

<b>310604</b>	Roll No. _____	Total No of Pages: <span style="border: 1px solid black; padding: 2px;">2</span>
	<b>310604</b> <b>B. Tech. III - Sem. (Main) Exam., February - 2021</b> <b>Electrical Engineering</b> <b>3EE3-04 Power Generation Processes</b> <b>Common for EE/EEE</b>	

Time: 2 Hours

Maximum Marks: 80

**Instructions to Candidates:**

**Part – A:** Short answer questions (up to 25 words)  $5 \times 2$  marks = 10 marks.  
All five questions are compulsory.

**Part – B:** Analytical/Problem Solving questions (up to 100 words)  $4 \times 10$  marks = 40 marks. Candidates have to answer four questions out of six.

**Part – C:** Descriptive/Analytical/Problem Solving questions  $2 \times 15$  marks = 30 marks. Candidates have to answer two questions out of three.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of following supporting materials is permitted during examination.  
(Mentioned in form No. 205)

1. NIL

2. NIL

**PART - A**

- Q.1 Differentiate between fertile and fissile materials. [2]
- Q.2 What is Chronological load curve? [2]
- Q.3 Why low power factor means higher energy losses? [2]
- Q.4 How is diversity helpful in reducing the cost of energy? [2]
- Q.5 What is meant by 'Spot pricing'? [2]

### **PART - B**

- Q.1 Draw the schematic diagram of a nuclear power plant. Briefly explain its operation and various parts. [10]
- Q.2 Compare the overall performance of thermal, gas, hydro and nuclear power plants. [10]
- Q.3 Explain the generation of electricity using single tidal basin arrangement. [10]
- Q.4 What do you understand by tariff? Discuss the objectives of tariff. [10]
- Q.5 A fluorescent tube-light takes a current of 0.75A when connected across a 240V, 50Hz single phase A.C. supply. The power consumed by the tube-light is 80W. Calculate the value of capacitance to be connected in parallel with fluorescent tube-light to improve the power factor to 0.95 lagging. [10]
- Q.6 An Industrial consumer has an annual energy consumption of 201500 kWh at a load factor of 0.35. The Tariff is ₹ 4000 + ₹ 1200 per kW of maximum demand + ₹ 2.20 per kWh of energy consumed. Determine –
- (a) Annual bill [5]
- (b) What is the annual bill if total energy consumption is same but load factor is improved to 0.55? [5]

### **PART - C**

- Q.1 (a) Explain the terms 'load factor' and 'diversity factor'. How do these factors influence the cost of generation? [7½]
- (b) What consideration governs the selection of site for a Nuclear Power Plant? [7½]
- Q.2 (a) Derive an expression for the most economical value of power factor when kW demand is constant. [7½]
- (b) Discuss the importance of encouraging consumers to use electricity during off-peak hours. [7½]
- Q.3 (a) Explain the sinking fund method to find out the depreciation charges. Prove that the depreciation charge by the sinking fund method is given by – [7½]

$$Q = (C - S) * [r / (1 + r)^n - 1]$$

Where C = Initial cost of plant  
S = Salvage cost  
r = Annual rate of interest  
n = useful life of plant

- (b) What objectives should utility keep in mind while deciding the tariff for consumers? [7½]
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