Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER–V • EXAMINATION – SUMMER 2013

Subject Code: 151904 **Date: 20-05-2013**

Subject Name: Power Plant Engineering

Time: 10.30 am - 01.00 pm **Total Marks: 70**

Instructions:

1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1 **(a)** Draw a neat named general layout of modern thermal power plant. State the function of feed water heaters, economizer, deaerator, steam turbine and electric generator. **07**

(b) Dry steam is condensed at a rate of 7000 kg/h and the air leakage amounts to 14 kg/h.The air pump suction is screened off. The exhaust steam temperature is 32°C.The condensate temperature is 30°C and the temperature at the air pump suction is 25°C.Determine (i) the volume of air handled by the pump, (ii) the mass of steam condensed in the air cooler section per hour, and (iii) the mass of water vapour carried away by air. **07**

Q.2 **(a)** Explain Loeffler boiler with a schematic. State the difficulty experienced in La-Mont and Benson boiler. How is it solved? Mention its advantages. **07**

(b) (i)Name different methods of controlling the superheat temperature of steam. Explain the operation of spray type attemperator. **04**

(ii)Explain diversity factor and its importance. **03**

OR

(b) A 12 MW capacity power plant has the input-output curve defined by the equation, **07**

$I=5\times10^6(10+8L+0.4L^2)$ kJ/h

Where L is in MW.

Find: (i) Load at which the plant has its maximum efficiency and its value (ii) Increase in input required to increase the output from 4MW to 6MW by using the input-output equation and also by incremental rate curve.

Q.3 **(a)** Explain Ball and Race mill with a schematic. State its merits and demerits. **07**

(b) Explain cyclone burner with a schematic. State its merits and demerits. **07**

OR

Q.3 **(a)** What do you understand by nuclear fission? Give the functions and materials used for following components of nuclear reactor: **07**

Moderator, reflector, control rod, coolant, thermal shield.

(b) Explain with neat sketch construction and working of CANDU type reactor. **07**

Q.4 **(a)** State the functions of engine cooling system. Explain with a neat schematic the working of a thermostat cooling system. **07**

(b) State the functions of lubrication system in diesel power plant. Explain with neat sketch full pressure lubrication system for diesel power plant. **07**

OR

Q.4 **(a)** Discuss bad effects of acid rains. How acid rains are controlled? **07**

(b) Write requirements of a good ash handling system. Explain with a schematic pneumatic ash handling system. **07**

Q.5	**(a)**	Discuss the merits and demerits of mechanical draught over natural draught system.	**07**
	(b)	Explain seawater treatment using reverse osmosis process.	**07**
		OR	
Q.5	**(a)**	Discuss about different impurities found in feed water.	**07**
	(b)	Forced draught fan discharges 1500 m^3 of air per minute through the outlet of 1.7 m diameter and maintains a static pressure of 110 mm .of water. The temperature of air is 25°C. The density of air at NTP is 1.293 kg/ m^3.Calculate power of motor to drive the FD fan if efficiency of fan is 70%.	**07**

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