

www.FirstRanker.com

www.FirstRanker.com

Code No: R1621025



SET - 1

II B. Tech I Semester Supplementary Examinations, May - 2018 THERMAL AND HYDRO PRIME MOVERS

Time: 3 hours

(Electrical and Electronics Engineering)

Max. Marks: 70

Note: 1. Question Paper consists of two parts (Part-A and Part-B)
2. Answer ALL the question in Part-A
3. Answer any Four Questions from Part-B

PART –A

- 1. a) Explain the importance of cooling and lubrication in IC engine.
 - b) Discuss about Carnot cycle.
 - c) Discuss about regeneration system used in gas turbine plant.
 - d) Differentiate between reciprocating and centrifugal pumps.
 - e) What is governing? Why it is required for hydraulic turbines?
 - f) Discuss about base load and peak load power plants.

PART -B

- 2. a) Explain in detail the valve timing diagram of four stroke SI engine.
 - b) What is the necessity of a carburetor in a petrol engine? With a neat sketch explain the working of a simple carburetor and write its limitations.
- 3. a) Explain the working of steam power plant with reheating system.
 - b) The nozzles of a Delaval steam turbine are supplied with dry saturated steam at a pressure of 9 bar. The pressure at the outlet is 1 bar. The turbine has two nozzles with a throat diameter of 2.5 mm. Assuming nozzle efficiency as 90% and that of turbine rotor 35%, find the quality of steam used per hour and the power developed.
- 4. a) With a neat sketch explain the working of closed cycle gas turbine plant.
 - 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 efficiencies of compressor and turbine are 80% and 85% respectively. The air-fuel ratio used is 90 : 1. If flow rate of air is 3.0 kg/s, find :(i) Power developed.(ii) Thermal efficiency of the cycle.Assume $C_P = 1.0$ kJ/kg K and $\gamma = 1.4$ for air and gases.Calorific value of fuel = 41800 kJ/kg.
- 5. a) A jet of water of 75 mm diameter strikes a curved vane at its center with a velocity of 20 m/s. The curved vane is moving with a velocity of 8 m/s in the direction of jet. Find the force exerted on the plate in the direction of the jet, power and efficiency of the jet. Assume the plate to be smooth.
 - b) Explain the working of a centrifugal pump with a neat diagram showing all the components.

1 of 2



www.FirstRanker.com

Code No: R1621025

R16

SET - 1

- 6. a) Explain the construction and working of Pelton wheel.
 - b) A Pelton wheel is to be designed for the following specifications: Shaft Power of the wheel = 115 kW, Head = 72 meters, speed = 240 rpm, overall efficiency = 85%, Determine the following: i) The wheel diameter, ii) Diameter of the jet, iii) size of the bucket, iv) number of buckets on the wheel. Take $C_V = 0.98$, speed ratio = 0.45.
- 7. a) Draw the general layout of a hydro electric power plant and explain its construction and working.
 - b) The annual peak load of 30 MW power plant is 25 MW. The loads having maximum demands of 10 MW, 8.5 MW, 5 MW and 4.5 MW are connected to the power plant. The annual load factor is 45%. Find i) Average load on the power plant, ii) Energy supplied per year, iii) Demand factor, iv) Diversity factor.

www.FirstRanker.com