power required and current drawn. Take the efficiency of the process as 75%.