

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V (OLD) EXAMINATION – WINTER 2018

Subject Code:151904

Date: 11/12/2018

Subject Name: Power Plant Engineering

Time: 10:30 AM TO 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.**
- 4. Use of Steam tables is permitted.**

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|------------|-----|---|-----------|
| Q.1 | (a) | Draw general layout of modern steam power plant label major components and state the function of each component. | 07 |
| | (b) | Explain with neat sketch construction and working of Lamont Boiler | 07 |
| Q.2 | (a) | With neat sketch explain different types of super heaters. | 07 |
| | (b) | What are the advantages and disadvantages of Pulverized coal firing | 07 |
| | | OR | |
| | (b) | Explain the working of electrostatic precipitator with neat sketch | 07 |
| Q.3 | (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 an expression for the condition of maximum discharge of flue gases through a chimney. | 07 |
| | (b) | Differentiate between Jet and Surface condensers. | 07 |
| | | OR | |
| Q.3 | (a) | Classify different types of cooling tower used in power plant. Explain Natural draft cooling tower also explain the reason of its hyperbolic shape | 07 |
| | (b) | Classify the steam condensers and describe the methods of obtaining maximum vacuum in condenser. | 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, (vii) Plant capacity factor. | 07 |
| | (b) | The peak load on a power station is 30 MW. The load having maximum demands of 25 MW, 10 MW, 5 MW and 7 MW are connected to the power station. The capacity of the power station is 40 MW and annual load factor is 50 %.
Find 1) Average load on the power station 2) Energy Supplied per year
3) Demand Factor 4) Diversity Factor | 07 |
| | | OR | |
| Q.4 | (a) | State advantages and disadvantages of nuclear power plant. | 07 |
| | (b) | Describe CANDU type reactor with the help of a neat sketch. State its advantages and disadvantages. | 07 |
| Q.5 | (a) | State effects of different pollutants emitted from different types of power plants. | 07 |
| | (b) | Explain with neat sketch arrangement of a Diesel power plant explain in brief function of each system | 07 |
| | | OR | |
| Q.5 | (a) | Explain the effects of impurities in boiler feed water | 07 |
| | (b) | With neat sketch discuss : “Hot lime soda process” | 07 |
