

SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR
(AUTONOMOUS)

B.Tech. II Year II Semester Regular & Supplementary Examinations March/April-2026

POWER SYSTEMS-I

(Electrical & Electronics Engineering)

Time: 3 Hours

Max. Marks: 70

PART-A

(Answer all the Questions 10 x 2 = 20 Marks)

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|-----|---|-----|----|----|
| 1 a | What is meant by the phenomenon "water hammer"? | CO1 | L1 | 2M |
| b | What are different Types Steam Boilers used In Thermal Power Plants? | CO1 | L1 | 2M |
| c | Why nuclear power plants are used as base load plants ? | CO2 | L1 | 2M |
| d | Write the three important factors in choosing a site for nuclear power plant. | CO2 | L1 | 2M |
| e | List out the different types of substations | CO3 | L1 | 2M |
| f | Write need of any two substation equipments | CO3 | L1 | 2M |
| g | Give the relation for insulation resistance of a cable. | CO5 | L2 | 2M |
| h | Classify the distribution system according to scheme of connection | CO5 | L1 | 2M |
| i | What is meant by three-part tariff? | CO6 | L1 | 2M |
| j | What is meant by block-rate tariff? | CO6 | L1 | 2M |

PART-B

(Answer all Five Units 5 x 10 = 50 Marks)

UNIT-I

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|---|---|-----|----|-----|
| 2 | Draw and explain the general layout of hydroelectric power plant? | CO1 | L1 | 10M |
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OR

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| 3 a | Explain the function of the following in thermal power plant.
i) Economizer ii) Electrostatic Precipitator iii) Condenser | CO1 | L2 | 5M |
| b | State the advantages and disadvantages of hydro power plant. | CO1 | L2 | 5M |

UNIT-II

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| 4 | Explain the various types of water coolant reactors used in nuclear power station. | CO2 | L2 | 10M |
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|-----|--|-----|----|----|
| 5 a | State the advantages and disadvantages of Nuclear power plant | CO2 | L2 | 5M |
| b | Explain shielding and safety precautions in nuclear power plants | CO2 | L2 | 5M |

UNIT-III

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|---|--|-----|----|-----|
| 6 | Discuss the different ways of classifications of substations | CO3 | L2 | 10M |
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| 7 a | Explain the double bus bar arrangement with one circuit breaker in substation. | CO3 | L2 | 5M |
| b | Explain the single busbar arrangement in substations | CO3 | L2 | 5M |

UNIT-IV

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|-----|--|-----|----|----|
| 8 a | Compare overhead and underground distribution systems. | CO5 | L2 | 5M |
| b | Derive an expression for maximum stress and minimum stress in a single core cable. | CO5 | L3 | 5M |

OR

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| 9 a | Explain requirements and design features of distribution systems. | CO5 | L2 |
| b | Calculate the capacitance and charging current of a single core cable used on a 3-phase, 66kV system. The cable is 1 km long having a core diameter of 10 cm and an impregnated paper insulation of thickness of 7 cm. the relative permittivity of insulation may be taken as 4 and the supply at 50Hz. | CO5 | L3 |

UNIT-V

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|------|---|-----|----|
| 10 a | Consumer has a maximum demand of 200 kW at 40% load factor. If the tariff is Rs. 100 per kW of maximum demand plus 10 paise per kWh, find the overall cost per kWh. | CO6 | L2 |
| b | What are the objectives of Tariffs? | CO6 | L2 |
- OR**
- | | | | |
|------|---|-----|----|
| 11 a | The maximum demand of a consumer is 20 A at 220 V and his total energy consumption is 8760 kWh. If the energy is charged at the rate of 20 paise per unit for 500 hours use of the maximum demand per annum plus 10 paise per unit for additional units, calculate : (i) annual bill (ii) equivalent flat rate. | CO6 | L2 |
| b | What do you understand by 'Economics of power generation'? Discuss the different costs of electrical energy | CO6 | L2 |

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