

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-GURUJADA VIZINAGARAM
II B. Tech II Semester Supplementary Examinations NOV-2025
POWER SYSTEMS-1
(EEE)

Time: 3 hours

Max. Marks: 70

The Question paper consists of Part A & Part B.

Part A is compulsory, Answer all questions.

Part B Answers any one question from each unit.

- | | | |
|---|---|-----------|
| 1 | PART-A | (20Marks) |
| | a) List the factors that are considered for site selection of Hydro power plants | [2] |
| | b) List the advantages and disadvantages of hydroelectric stations | [2] |
| | c) What is a nuclear fission | [2] |
| | d) Explain the function of moderator and control rods in a nuclear reactor | [2] |
| | e) List the precautions that need to be taken in gas insulated substations | [2] |
| | f) Distinguish between Ring main system and interconnected system | [2] |
| | g) Explain the construction aspect of a 3-core underground cable | [2] |
| | h) List the various connection schemes of distribution system | [2] |
| | i) Explain the terms average load, maximum demand and Load factor | [2] |
| | j) Why the values of demand factor and load factor are always less than 1. Justify? | [2] |
| | PART-B | (50Marks) |
| | Question from Unit - I | |
| 2 | With a neat schematic diagram, explain the working of a Hydroelectric power plant | [10] |
| | (OR) | |
| 3 | Explain the following w.r.t Thermal Power plant:
i) Coal handling plant ii) Air pre heater iii) Economizer iv) Super heater v) feed water pump | [10] |
| | Question from Unit - II | |
| 4 | a) Explain the safety precautions that need to be taken in a nuclear power plant w.r.t radiation | [5] |
| | b) Explain the working of a Fast breeder reactor with a neat diagram | [5] |
| | (OR) | |
| 5 | Draw and explain the schematic arrangement of a Nuclear Power station | [10] |
| | Question from Unit - III | |
| 6 | a) Explain the significance of SF ₆ gas in a gas insulated substation and list its merits and demerits | [5] |
| | b) Explain the working of sectionalized single bus bar arrangement with a neat sketch and labelling | [5] |
| | (OR) | |
| 7 | a) Distinguish in detail between air insulated substations and gas insulated substations | [5] |
| | b) List the advantages and disadvantages of main and transfer bus bar System over other bus bar arrangements in substations. | [5] |
| | Question from Unit - IV | |
| 8 | a) Explain in detail about intersheath grading | [5] |
| | b) The capacitance per kilometer of a 3-phase belted cable is 0.5 μ F between the two cores with the third core connected to the lead sheath. Calculate the charging current taken by five kilometers of this cable when connected to a 3-phase, 50 Hz, 11 kV supply. | [5] |

(OR)

- 9 a) Derive the equation for dielectric stress of a Single core underground cable [5]
- b) Calculate the capacitance and charging current of a single core cable used on a 3-phase, 66 kV system. The cable is 1 km long having a core diameter of 10 cm and an impregnated paper insulation of thickness 7 cm. The relative permittivity of the insulation may be taken as 5 and the supply at 50 Hz. [5]

Question from **Unit - V**

- 10 a) Explain the points to be considered while selecting the number and sizes of generating units for meeting the load requirements [5]
- b) Explain in detail about [5]
- i) Fixed cost ii) Semi – fixed cost and iii) Running cost

(OR)

- 11 A generating station has a maximum demand of 25MW, a load factor of 60%, a plant capacity factor of 50% and a plant use factor of 72%. Find (i) the reserve capacity of the plant (ii) the daily energy produced and (iii) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded. [10]
