2008-VISVESVARAYA TECHNOLOGICAL UNIVERSITY

B.E THERMODYNAMICS AND FLUID MECHANICS

TIME-3HOUR
MARKS-80

ANSWER ANY FIVE QUESTIONS ALL QUESTIONS CARRY EQUAL MARKS.
MARKS 16*5=80

1. (a) State the Zeroth law of Thermodynamics.

(b) Explain quasistatic process with a schematic representation.

(c) Define a thermodynamic system with an example.

(d) Define the following with example

i) Intensive Property

ii) Extensive Property

iii) Thermodynamic State

2. (a) Heat is supplied to an IC engine at constant temperature of 648 K that produces

(b) State the II law of thermodynamics. Draw the schematic representation with the help of a heat source and sink.

(c) Draw a property diagram for an IC engine and list the processes involved.

(d) Define work and heat.

3. (a) Derive an Expression for work done of a single stage air compressor without clearance volume.

(b)In a multi stage axial flow compressor air is taken at 1 bar and 15 C. It is compressed to a final pressure of 6.4 bar. The final temperature is 300 C. Determine the overall isentropic efficiency of the compressor and also the polytropic efficiency.

(c) With a neat property diagram list out the process involved in multi stage reciprocating compressor.

4. (a) Briefly discuss about systems of measurements and it's importance in industries.

(b) Differentiate between Newtonian and non-Newtonian fluid.

(c) Define fluid and few of its properties mentioned below.

i) Specific Gravity. ii) Specific weight iii) Compressibility

5. (a) Distinguish between absolute pressure, Gauge pressure and Gauge vacuum and indicate their relative positions in a chart.

(b) Explain the working and construction of a Bourdon's gauge. Differentiate the mechanisms applied in a Piezometer with diaphragm pressure gauge.

6. (a) Explain the concept of the total energy line and hydraulic gradient line for fluid flow. Sketch the hydrostatic line and total energy line in a chart with specification.

(b) State and derive Bernoulli's equation for frictionless and incompatible flow. List the assumptions made.

7. (a) Derive an expression for discharge through an orifice.

(b) Explain why coefficient of discharge (C) of venturimeter is higher than that of the orifice meter?

(c)Distinguish between orifice and a notch.

8. (a) Write a note on cavitations of a centrifugal pump.

(b) With neat sketches explain the construction and working principle of a vane pump.

(c) Describe with a neat sketch the work of a centrifugal pump. Explain with sketch how is the pressure energy of the liquid increases in different stages?