

**III B.Tech II Semester Supplementary Examinations,
November/December 2005**

**UTILISATION OF ELECTRICAL ENERGY
(Electrical & Electronic Engineering)**

Time: 3 hours**Max Marks: 80**

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

1. (a) Discuss the advantages and disadvantages of electric drive over other drives. [8]
(b) A 220 V, 10 h.p. (metric) shunt motor has field and armature resistances of 120 Ohms and 0.25 Ohm, respectively. Calculate the resistance to be inserted in the armature circuit to reduce the speed to 700 r.p.m. from 950 r.p.m, if the full load efficiency is 80% and the torque varies as the square of the speed. [8]
2. (a) Discuss the various factors that govern the size and the rating of a motor for a particular service. [6]
(b) A motor has to deliver a load rising uniformly from zero to a maximum of 1500 Kw in 20 sec during the acceleration period, 1,000 Kw for 50 sec during the full load period and during the deceleration period of 10 sec when regenerative braking takes place the K w returned to the supply falls from an initial value of 500 to zero uniformly. The interval for decking before the next load cycle starts is 20 sec. Estimate the rating of the motor in KW. [10]
3. (a) Explain about various losses in Resistance oven write the expression for efficiency of resistance oven. [8]
(b) A 50KW, 3 phase, 440V, resistance oven is to provide nichrome strip 0.3mm thick for the three phase star connected heating elements. If the temperature of the wire is to be $1500^{\circ}C$ and that of charge is to be $1000^{\circ}C$, calculate the suitable width of the strip. Assume emmissivity=0.91 and radiation efficiency = 0.6. [8]
4. (a) What are the requirements of good electric braking? [6]
(b) Explain the method of rheostatic braking. [10]
5. Write short notes on
(a) High pressure mercury vapour lamp [8]
 i. M.A Type
 ii. M.T.Type
(b) Mercury fluorescent lamp [8]
6. (a) Explain in detail the inverse square law. [6]

- (b) What are the various types of lighting schemes. Explain with relevant diagrams. [10]
7. (a) Discuss the merits and demerits of the D.C and 1 - ϕ A.C systems for the main and suburban line electrification of the railways. [8]
- (b) Which system you consider to be the best for the suburban railways in the vicinity of large cities? Give reasons for your answer. [8]
8. (a) Draw the speed-time curve of a main line service and explain how it works. [8]
- (b) A train has a scheduled speed of 40km/hr between two stops, which are 4 kms apart. Determine the crest speed over the run, if the duration of stops is 60 sec and acceleration and retardation both are 2km/hr/sec each. Assume simplified trapezoidal speed-time curve. [8]
