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Roll No.

1st SEMESTER

B.Tech.

END SEMESTER EXAMINATION

Nov/Dec-2016

ME-101: BASIC MECHANICAL ENGG.

Max. Marks: 50

Time: 3:00 Hours

Note: Answer part-A in half of Answer Sheet and part-B in another half.
Answer 5 questions from each part. Each question carries equal mark.
Assume suitable missing data, if any.

Part A

1. Show the four energy interactions of a cyclic heat engine and derive an expression for thermal efficiency and also explain Kelvin Planck statement of second law as well as Clausius statement of second law. (5)
2. Show that the COP of a heat pump is greater than COP of a refrigerator by unity and calculate the heat rejected per KW net output of a reversible heat engine operating between a source temperature of 800°C and a sink temperature of 30°C . (5)
3. Prove that the efficiency of the Otto's cycle depends only on the compression ratio also indicate P-V and T-S diagram for the diesel cycle. (5)
4. Calculate the dynamic viscosity of oil film of thickness 1.5 mm used for lubrication between a square plate of 0.8 m x 0.8 m and on an inclined plane having 30° inclination from the horizontal. The weight of the square plate is 300 N and it slides down the plane with a uniform velocity of 0.3 m/s. (5)
5. State and prove the Pascal's law. (5)
6. Give the statement of Bernoulli's theorem and find the total head of the water flowing through a pipe of 100 mm diameter under a pressure of 19.62 N/cm^2 (gauge) and with mean velocity of 3.0 m/s. The pipe is 8 m above the datum line. (5)
7. Derive an expression for pressure variation in a fluid at rest. (5)

Part B

- ✓ 1. Describe the common sheet metal operations or processes with neat sketches. (5)
- ✓ 2. How the Pattern classified? Describe them with neat sketches and state the use of each of them. (5)
- ✓ 3. State the principle of Vernier Instrument. Explain briefly the construction and use of vernier callipers with neat sketch. (5)
- ✓ 4. Describe the types of Flames obtained in an Oxy-acetylene gas welding process giving the applications. (5)
- ✗ 5. What are the comparators? Write short notes on classification of comparators. (5)
6. State the range of composition of low carbon, medium carbon and high carbon steels. Give two application of each range. (5)

Write the answer in the space provided.