

**PRAGATI ENGINEERING COLLEGE: SURAMPALEM
(AUTONOMOUS)**

II B.Tech II Semester Regular/Supplementary Examinations, May-2024

**POWER SYSTEMS-1
(EEE)**

Time: 3 hours

Max. Marks: 70

**Answer ONE Question from each Unit
All Questions Carry Equal Marks**

Q. No.	Questions	BTL	CO	Marks
UNIT – I				
1.	a) With a neat sketch, enumerate & explain about the essential components of hydroelectric plant.	K2	CO1	8M
	b) Explain the choice of factors to be considered while selecting a site for steam power station.	K2	CO1	6M
OR				
2.	a) Explain the operation of steam power station with a neat schematic diagram.	K2	CO1	8M
	b) Explain the essential factors which influence the choice of site for a hydro-electric plant.	K2	CO1	6M
UNIT – II				
3.	a) Explain the principle of working and operation of nuclear power plant with a neat diagram.	K2	CO2	8M
	b) List out the advantages, disadvantages, and applications of Nuclear Power Plant.	K2	CO2	6M
OR				
4.	a) Define the concept of shielding and describe the types of radiations emitted by nuclear waste and their potential health effects on humans and environment.	K2	CO2	7M
	b) Explain PWR (Pressurized water Reactor) and state its advantages and disadvantages.	K2	CO2	7M
UNIT – III				
5.	a) Draw the single line diagram, show the location of substation equipment for the following bus bar arrangements. i) Single bus bar and ii) Main and transfer bus bar.	K2	CO3	7M
	b) Distinguish Air Insulated Substations (AIS) and Gas Insulated Substations (GIS). Which type of substation is generally preferred in urban areas and why?	K2	CO3	7M
OR				
6.	a) What do you understand by substation? Draw the substation layout of 33/11 kV and explain briefly about the components of a substation.	K2	CO3	7M
	b) Outline the steps involved in the installation of Gas Insulated Substations (GIS). Additionally, discuss the maintenance practices necessary to ensure the reliable operation of GIS.	K2	CO3	7M

UNIT – IV					
7.	a)	Explain in detail about the insulating materials used in a cable and mention its properties.	K2	CO4	7M
	b)	Discuss about capacitance grading and derive the expression.	K3	CO4	7M
OR					
8.	a)	Derive the expression for capacitance of a three-core cable.	K3	CO4	7M
	b)	The insulation resistance of a single-core cable is $495 \text{ M}\Omega$ per km. If the core diameter is 2.5 cm and resistivity of insulation is $4.5 \times 10^{14} \Omega\text{-cm}$, find the insulation thickness.	K3	CO4	7M
UNIT – V					
9.	a)	The tariff in force is Rs. 125 per kVA of maximum demand and 6 paise per unit consumed. If the load factor is 30%, find the overall cost per unit at i) unity power factor and ii) 0.8 power factor.	K3	CO5	6M
	b)	Define and explain the following factors: i) demand factor ii) diversity factor iii) capacity factor and iv) utilization factor.	K2	CO5	8M
OR					
10.	a)	Explain about simple rate tariff, block rate tariff and three-part tariff methods in detail.	K2	CO5	7M
	b)	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) maximum energy that could be produced daily if the plant while running as per schedule, were fully loaded.	K3	CO5	7M