## II B.Tech - II Semester – Regular Examinations - MAY 2025

## **POWER SYSTEMS - I** (ELECTRICAL & ELECTRONICS ENGINEERING)

Duration: 3 hours

Note: 1. This question paper contains two Parts A and B.

- 2. Part-A contains 10 short answer questions. Each Question carries 2 Marks.
- 3. Part-B contains 5 essay questions with an internal choice from each unit. Each Question carries 10 marks.
- 4. All parts of Question paper must be answered in one place.
- BL Blooms Level

CO – Course Outcome

		BL	CO
1.a)	Judge why the overall efficiency of a steam	L4	CO1
	power station is very low.		
1.b)	Examine why hydroelectric stations have high	L4	CO2
	transmission and distribution costs?		
1.c)	Define Nuclear Fission.	L2	CO2
1.d)	Mention the function of Moderator in Nuclear	L3	CO3
	power plant.		
1.e)	Infer the features of single bus bar and	L3	CO3
	sectionalized single bus bar.		
1.f)	List out the advantages of gas insulated	L2	CO3
	substations		
1.g)	Classify Cables.	L1	CO3
1.h)	Sketch the single line diagram of typical low	L3	CO4
	tension distribution system.		
1.i)	Define economics of power generation.	L2	CO4

## $\mathbf{PART} - \mathbf{A}$

Max. Marks: 70

1.j)	A consumer has a maximum demand of 200kW	L4	CO5
	at 40% load factor. If the tariff of Rs.100 per		
	kW of maximum demand plus 10 paise per		
	kWh, find the overall cost per kWh.		

			BL	СО	Max. Marks		
		UNIT-I		1			
2	Dra	w the schematic diagram of a modern	L3	CO2	10 M		
	Stea	am power station and explain its operation.					
		OR					
3	a)	Explain the functions of the following:	L3	CO2	5 M		
		i. Dam					
		ii. Spilways					
		iii. Surge tank					
		iv. Headworks					
		v. Draft tube					
	b)	Discuss the merits and demerits of a	L2	CO1	5 M		
		hydro electric plant.					
	UNIT-II						
4	Illu	strate about Pressurized Water Reactor,	L2	CO2	10 M		
	Boi	ling water Reactor and Fluidized Bed					
	Rea	ictor.					
OR							
5	Cor	npare and analyze the operations of	L4	CO2	10 M		
	Hyo	droelectric, Thermal and Nuclear Power					
	stat	ions.					

## PART – B

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OR   7 a) Illustrate the key aspects of Gas Insulated Substations (GIS). L2 CO3 5 M   b) Analyse air insulated substations and gas insulated substations by comparing their features and installations. L4 CO3 5 M   UNIT-IV   8 Elaborate the capacitance and Intersheath grading with the derivation and Analyse disadvantages of both grading. L3 CO4 10 M   9 a) Infer the connection schemes of Distribution system with relevant layouts. L2 CO4 5 M   b) Illustrate the requirements of Distribution system. L2 CO4 5 M   UNIT-V   10 Explain the following terms w.r.t economic of a plant L4 CO4 5 M   10 Explain the following terms w.r.t economic of ii. L4 CO4 10 M   iii. Load factor iii. Diversity factor iii. III apacity factor III apacity factor		sho	wing the location of all the substation				
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iv. Plant use factor		ii.	Diversity factor				
		iii.	Plant capacity factor				
OR		iv.	Plant use factor				
<b>OK</b>			OR				

11	An electric supply company having a	L4	CO4	10 M
	maximum load of 50 MW generates $18 \times 10^7$			
	units per annum and the supply consumers			
	have an aggregate demand of 75 MW. The			
	annual expenses including capital charges are:			
	i. For fuel = Rs 90 lakhs			
	ii. Fixed charges concerning generation =			
	Rs 28 lakhs			
	iii. Fixed charges concerning transmission			
	and distribution $=$ Rs 32 lakhs.			
	Assuming 90% of the fuel cost is essential to			
	running charges and the loss in transmission			
	and distribution as 15% of kWh generated,			
	deduce a two part tariff to find the actual cost			
	of supply to the consumers.			