

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-VII (NEW) EXAMINATION – WINTER 2017

Subject Code: 2171910

Date: 22/11/2017

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. Mollier Diagram is permitted.

- Q.1** (a) What is compounding of steam turbines and why it is essential? **03**
- (b) Why feed water treatment is essential in power plants? **04**
- (c) Pressure-Velocity compounded impulse steam turbine. **07**
- Q.2** (a) Explain working of Bowl pulverizing mill with neat sketch. **03**
- (b) Explain following terms pertaining to cooling tower: Drift, Approach, Range and Cooling efficiency of cooling tower. **04**
- (c) Dry saturated steam at a pressure of 8 bar enters a convergent divergent nozzle and leaves it at a pressure of 1.5 bar. If the flow is isentropic and the corresponding expansion index is 1.135; calculate **07**
- (a) the ratio of cross-sectional area at exit
- (b) throat for maximum discharge.
- OR**
- (c) Gas turbine with Inter cooling, Regeneration and Reheating **07**
- Q.3** (a) Advantages of Mechanical draught over Natural draught. **03**
- (b) Types of Cooling Towers. **04**
- (c) Combined cycle power plant **07**
- OR**
- Q.3** (a) Classification of Condensers. **03**
- (b) Discuss Turbojet Engine, also discuss equations of thrust, Thrust power, Propulsive efficiency and Thermal efficiency. **04**
- (c) Discuss FBC. Explain CFBC with neat sketch **07**
- Q.4** (a) Distinguish between force draught and induced draught. **03**
- (b) Main components of nuclear reactor and nuclear control **04**
- (c) Discuss various methods of water treatment. **07**
- OR**
- Q.4** (a) Discuss the significance of vacuum in the condenser. Explain methods to obtain vacuum in short. **03**
- (b) Discuss Boiling Water Reactor (BWR) with neat sketch. **04**
- (c) With usual notations derive an expression of estimation of height of chimney and condition of maximum discharge. Or Prove the following: **07**

- OR**

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|------------|------------|---|-----------|
| Q.5 | (a) | Chain Reaction in Nuclear Power plant | 03 |
| | (b) | Discuss In-plant coal handling system | 04 |
| | (c) | The data refer to a stage of Parson's reaction turbine: | 07 |
| | | The mean diameter of blade ring is 680 mm. Running speed is 3100 rpm. The steam velocity at exit from fixed blades is 160 m/s. Blade outlet angle is 21° . Steam flow rate through blades is 7.4 kg per second. Draw the velocity diagram and find :
(i) Blade inlet angle
(ii) Power developed in the stage.
(iii) The maximum blade efficiency. | |

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