

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER V • EXAMINATION – WINTER - 2012****Subject code: 151904****Date: 16-01-2013****Subject Name: Power Plant Engineering****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 is permitted.

- Q.1** (a) A diesel power plant consists of two units of 500 K W capacity of each and one unit of 200 KW capacity. The fuel has a calorific value of 40,000K J/Kg and fuel consumption is 0.25 Kg/K W hr. Determine the quantity of fuel required a month of 30 days and its cost if the fuel cost is Rs 4000 per ton, also find overall efficiency of the plant. **07**
- (b) How is the total annual cost of electricity estimated? How does the fuel cost relate to the load and cost of power generation? **07**
- Q.2** (a) The following details refer to a boiler plant consisting of economizer, a boiler and super heater **07**
 Mass of water evaporated per hour =5940 Kg, mass of coal burnt per hour =675Kg, L.C.V of coal =31600K J/Kg, pressure of steam at boiler stop valve =14 bar, temperature of feed water entering the economizer =32 °C, temperature of feed water leaving economizer =115 °C, dryness fraction of steam leaving the boiler and entering super heater is 0.96 temperature of steam leaving the super heater =260°C specific heat of super heater steam =2.3K J / Kg K.. Determine :
 i. Percentage of heat in coal utilized in economizer, boiler and super heater
 ii. Overall efficiency of boiler plant.
- (b) With neat sketch explain different types of super heaters. **07**
- OR**
- (b) Discuss status of Fluidized bed combustion boilers worldwide and list its advantages and disadvantages. **07**
- Q.3** (a) List requirements of good coal handling plant and list various stages of coal handling. **07**
- (b) Write brief note on Electrostatic precipitator. **07**
- OR**
- Q.3** (a) Explain principle of overfeed stoker with neat sketch. Compare under feed stoker and overfeed stoker. **07**
- (b) Discuss requirements of oil burners? With neat sketch explain long flame, turbulent burners and tangential burners. **07**
- Q.4** (a) With neat sketch explain engine lubrication system of a typical diesel power plant. **07**
- (b) Describe working of hot sodium zeolite process with neat sketch and chemical reactions. List advantages and disadvantages over ion exchange system. **07**

OR

- Q.4** (a) With neat sketch explain engine cooling system of diesel power plant **07**
(b) The following reading were taken during a test on a surface condenser Mean **07**
condenser temperature =35 °C , Hot well temperature=30 °C, condenser
vacuum=69cm Hg , barometer reading 76cm Hg, condensate collected
16Kg/min. Cooling water enters at 20 °C and leaves at 32.5 °C, flow rate
being 37500 Kg/hr calculate
i. Mass of air present per cubic meter of condensate
ii. Quality of steam at condenser inlet
iii. Vacuum efficiency
iv. Condenser efficiency

- Q.5** (a) Draw neat sketches of following: **07**
• Gas cooled reactor
• CANDU reactor
(b) With usual notations derive an expression of estimation of height of chimney **07**
and condition of maximum discharge.

OR

- Q.5** (a) State effects of different pollutants emitted from different types of power **07**
plants.
(b) Compare the following **07**
i. Nuclear power plant and thermal power plant
ii. Diesel power plant and thermal power plant

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