Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER– V • EXAMINATION – WINTER 2016

Subject Code: 151904 **Date: 17/11/2016**
Subject Name: Power Plant Engineering
Time: 10:30AM – 01:00PM **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 the general layout of modern steam power plant and label all major component & enlist function of each component **07**

(b) The following are the data collected for a typical oil fired boiler. Find out the efficiency of the boiler by indirect method and Boiler Evaporation ratio. **07**

- Type of boiler : Oil fired
- Ultimate analysis of Oil
  C : 84.0 % H_2 : 12.0 %
  S : 3.0 % O_2 : 1.0 %
- Calorific Value of Oil : 10200 kCal/kg
- Steam Generation Pressure : 7kg/cm^2(g)-saturated
- Enthalpy of steam : 660 kCal/kg
- Feed water temperature : 60 °C
- Percentage of Oxygen in flue gas : 7
- Percentage of CO_2 in flue gas : 11
- Flue gas temperature (T_f) : 220 °C
- Ambient temperature (T_a) : 27 °C
- Humidity of air : 0.018 kg/kg of dry air

Q.2 **(a)** Derive an expression for chimney height in order to obtain a draught of 'h' mm of water column if the boiler used 'm' kg of air / kg of fuel. Assume, surrounding air temperature as 'Ta' and flue gas temperature as 'Tg' in degree absolute. Also derive expression for the condition of maximum discharge of flue gases through a chimney. **07**

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

OR

(b) List application, advantages and disadvantages of Diesel power plants **07**

Q.3 **(a)** (i) State requirements of a good fuel injection system. Explain working with a schematic of common rail system **07**
(ii) Derive an expression for maximum discharge through a chimney

(b) Write neat sketch of Pneumatic ash handling system. Draw and explain Ball and race mill **07**

OR

Q.3 **(a)** Explain with neat sketch arrangement of Pressurized Water Reactor (PWR). Explain function of pressurizer in PWR **07**

(b) Explain the working of Electronic precipitator with neat sketch **07**

Q.4	**(a)**	Define the following terms: (i) Connected load (ii)Maximum demand (iii) Average demand (iv) Load factor (v) Diversity factor (vi) Utilization factor (vi) Plant capacity factor	**07**
	(b)	Explain with neat sketch construction and working of Schmidt-Hartmann Boiler	**07**

OR

Q.4	**(a)**	What is meant by overfeed and underfeed firing? Which is more preferable for high volatile coal and why?	**07**
	(b)	Write short notes on: (i) Fast breeder reactor (ii) Problems in disposal of nuclear waste	**07**
Q.5	**(a)**	Write short note on sea water treatment using reverse osmosis process and also explain De-aeration	**07**
	(b)	What are the effects of pollutants on Human health and Explain in brief Acid rains	**07**

OR

Q.5	**(a)**	Explain cyclone burner with neat sketch and write its advantages and limitations	**07**
	(b)	Explain Dalton's law of partial pressure and briefly explain Edward air pump	**07**

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