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Roll No. 1014

SECOND SEMESTER

B.Tech. (ME)

END SEMESTER EXAMINATION

MAY-2012

ME-115 BASIC MECHANICAL ENGINEERING

Time: 3:00 Hours

Max. Marks : 70

Note : Answer any *FIVE* questions selecting at least *TWO* question from each part.
Assume suitable missing data, if any.

PART-A

1[a] What is a steady flow process. State all the assumptions made for such a Flow Process. Explain the concept of flow work. 4

[b] A centrifugal pump delivers 2750 kg of water per minute from initial pressure of 0.8 bar absolute to a final pressure of 2.8 bar absolute. The suction is 2m below and the delivery is 5m above the centre of pump. If the suction and delivery pipes are 15 cm & 10 cm diameter respectively, make calculation for the power required to run the pump. 10

2[a] Explain thermal efficiency of a heat engine. Can it be 100 percent? Deduce the concept of Clausius inequality. 7

[b] Define entropy. What are the two requirements for a process to be isentropic? Also prove the entropy is a point function. 7

3[a] Derive an expression for the air standard efficiency of the Diesel cycle in terms of the compression ratio, cut off ratio and the adiabatic index. 7

[b] An air standard Otto cycle is designated to operate with the following data:

Maximum cycle pressure and temperature: 5 MPa and 2250 K.

Minimum cycle pressure and temperature: 0.1 MPa and 300 K.

Determine the network output per unit mass of working fluid and the thermal efficiency. 7

4[a] Obtain an expression for total pressure and corresponding centre of pressure on a plane surface immersed in a fluid vertically. 7

[b] A cubical block weighing 4.5 N and having a 40 cm edge is allowed to slide down an inclined plane surface making an angle of 30° with the

horizontal on which there is a uniform layer of oil 0.005 cm thick. If the expected steady state velocity of the block is 12.5 cm/s, determine the viscosity of the oil. Also express the kinematic viscosity in stokes if the oil has a mass density of 800 kg/m^2. 7

PART-B

5[a] Explain various types of manufacturing process with examples. 5

[b] Discuss NC, CNC & DNC machines. How a CNC machine has changed the whole machine scenario. 5

[c] Discuss the desirable properties of moulding sand. 4

6[a] Discuss various types of welding. Explain TIG welding. Also explain the defects occurred during welding. 7

[b] What is surface Mount Technology? Explain the automated assembly system. 7

7[a] What are the line & angular measurements? Explain the comparators. 5

[b] Write advantages and limitations of unconventional machining process. 5

[c] Discuss the steps involved in making a mould. 4

8 Write short notes on any two of the following while discussing their types and basic operation performed on them. 2x7=14

[a] Lathe

[b] Shaper

[c] Planer