B.E / B.Tech (Full Time) DEGREE END SEMSESTER EXAMINATIONS, NOV / DEC 2011
ELECTRICAL AND ELECTRONICS ENGINEERING BRANCH
SEVENTH SEMESTER
EE 9402 – UTILISATION AND CONSERVATION OF ELECTRICAL ENERGY
(REGULATIONS 2008)

Time: 3 Hours   Max. Marks: 100
Answer ALL Questions

PART A   (10 x 2 = 20 Marks)

1.   Draw the load torque as a function of speed for different mechanical loads.
2.   Define the term Specific energy consumption.
3.   A 500 W lamp having M.S.C.P of 800 is suspended 3 m above the working plane.
     Find the lamp efficiency.
4.   What are the main objectives of street lighting?
5.   What are the advantages of indirect arc furnaces?
6.   Write down the various materials used for the electrodes.
7.   What are the basic elements of a refrigeration system?
8.   Define the term Grand total heat.
9.   What are the requirements of tariff?
10. What do you meant by the term energy auditing?

PART B   (5 x 16 = 80 Marks)

11.   (i) A new factory requires a maximum demand of 700 kW and load factor of 25 %.
      The following two supplies are available:
      (a) Public supply tariff is ₹ 48 per kW of maximum demand plus 2.4 paise per kWh
              Capital cost = ₹ 84,000
              Interest and depreciation = 10 percent
      (b) Private oil engine generating station:
              Capital cost = ₹ 300000
              Fuel consumption = 3N / kWh
              Cost of fuel = ₹ 8.4 per kN
              Wages = 0.48 p/ kWh
              Maintenance cost = 0.36 p /kWh
              Interest and depreciation = 15 percent.
      Find which supply will be more economical.   (8)
      (ii) Explain the temperature rise in a motor with relevant equations and graph.   (8)

12. (a) (i) Explain the selection of various electric drives for particular application. (8)

(ii) Explain the operation of disc braking and magnetic track braking with neat diagram. (8)

(OR)

(b) (i) Explain the Trapezoidal speed time curves for a train with neat diagram. (8)

(ii) A 220 tonne motor coach driven by four motors takes 18 seconds to attain a speed of 40 km/h, starting from rest on an ascending gradient of 1 in 75. The gear ratio is 3.2, gear efficiency 90%, wheel diameter 92 cm, train resistance 45 N/t and rotational inertia 8 percent of the dead weight. Find the torque developed by each motor. (8)

13. (a) (i) A Hall of 30 m long and 12 m wide is to be illuminated and illumination required is 50 meter-candles. Five types of lamps having lumen outputs as given below are available:

Watts	100	200	300	500	1000
Lumens	1615	3650	4700	9950	21500

Taking a depreciation factor of 1.3 and utilisation coefficient of 0.5, calculate the number of lamps needed in each case to produce required illumination. Out of the above five types of lamps select most suitable type and design a suitable scheme and make a sketch showing location of lamps. Assume a suitable mounting height and calculate space-height ratio of lamps. (8)

(ii) Write short notes on High Pressure Mercury Vapour lamp (8)

(OR)

(b) Write short notes on:
(i) Flood lighting (8)
(ii) Factory lighting (8)

14. (a) Explain the various types of induction heating with neat diagrams.

(OR)

(b) Write short notes on
(i) Plasma Arc welding. (8)
(ii) Radiation welding (8)

15. (a) Explain the construction and operation of domestic refrigerator with its electric circuit. And also explain the maintenance and troubleshooting of refrigerator in detail.

(OR)

(b) Explain the operation of central and unitary air conditioning system with neat diagrams.