

GUJARAT TECHNOLOGICAL UNIVERSITY
BE - SEMESTER-V • EXAMINATION – SUMMER • 2015

Subject Code: 151906**Date: 15/05/2015****Subject Name: Conventional Power Engineering****Time: 02.30pm-05.00pm****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) Describe CANDU type reactor with neat sketch and give its advantage and disadvantages over the other type of nuclear reactor. **07**
- (b) Describe the working of a simple constant pressure open cycle gas turbine plant giving a neat sketch. **07**

- Q.2** (a) Steam expands in a turbine from 40 bar ,500⁰C to 0.10 bar isentropically. Assuming ideal condition, determine the mean diameter of the wheel if the turbine were of (a) Single impulse stage (b) single 50% reaction stage ,(c) four 50% reaction stage . Take the nozzle angles as 16⁰ and speed as 300 rpm. **04**
- (b) What is the present status of power generation in India? **03**
- (c) On which cycle thermal power plant works? Explain the cycle with Line diagram. Also plot (T-s) and (h-s) diagram. **07**

OR

- (c) The angles at inlet and discharge of the blading of 50% reaction turbines are 35⁰ and 20⁰, respectively. The speed of rotation is 1500 rpm and at a particular stage, the mean ring diameter is 0.67 m and the steam condition is at 1.5 bar, 0.96dry estimate (a) the required height of blading to pass 3.6 kg/sec of steam, and (b) the power developed by the ring. **07**
- Q.3** (a) Draw the schematic diagram of a diesel electric power plant and write its advantages and disadvantages. **07**
- (b) What is the purpose of governing of a hydraulic turbine? Explain the governing action with the help of a neat diagram. **07**

OR

- Q.3** (a) What is fuel injector? Explain common rail fuel injection system. **07**
- (b) Classify all hydraulic turbines and briefly explain pelton wheel with neat diagram. **07**
- Q.4** (a) Define the following (1)Load factor(2)utility factor(3)plant operating factor(4)capacity factor(5)Demand factor (6)Base load (7)peak load **07**
- (b) Draw and discuss Francis Turbine. **07**

OR

- Q.4** (a) Explain load duration curve. The yearly duration of a certain plant can be considered as a straight line from 20 MW to3 MW.To meet this load, three **07**

turbine generator units ,two rated at 10MW each and one at 5 MW ,are installed.
Determine:-1)Installed capacity(2)Plant factor(3)Maximum Demand(4)Load
Factor (5)Utilization Factor

- (b) Draw and discuss the plant layout of hydro plant. **07**
- Q.5** (a) In an open cycle regenerative gas turbine plant the air enters the compressor at 1 bar and 32 C and leaves at 6.9 bar absolute. The temperature at the end of combustion chamber is 816C. The isentropic efficiency of compressor and turbine are respectively 0.84 and 0.85.Combustion efficiency is 90% and regenerator effectiveness is 60%.Determine(1)Thermal Efficiency(2)Air rate(3)work ratio **07**
- (b) Explain the mechanism of moderator and discuss fast breeder reactor. **07**
- OR**
- Q.5** (a) Compare gas turbine and steam turbine power cycle and list the advantage of combined cycle power cycle. **07**
- (b) What is the future for nuclear power? Discuss with neat sketch PWR **07**
