Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

ME – SEMESTER I (NEW) – • EXAMINATION – SUMMER 2016

Subject Code: 2712107 **Date:19/05/2016**

Subject Name: Thermal and Nuclear Power Plants

Time:02:30 pm to 05:00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**
4. **Use of Steam Tables & Mollier Diagram Permissible.**

Q.1	**(a)**	Draw the plant layout of 210 MW showing major four circuits . Label the major equipments.	**07**
	(b)	Explain two stage reheating of steam with line and T-S diagram. Give equation of efficiency for reheating.	**07**
Q.2	**(a)**	Explain PWR & BWR with neat sketch.	**07**
	(b)	Explain condenser efficiency & vacuum efficiency. Give sources of air leakages in surface condenser.	**07**
		OR	
	(b)	Draw Nuclear reactor showing main components. Give the function of each component in brief.	**07**
Q.3	**(a)**	Explain working of cooling tower used in modern thermal power plant with neat sketch. Give the approximate quantity of water for 100 MW power plant.	**07**
	(b)	Explain CANDU reactor with neat sketch. Why it is more preferable than other reactors.	**07**
		OR	
Q.3	**(a)**	Explain dual pressure steam cycle with neat sketch.	**07**
	(b)	Explain combined steam and gas turbine power plant with neat sketch and T-S diagram.	**07**
Q.4	**(a)**	In gas Turbine Plant air Enters at 1 bar and 27 º C and is compressed to a Pressure 4 bar. Compressor and Turbine Efficiencies of cycle are 0.78 and 0.8 respectively. CV. of fuel is 42000 kJ/kg. Mass flow rate of Air is 2.5 kg/sec and air fuel ratio is 75. Find Power output and Efficiency of Cycle. Take Cp=1.005 kJ/kg K and ϒ=1.4 for air and gases.	**07**
	(b)	Explain nuclear power plant safety in brief	**07**
		OR	
Q.4	**(a)**	In steam turbine plant steam enters at 15 bar and 90 degree super heat steam is extracted at 3 bar for feed heating. Condenser pressure is 0.05 bar. For regenerative and non-regenerative cycle find thermal efficiency.	**07**
	(b)	Explain how efficiency of gas turbine power plant is increased by inter cooling and regeneration.	**07**
Q.5	**(a)**	Explain load and load duration curve with suitable example.	**07**
	(b)	Define : (1) Peak load (2) average load (3) load factor (4) plant use factor (5) capacity factor (6) connected load (7) diversity factor	**07**
		OR	
Q.5	**(a)**	Explain with electrical circuit how Co2 content in gases is measured.	**07**
	(b)	In a 210 MW thermal power plant the maximum load is 160 MW. It's annual lord factor is 0.6. The coal consumption is 1 Kg per KWh of energy generated and the cost of coal is Rs 450 per tonne. Find (1) the annual revenue earned if energy is sold at Rs 1 per kWh and (2) the capacity factor.	**07**

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