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700
Reg. No. :
Question Paper Code: 90872
B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2022.
Third / Seventh Semester
Mechanical Engineering
ME 8792 – POWER PLANT ENGINEERING
(Common to Electrical and Electronics Engineering)
(Regulations 2017)
Time: Three hours Maximum: 100 marks
Answer ALL questions.
PART A — $(10 \times 2 = 20 \text{ marks})$
 State the reasons for internal irreversibility in Rankine cycle. Why draft system needed for boiler furnace? List the advantages and disadvantages of diesel power plant. What are the major components of a gas turbine power plant?
5. What is meant by breeding ratio?
6. What are the properties of a good coolant for nuclear power plant?
 Classify the hydraulic turbines based on direction of flow of water in the runner.
8. List the categories of geothermal sources.
9. How to reduce power generation cost?
10. Define tariff for electrical energy.
PART B — $(5 \times 13 = 65 \text{ marks})$
 (a) Draw the layout of modern coal power plant and discuss the main circuits in detail.
Or
(b) Discuss the various stages involved in the fuel handling system from coal delivery to furnace in a steam power plant.
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12. (a) Explain the need and working principle of combined cycle power plant.

Or

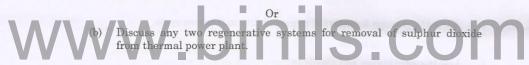
- (b) What are the essential functions of a fuel injection system in a diesel power plant and explain their types with neat sketches?
- 13. (a) With neat sketches explain the working principle of PWR and BWR plants.

Or

- (b) Why CANDU type reactors are economical? Explain the working principle, advantages and disadvantages of CANDU type reactor.
- (a) Draw the layout of hydro-electric power plant and discuss the working principle, main components, advantages and disadvantages.

Or

- (b) Discuss the construction and working of solar cell.
- (a) Explain the various methods used to calculate the depreciation cost of the power system.



PART C — $(1 \times 15 = 15 \text{ marks})$

16. (a) It is porposed to supply a load with a maximu demand of 100MW and a load factor of 0.4. Choice made from nuclear, hydro - electric and steam power plants. Recommend a power plant based on minimum overall cost per kWh. Assume 365 days a year.

Cost	Nuclear	Hydro-electric	Steam
	power plant	power plant	power plant
Capital per kW installed	Rs. 6,000	Rs. 4,320	Rs. 2,160
Interest rate	10%	10%	12%
Depreciation	10%	8%	12%
Operation cost per kWh	12 paise	6 paise	18 paise
Transmission and distribution cost per kWh	0.24 paise	0.96 paise	0.24 paise

Or

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										10a	
	(b)	stra	yearly duright line for the formating united to the contraction of the	rom 300 t of 200 N	MW to	80 MW.	Power is	supplied	with o	ne	
		(i)	Installed		ming.				((3)	
		(ii)	Load facto							(3)	
		(iii)	Plant fact						((3)	
		(iv)	Maximum		d				((3)	
		(v)	Utilizatio							(3)	
V	/ \/	/	V .	.b	ir	nil	S	.C	0	m	
V	/ \/	/\	W .	.b	ir	nil	S	C	0	m	
	/ \	/\	\	.b		nil	S	C		m	
				b		nil	S	C		m	
		/ \		b	3	nil	S	C	908		