Registration No: | | | | | | | | | | |

Total Number of Pages: 01 **M.TECH**

HTPE211

2nd Semester MTech Regular/Back Examination – 2014-15

POWER PLANT PRACTICE AND CONTROL

BRANCH(S): HEAT POWER, THERMAL ENGINEERING

Time: 3 Hours **Max Marks: 70**

Q.Code: T522

Answer Question No.1 which is compulsory and any five from the rest.

The figures in the right hand margin indicate marks.

Q1		Answer the following questions:	(2x10)
	a)	Define Half life, Mean life and Decay constant.	
	b)	What is the main purpose of using super heater? What are the main advantages of superheated steam?	
	c)	Define vacuum efficiency applied to a condenser.	
	d)	List out the major advantages of the combined power cycles.	
	e)	Why feed water treatment is necessary before supplying to the boiler? What are the effects of impurities in feed water on the boiler?	
	f)	What do you understand by drought? How droughts are classified?	
	g)	What are the functions of control rod and moderator in a nuclear reactor?	
	h)	Define Load factor and Utility factor.	
	i)	What are the two different methods used to control No_x and So_2 in flue gases?	
	j)	What is the function of economizer and air preheater?	
Q2	a)	Draw a neat diagram of cyclone burner and describe its working?	(5)
	b)	Explain the working of electrostatic precipitator with a diagram?	(5)
Q3	a)	Define Breeding. What factors control breeding?	(4)
	b)	Explain with diagram the working of PWR and BWR and explain the advantages and disadvantages.	(6)
Q4	a)	What are the different methods of governing the steam turbine? Explain one of the methods with diagram?	(6)
	b)	Mention advantages and disadvantages of hydro-electric power plant compared with Thermal power plant?	(4)
Q5		The steam at 40 bar and 400^0C is supplied to the steam turbine. The steam is bled for regenerative heating at 2bar and 0.5 bar. The condenser pressure is 0.05 bar. Assuming the isentropic efficiencies in first, second and third stage of the turbine 75%,80% and 85% respectively and neglecting the pump work and heat losses, find((a)steam bled for regenerative heaters per kg of steam supplied to turbine (b) power developed by the turbine in kW if the steam flow is 10 kg/sec (c)the thermal efficiency of the cycle. In each heater, the feed water is heated to saturation temperature of steam at heater pressure and bled steam in the heater is pumped into the feed line immediately ahead of each heater.	(10)
Q6	a)	A thermal power plant consists of two 60MW units running for 8000 hours and 30MW unit running for 2000 hours per year. The energy produced by the plant is 876 x 10^6 kWh per year. Determine plant load factor and plant use factor. Consider maximum demand is equal to plant capacity	(4)
	b)	A steam turbine develops 3000kW when the steam is supplied at 10 bar and 250^0C. The vacuum in the condenser is maintained at 65cm of Hg. The barometer reads 75.2 cm of Hg. The rise in temperature of cooling tower is limited to 15^0C.The temperature of the condensate coming out of condenser is 35^0C.Neglecting all loses and assuming expansion through turbine is isentropic find (a) Specific steam consumption of the plant (b) Thermal efficiency of the plant (c) Quantity of cooling water circulated through the condenser per hour. Assume no leakage.	(6)
Q7	a)	Explain different carbon fixation methods?	(5)
	b)	What do you understand by PFBC what are its outstanding features over conventional FBC?	(5)
Q8		Write short notes on (any two)	(5+5)]
	a)	Ash Handling systems	
	b)	Nuclear Waste and its Disposal	
	c)	Water pollution by thermal power plant and its control	