

Ref. No.: Ex/PG/ELE/PE/T/115E/2025

M.E. ELECTRICAL ENGINEERING FIRST YEAR FIRST SEMESTER
EXAMINATION 2025

POWER SYSTEM PLANNING AND MANAGEMENT

Time: Three hours

Full Marks: 100

(50 marks for each part)

Use separate answer script for each part.

PART I

Figures in the margin indicate full marks

Group-A

Answer any one question out of two

20×1=20

1. (a) What is load forecasting? Discuss about the factors to be considered in load forecasting. (10)
- (b) Explain least square method using parabolic trend term. (10)
2. (a) Write an equation for load curve that may be used in load forecasting of a power system and explain it. (4)
- (b) Discuss how to estimate deterministic part of a load curve assuming linear trend curve. (16)

Group-B

Answer any three questions out of four

10×3=30

3. Why a utility company should pursue supply side management (SSM)? Discuss about the actions that could be taken under SSM. (5+5)
4. Discuss about the opportunities available to improve electric power generation. (10)
5. Explain cogeneration with the help of a suitable diagram. Also discuss the role of cogeneration in demand side management. (10)
6. Discuss about different actions adopted in present day power system for demand side management. (10)

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1. i) What do you understand by two state fluctuating model? Draw and explain state space diagram of a single repairable component operating in two state fluctuating environment. 6
 ii) Explain the terms mean down time and mean up time in connection with reliability. 4
 iii) State the assumptions considered in approximate method of reliability assessment. 3
 iv) The reliability of a component is 0.3. How many such components should be connected in parallel to achieve overall reliability of at least 0.85? 3
2. i) Explain what you understand by transmission congestion management in power system. 4
 ii) Define available transfer capability of a transmission system. What do you understand by OASIS in connection with transmission congestion management? 4
 iii) Define power transfer distribution factor. Explain how ATC can be calculated using power transfer distribution factor. 8
3. i) Mention the benefits of deregulation in electricity sector. 4
 ii) Explain the significance of power pool in deregulated environment. 4
 iii) The buy and sell offers of four power system utilities to the broker are shown in the table below: 8

Utilities selling energy	Incremental cost	MWh for sale	Seller's total increase in cost
A	Rs. 25/ MWh	100	Rs. 2500
B	Rs. 30/MWh	100	Rs. 3000

Utilities buying energy	Decremental cost	MWh for purchase	Buyer's total decrease in cost
C	Rs. 35/ MWh	50	Rs. 1750
D	Rs. 45/ MWh	150	Rs. 6750

Determine the total payments under split savings arrangement if A sells 100MWh to D and B sells 50MWh to D and C each.

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- | | |
|---|---|
| 4. i) Why DC power flow is used for ATC calculation? What are its limitation? | 4 |
| ii) Explain the terms Power wheeling and Transmission open access in deregulated power environment. | 4 |
| iii) Describe the role of ISO in restructured power system. | 4 |
| iv) Describe the postage stamp method of transmission pricing. Explain the advantages and disadvantages of this method. | 4 |