

B. Tech in Electrical Engineering, Semester 4th



Roll No.....

EE403: Conventional Energy Sources

Time: 3 hours

Max. Marks: 100

Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A	True/False type questions (10 questions @ 1 mark)	10
i.	Calorific value of Naptha is about 20000 kcal/kg.	
ii.	The present trend, all over the world, is to involve private sector in energy sector.	
iii.	Group diversity factor cannot be less than 1.	
iv.	For residential loads demand factor is about 0.6.	
v.	As load factor increases, generation cost per kW decreases.	
vi.	Annual plant cost is always greater than annual operating cost.	
vii.	A tariff should provide incentives to use electricity in off-peak hours.	
viii.	Low power factor leads to decrease in circuit current.	
ix.	The function of control rods in a nuclear reactor, is to keep multiplication constant nearly equal to 1.	
x.	Natural uranium contains more than 99% of U-234.	
Q.2	Short answer type questions (4 questions @ 2.5 marks)	10
i.	Name some moderator materials.	
ii.	On what factors does the power output of hydro plant depend?	
iii.	Differentiate between forced and induced draft fans.	
iv.	Previously diesel and gas turbine plants were used only for peaking duty. Now they are also used as base load plants. Why?	
Q.3A	What are the reasons of power crisis in India?	05
Q.3B	Give salient features of Indian Electricity Act 2003.	05
Q.4	Discuss the importance of diversity of loads in a power system. A central station supplies energy to two sub-stations. 4 feeders take off from each of the sub-stations. The maximum demand are as under: Central station	

	Feeder on Sub-station B Calculate the diversity factors between: (i) Sub-stations, (ii) feeders of Sub-stations A, (iii) feeders of Sub-stations B	2, 4, 5, 1 MW	
Q.5A	What is depreciation reserve? Why is it necessary to maintain it? Discuss the methods to calculate the depreciations charges.	1+1 +3	
Q.5B	Compute the generation cost per kWh from the following data: Installed capacity 200 MW Capital cost ₹ 45000 per kW Interest and depreciation 12% Fuel consumption 0.6 kg per kWh Fuel cost ₹ 1230 per 1000 kg Other operating cost 30% of fuel costs Peak Load 170 MW Load factor 80%	05	
Q.6A	What is tariff? What are its objectives?	1+4	
Q.6B	An industrial consumer has a load of 250 kW at a power factor of 0.8 for 8 hours a day and 300 days per year. Calculate his annual payment under each of the following tariffs, (a) ₹ 2000 per kVA of maximum demand per year + ₹ 2 per kWh (b) a flat rate of ₹ 3 per kWh	05	
	OR		
Q.6B	Two tariffs are offered : (a) ₹ 4000 per month + ₹ 1 per kWh (b) a flat rate of ₹ 4 per kWh At what consumption is tariff (a) preferable?	05	
Q.7A	Discuss the main features of diesel engines and alternators.	05	
Q.7B	Draw and explain (a) Flue gas flow diagram (b) Water steam flow diagram of a thermal plant.	05	
	OR		
Q.7B	Write short notes on (a) Heat balance and efficiency (b) Ash handling plant in case of thermal plant.	05	
Q.8A	Write a note on pumped storage plants. Also mention the advantages and types of pumped storage installations. Give two examples of pumped storage plants in India.	4+2+ 2+2	
Q.9A	Distinguish between fast and thermal reactors, fissile and fertile materials, fusion and fission. What do you mean by 'shielding against nuclear reactor'.	6+4	
Q.9B	Give the different classifications of nuclear reactors by making a table of different parameters.	10	
	OR		
Q.9B	What is specific speed of a turbine? How can turbines be classified according to specific speed?	10	