

GUJARAT TECHNOLOGICAL UNIVERSITY

P.D.D.C. Sem - IV Examination June- 2011

Subject code: X41903

Subject Name: Power Plant Engineering

Date: 06/06/2011

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) Discuss at least seven factors which are considered in selecting a site for a big thermal power plant. **07**
- (b) Explain construction and working of Schmidt-Hartmann boiler with the help of neat sketch. **07**
- Q.2** (a) Draw the neat diagram of hyperbolic cooling tower and discuss its merits and demerits. **07**
- (b) List different types of pulverizing mills. Draw the sketch of ball mill and label each component on sketch. **07**
- OR**
- (b) (i) Discuss the main requirements of a good ash handling plant. **04**
- (ii) What are the advantages of quenching the ash before carrying to the slump? **03**
- Q.3** (a) What are the advantages of mechanical draught over natural draught? **07**
- (b) Discuss about pH & its role in corrosion and scale formation. **07**
- OR**
- Q.3** (a) Explain Acid Rain phenomena. **07**
- (b) Explain hot lime soda process with the help of neat sketch. **07**
- Q.4** (a) The steam at 100 bar and 400 °C is supplied to a steam turbine. The is-entropic efficiency of the turbine is 80%. The condenser pressure is 0.1 bar. If the plant capacity is 120 MW and the specific steam consumption is 4 kg/kWh. **07**
- (a) determine the cooling water required per hour in the condenser assuming that there is no under cooling in the condenser,
- (b) and assuming that there is 5 °C under cooling in the condenser. Rise in the temperature in the cooling water is limited to 10 °C,
- (b) Draw a schematic arrangement of diesel engine power plant and label essential components on diagram. **07**
- OR**
- Q.4** (a) Explain fluidized bed combustion with the help of figure and discuss its advantages. **07**
- (b) What are the reasons for providing cooling system in diesel engine? Explain any one method of cooling of diesel engine with the help of neat sketch. **07**
- Q.5** (a) Explain construction and working of boiling water type reactor with the help of neat sketch. **07**
- (b) Explain following terms briefly with reference to economics of power generation. **07**
- (i) Load Factor, (ii) Base Load (iii) Peak Load

OR

- Q.5 (a)** List various nuclear power plants in India. Discuss current issues regarding various nuclear power plants in India and Japan. **07**
- (b)** A power plant of 210 MW installed capacity has the following particulars: **07**
- Capital cost = Rs 18000/kW installed,
 - Interest and depreciation = 12%
 - Annual load factor = 60%
 - Annual capacity factor = 50%
 - Annual running charges = Rs 200 * 10⁶
 - Energy Consumed by power plant auxiliaries = 6 %
- Calculate (a) the cost of power generation per kWh and (b) the reserve capacity.
