

**GUJARAT TECHNOLOGICAL UNIVERSITY****BE - SEMESTER-V (OLD) EXAMINATION – WINTER 2018****Subject Code:151906****Date: 30/11/2018****Subject Name: Conventional Power 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 table is permitted

- Q.1** (a) Describe Rankine cycle with the help of schematic, (T-S) and (h-s) diagrams and derive the expression for its efficiency **07**
- (b) A steam power plant working on Rankine cycle has range of operation from 30 bar dry saturated to 0.06 bar. Determine, (i) Cycle efficiency (ii) Work ratio (iii) Specific steam consumption **07**
- Q.2** (a) State the applications of gas turbine and Derive an expression for the thermal efficiency of an actual Brayton cycle. **07**
- (b) The air enters the compressor of an open cycle constant pressure gas turbine at a pressure of 1 bar and temperature of 20°C. The pressure of the air after compression is 4 bar. The isentropic efficiency of compressor and turbine are 80 % and 85 % respectively. The air fuel ratio used is 90 : 1. if the flow rate of air is 3 kg per second Find, (i) Power developed (ii) Thermal efficiency of the cycle **07**  
Assume,  $C_p = 1 \text{ kJ/kgK}$  and  $\gamma = 1.4$ , for air & gas and C.V. of fuel = 41800 kJ/kg
- OR**
- (b) Write advantages and disadvantages of Hydroelectric power plant Also write classification for hydraulic turbines. **07**
- Q.3** (a) With the help of a neat sketch explain the working of pressurized water reactor (PWR). Also write advantages over others. **07**
- (b) Give detail classification of steam turbines. What is compounding of steam turbine .state the different methods of compounding of steam turbine? **07**
- OR**
- Q.3** (a) State the functions of engine cooling system. With the help of neat sketch explain working of thermostat cooling system. **07**
- (b) What is intercooling and regeneration? Sketch simple line diagram and T-s diagram of open cycle gas turbine with intercooling, reheating and regeneration. **07**
- Q.4** (a) State the various methods of governing of steam turbines. Explain nozzle governing with neat sketch. **07**
- (b) Explain with neat sketch full pressure lubrication system for diesel power plant. **07**
- OR**
- Q.4** (a) Derive an equation maximum blade efficiency for single stage Impulse turbine. And hence derive the equation for maximum power output per kg of steam. **07**
- (b) Differentiate between Nuclear fission and fusion process. Explain Nuclear fission and chain reaction. **07**
- Q.5** (a) Describe the significance of load curves in planning and determining the size of Units in power plants. Define base load, Intermediate load and peak loads, with load curves. **07**
- (b) Draw a General layout of a thermal power plant and discuss the various circuits. Also explain the working of steam power plant. **07**
- OR**
- Q.5** (a) With a neat diagram explain diesel power plant **07**
- (b) Describe with the help of a neat sketch CANDU type nuclear reactor. **07**

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