1079
B.E. (Electrical and Electronics Engineering)
Seventh Semester
Elective – I
EE-709: Electrical Power Generation

Time allowed: 3 Hours   Max. Marks: 50

NOTE: Attempt _five_ questions in all, including Question No. I which is compulsory and selecting two questions from each Part.

x-x-x

1. (a) What is the difference between capacity factor and utilization factor? Discuss why the utilization of a plant may be more than one?

(b) Describe the role of load factor on the cost of electrical energy?

(c) Two-part tariff is used for industrial consumers not for residential consumers. Discuss Why?

(d) What consideration govern the selection of plant size? Discuss the advantage which accumulate from large plant sizes??

(e) What is the significance of incremental water rate? Is it necessary to consider transmission losses in short term hydro thermal coordination?

(5*2=10)

PART –A

2. An electrical system having linear variations in load has the following laod values in MW

Time	12	5	8am	4pm	6	9	12
Weekday load	30	30	60	60	90	90	30
Sunday Load	30	30	20	20	40	40	30

Plot chronological load curve for weekday and Sunday. Also plot the load duration curve for one week. Find energy consumed in one week and load factor.   (10)

3. (a) An industrial consumer undertaking has connected load of 100kW. The maximum demand is 80kW. On an average each machine works for 60% time. Find the yearly expenditure on electricity if tariff is Rs.1.80 per kWh + Rs.6000 + Rs.700 per kW of maximum demand per year.

(b) Why is it not economical for consumers to raise power factor to unity? How can the most economical power factor be determined for a consumer installation? Compare the advantages and disadvantages of using a synchronous condensed and a capacitor for power factor improvement.

(5*2=10)

P.T.O.

4. What is the effect of load factor on unit generation cost? How is diversity helpful in reducing costs? Compute the generation cost per kWh from the following data:-

Installed Capacity= 120MW

Capital Cost= Rs. 40000 per kW

Interest and Depreciation = 15%

Fuel Consumption= 0.64 kg per kWh

Fuel Cost= Rs. 1500 per 1000 kg

Other operating costs= Rs. 50,000,000

Peak load = 100 MW

Load Factor= 60%

(10)

PART-B

5. The characteristics equations of a two plant system are given as:

$C1 = (20+0.03 P_1) P_1$ Rs. /hour

$W2 = (6+0.002 P_2) P_2$ m³/sec

Loss coefficient $B_{22}=0.0004$. The load variation is from 400MW to 800MW. Calculate the generation scheduling by solution of coordination equations and plot the following curves. Take r_2 = Rs. 3 per hour per m³ per sec.

(a) Hydro generation versus total load

(b) Steam generation versus total load

(c) Transmission losses versus total load

(10)

6. Explain the advantages of interconnected grid system. What factors needs to be considered for the selection of number and size of units? A generating station is to supply four regions of load whose peak loads are 10 MW, 5 MW, 8 MW and 7 MW. The diversity factor at the station is 1.5 and the average annual load factor is 60%. Calculate:

(i) The maximum demand on the station.

(ii) Annual energy supplied by the station.

(iii) Suggest the installed capacity and the number of units.

(10)

7. Write short note on the following. Explain with suitable examples:

(i) Straight Line and Sinking Fund depreciation

(ii) Spinning and non-spinning reserves

(2*5=10)

x-x-x