

Please check that this question paper contains 09 questions and 02 printed pages within first ten minutes.

[Total No. of Questions: 09]

[Total No. of Pages: 02]

Uni. Roll No. ....

Program: B.Tech. (Batch 2018 onward)

Semester: 5

Name of Subject: **Electric Generation and Economics**

Subject Code: **PCEE-113**

Paper ID: **16465**

Scientific calculator is Allowed

**Time Allowed: 03 Hours**

**Max. Marks: 60**

**NOTE:**

- 1) Parts A and B are compulsory
- 2) Part-C has Two Questions Q8 and Q9. Both are compulsory, but with internal choice
- 3) Any missing data may be assumed appropriately

**Part – A**

**[Marks: 02 each]**

**Q1.**

- a) Differentiate between topping and bottoming cycles.
- b) What is tariff? What are its objectives?
- c) Write various advantages of combined operation of power plants.
- d) How kVAR of capacitors calculated?
- e) Should power factor be raised to unity? Give reasons.
- f) Between which quantities mass curve is plotted.

**Part – B**

**[Marks: 04 each]**

**Q2.** Explain the methods of loading turbo-generators..

**Q3.** What can be the social and economic impacts of power plants?

**Q4.** What do you understand by the term power factor? What are the causes and effects of low power factor?

**Q5.** Discuss the factors which tend to limit the size of units in steam plants.

**Q6.** Determine the generation cost per unit of energy from the following plant data:

Installed capacity=220MW, Capital cost of plant= Rs 35000 per kW, Interest and depreciation=14%, Fuel consumption=0.6 kg/kWh, Fuel cost Rs1400 per 1000kg,

Salaries, wages, repair and other operating cost per annum = Rs 90,000,000, Peak load = 180 MW, Load factor = 60%.

- Q7. Why is necessary to operate run off river plant in combination with a steam plant? How are they operating in rainy season and dry season?

Part – C

[Marks: 12 each]

- Q8. Discuss the methods used for computing the generation schedules in a combined hydro thermal system.

OR

Why should transmission losses be included in incremental cost criterion?

- Q9. The load curve of an electrical system is linear with the following values at different times:

Time	12	2am	5am	8am	5pm	6pm	9pm	12
Load MW	20	10	10	50	50	100	100	20

- Plot chronological load curve and load duration curve for the system.
- Plot energy curve and mass curve.
- Find load factor of the system

OR

Two units of thermal station have each the following cost characteristics

$$C = 5000 + 450P + 0.5P^2 \text{ Rs/hr}$$

Due to an instrumentation error the cost characteristics of first unit is in error by +2% and that of the second unit by -2% at the time of scheduling. Find the extra operating cost due to erroneous scheduling. Total load is 200 MW.

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