Sea	ıt No.:	Enrolment No	
		GUJARAT TECHNOLOGICAL UNIVERSITY	
~ .		BE - SEMESTER-V • EXAMINATION – WINTER • 2014	
	-	Code: 151906 Date: 08-12-2014	
	-	Name: Conventional Power Engineering	
		0.30 am - 01.00 pm Total Marks: 70	
Inst	tructio 1.	ns: Attempt all questions	
	2.		
	3.	Figures to the right indicate full marks.	
Q.1	(a)	Draw a General layout of a thermal power plant and discuss the various circuits. Also explain the working of steam power plant.	07
	<b>(b)</b>	State the various methods of improving the efficiency and work output of a gas turbine plant. With schematic and T-S diagram explain the regeneration process.	07
Q.2	(a)	A gas turbine operates on Brayton cycle. The temperature range is $877^{\circ}$ C and $15^{\circ}$ C. Find pressure ratio for maximum power output. Also determine thermal efficiency, work ratio and power output, if the mass flow rate of air is $20 \text{ kg/sec}$ . Take Cp = $1.005 \text{ kj/kg}$ and Gama = $1.4 \text{ for compression and expansion process}$ .	07
	<b>(b)</b>	Explain the process in simple Rankine Cycle on p-v and T-S diagrams and derive an expression for thermal efficiency. Name the significant parameters to improve thermal efficiency of the power plant.	07
	<b>(b)</b>	OR  Derive an equation maximum blade afficiency for single stage Impulse turbine	07
	<b>(b)</b>	Derive an equation maximum blade efficiency for single stage Impulse turbine. And hence derive the equation for maximum power output per kg of steam.	U/
Q.3	(a)	With a neat sketch draw an outline diagram of a diesel power plant and state the functions of different systems.	07
	<b>(b)</b>	Define "degree of reaction" of steam turbine. Derive an expression for calculating degree of reaction in terms of velocities. Give a brief comparison of impulse and reaction turbines?	07
		OR	
Q.3	(a)	State the various methods of governing of steam turbines. Explain nozzle control Governing with neat sketch & Compare with the Throttle governing.	07
	<b>(b)</b>	State the requirement of a fuel injection systems in a Diesel engine and explain with neat sketch Common rail fuel injection system.	07
Q.4	(a)	Write advantages and disadvantages of Hydraulic power plant Also write the classification for hydraulic turbines.	07
	<b>(b)</b>	Describe CANDU type nuclear reactor with help of neat sketch .Give names of various nuclear fuels used in nuclear power plants.  OR	07
Q.4	(a)	Differentiate between Nuclear fission and fusion process. Explain Nuclear fission and chain reaction.	07
	<b>(b)</b>	What is axial flow turbine? Explain construction and working of Kaplan turbine and compare with the Francis Turbine.	07
Q.5	(a)	Define load factor, Diversity factor and plant use factor. A thermal power plant consists of two units of 30 MW each running for 8200 hours and one unit of 10 MW running for 2000 hours in a year. The energy produced by the plant $400 \times 10^6$ kWh per annum. Determine the plant load factor and plant use factor. The maximum demand is equal to the plant capacity.	07
	<b>(b)</b>	What is present status of power generation in India? Explain the difference in working of three different types of Hydro turbines?	07

- Q.5 (a) Describe the significance of load curves in planning and determining the size of Units in power plants. Define base load, Intermediate load and peak loads, with load curves.
  - (b) List various nuclear power plants in India. Explain in detail Nuclear waste and its disposal. 07

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