Seat No	o.:	Enrolment No	
		GUJARAT TECHNOLOGICAL UNIVERSITY	
	BE- V <sup>th</sup> SEMESTER-EXAMINATION – MAY/JUNE - 2012		
Subje	ect cod	e: 151904 Date: 05/0	6/2012
Subje	ect Nar	ne: Power Plant Engineering	
Time	: 02:30	) pm – 05:00 pm Total Ma	rks: 70
Instr	uction	IS:	
	1. Att	tempt all questions.	
		ke suitable assumptions wherever necessary.	
		gures to the right indicate full marks.	
<u>.</u> .		e of steam tables is permitted	
Q.1	(a)	Sketch layout of modern thermal power plant and explain different circuits.	07
	(b)	Calculate the cost of generation per kWhr for a power station having	07
		following data:	
		Installed capacity of plant =200MW	
		Capital cost=Rs400 crores Rate of interest and depreciation =12%	
		Annual cost of fuel, salaries and taxation=Rs 5 crores	
		Load factor=50%	
		Also estimate the saving in cost per KWhr if annual factor is raised	
		to 60%.	
Q.2			
	(a)	(i) Explain how thermal power plant leads to acid rain?	03
		(ii) Define following terms: Diversity factor, Load factor, Demand	04
	(b)	factor, Connected load.  What is meant by overfeed and under feed principle of coal firing?	07
	(b)	Which is preferred for high volatile coal and why?	07
		OR	
	(b)	With neat sketch explain Pneumatic ash handling system. List its	07
	( )	advantages and disadvantages.	
Q.3			
	(a)	With neat sketch explain construction and working of Fluidized bed	07
	(1-)	combustion boiler and list its advantages and limitations.	.=
	(b)	Derive an expression for maximum discharge through a chimney.	07
Q.3	(a)	OR A 40 m high chimney is discharging flue gases at 350 °C, when the	07
Q.U	(α)	ambient temperature is 30 °C. The quantity of air supplied is 18Kg/	01
		Kg of fuel burnt. Determine	
		(i) Draught produced in mm of water	
		(ii) Equivalent draught in m of hot-gas column	
		(iii) Efficiency of chimney if minimum temperature of	
		artifical draught is 150 °C mean specific heat of flue	
		gases is 1.005K J/Kg K,	
		(iv) Percentage of heat spent in natural draught system if	
		Calorific value of fuel supplied is 30600K J/Kg (v) Temeprature of chimney gases for maximum	
		discharge in given time and what will be	

corresponding draught in mm ofwater produced.

Sketch Schmidt-Hartmann boiler and explain its construction and

(b)

working.

07

Q.4			
	(a)	The air leakage into a surface condenser operating with a steam turbine is estimated 84kg/hr. the vacuum near the inlet of air pump is 70mm of Hg when barometer reads 76mm of Hg. The temperature at the inlet of vacuum pump is 20 °C Calculate  (i) Minimum capacity of pump in cu-meters per hour  (ii) Dimensions of reciprocating air pump to remove air if it runs at 200rpm  (iii) L:D=3:2 and volumetric efficiency=80%  (iv) Mass of vapour extracted per minute with air	07
	(b)	List different impurities found in feed water and their effects on performance of thermal power plant.  OR	07
Q. 4	(a)	Explain following terms pertaining to cooling tower: Drift, Fill, Approach, Range and Cooling efficiency of cooling tower	07
	(b)	Write short note on sodium zeolite ion exchange process.	07
Q.5			
	(a)	List application, advantages and disadvantages of diesel power plants.	07
	(b)	Write short notes on:	07
		(i)Fast breeder reactor	
		(ii) Problems in disposal of nuclear waste.	
		OR	
Q.5	(a)	Sketch layout of diesel power plant and explain any two circuits?	07
	(b)	Compare the following:	07
		a) Nuclear power plant and thermal power plant	
		b) Diesel power plant and thermal power plant	

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