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Total No. of Pages : 02

Total No. of Questions : 18

B.Tech. (Electrical Engineering) (PT) (Sem.-7)

ELECTRIC POWER UTILIZATION

Subject Code : BTEE-601

M.Code : 74090

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS 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**Write briefly :**

1. List the factors governing the choice of a drive.
2. List the components of load torque.
3. Enumerate the types of motors. Find its application in traction.
4. Define tractive effort.
5. Explain Resistance heating?
6. Enumerate the advantages of vertical core type induction furnace.
7. Define Dielectric heating.
8. Define Solid Angle.
9. List out the demerits of Discharge lamps.
10. Define electro deposition.

SECTION-B

11. Derive an expression for derating factor of a motor for short time loading.
12. Derive an expression for tractive effort for propulsion of a train up and down a gradient.
13. Explain the process of dielectric heating. Also specify its applications?
14. Explain in detail the metallic arc welding.
15. With the help of a circuit diagram, explain the working of a water cooler.

SECTION-C

16. a) A three-phase, four-pole, 440 V, 50 Hz, star connected induction motor has the following parameters :

$$R_1 = 0.5 \Omega$$

$$X_1 = 1.5 \Omega$$

$$R_2' = 0.5 \Omega$$

$$X_2' = 1.5 \Omega$$

Using approximate equivalent circuit, determine the current and torque when the machine is running at (i) 1200 rpm (ii) 1800rpm.

- b) A 6-pole induction motor has a flywheel of 1200 kg/m^2 as moment of inertia. Load torque is 980 Nm for 10 secs. No-load period is long enough for the flywheel to regain its full speed. Motor has a slip of 6% at a torque of 490Nm. Calculate :
 - i) Maximum exerted by the motor.
 - ii) Speed at the end of deceleration period.
17. a) Define 'co-efficient of adhesion' and explain the factors on which it depends?
 - b) A motor driving a colliery winder has to deliver a load rising uniformly from zero to maximum of 1500 kW in 20 secs. during the accelerating period, 750 kW for 40 secs. during the full speed period and during the decelerating period of 10 secs. when the regenerative braking takes place the kW which is returned to the supply falls from an initial value of 250 to zero. The interval for rest before the next cycle starts is 20 secs. Estimate a suitable rating of the motor.
18. a) Describe the polar curves of different types of sources.
 - b) Two street lamps are 20m apart and fitted with 500CP lamp at a height of 8m above the ground. Find the illumination at a point under the lamp post and midway between the lamp.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.