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B.Tech.(EE)(2011 Onwards)/(EE)PT

B.Tech.(Electrical & Electronics)(2011 & 2012 Batch) (Sem.-5)

ELECTRIC GENERATION & ECONOMICS

Subject Code : BTEE-502

Paper ID : [A2108]

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) Which type of power plants always operate as base load plants and why?
- b) What type of information is obtained from mass curve?
- c) Show that the heat rate curve and incremental rate curve cross each other at a point having minimum heat rate.
- d) What are the objectives of tariff?
- e) Draw a labeled graph showing straight line method of determination of depreciation.
- f) What are the advantages of combined operation of hydro-electric and thermal power plants?
- g) What are the disadvantages of low power factor?
- h) "*Higher the values of load factor and diversity factor, lower will be the overall cost per unit generated*". Justify the statement.
- i) Why the problems of disposal, transport and storage of liquid radio-active wastes are extremely significant in case of nuclear power plants?
- j) What is main difference between topping and bottoming cycles used for cogeneration?

SECTION-B

2. Briefly discuss organization of power sector in India.
3. Write a note on factors affecting aquatic ecosystems.
4. A single phase motor connected to 400V, 50 Hz supply takes 31.7A at a power factor of 0.7 Lagging. Calculate the capacitance required in parallel with the motor to raise the power factor to 0.9 lagging. Draw phasor diagram also.
5. The capital cost of a hydro-power station of 50 MW capacity is Rs 1,000 per kW. The annual depreciation charges are 10% of the capital cost. A royalty of Re 1 per kW per year and Re 0.01 per kWh generated is to be paid for using the river water for generation of power. The maximum demand on the power station is 40 MW and annual load factor is 60%. Annual cost of salaries, maintenance charges etc. is Rs 7,00,000. If 20% of this expense is also chargeable as fixed charges, calculate the generation cost in two part form.
6. Write a note on selection of plant size and number of units in power plants.

SECTION-C

7. A generation station of 1MW supplied a region which has the following demands :

From	To demand (kW)
midnight to 5 am	100
5 am to 6 pm	No-load
6 pm to 7 pm	800
7 pm to 9 pm	900
9 pm to midnight	400

Neglect transmission line losses and find the following :

- a) Plot the daily load curve and the load duration curve.
- b) Find the load factor, the reserve capacity, plant capacity factor, plant use factor, the hours that the plant has been off and utilization factor.
8. With the help of a diagram, derive expressions for coordinating equations for economic load dispatch considering transmission losses.
9. Write a note on long term operational aspects of hydro-thermal power plants.