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2<sup>nd</sup> SEMESTER

END SEMESTER EXAMINATION

Roll No. 1668

B.Tech.

May 2017

**ME-104 BASIC MECHANICAL ENGG.**

Time: 3:00 Hours

Max. Marks: 50

Note: Use the single Answer sheet. Answer any 5 questions from part A and any 5 questions from part B. Each question carries 5 marks. Assume suitable missing data, if any.

**Part A**

1. Explain with schematic diagram the working principle of a (a) Thermal Power Plant (b) Hydro Electric Power Plant
2. A reversible heat Engine operates between two reservoirs at temperature of  $600^{\circ}\text{C}$  and  $40^{\circ}\text{C}$ . The heat transfer to the heat engine is  $2000\text{kJ}$ . Find the heat rejected, the work done by the engine and the Thermal Efficiency of the Carnot's Engine.
3. (a) Derive the efficiency of Otto cycle in terms of Compression ratio.  
(b) Draw the P-V and T-S diagram of the Diesel cycle with all notations.
4. State and prove the Carnot's Theorem.
5. An oil film of thickness  $1.5\text{ mm}$  is used for lubrication between a square plate of size  $0.9\text{ m} \times 0.9\text{ m}$  and an inclined plane having an angle of inclination  $20^{\circ}$ . The weight of the square is  $392.4\text{ N}$  and it slides down the plate with a uniform velocity of  $0.2\text{ m/s}$ . Find the dynamic viscosity of the oil.
6. (a) State and Prove Pascal's Law  
(b) Derive an expression for the Pressure variation in a fluid at rest.
7. State the Bernoulli's theorem mathematically and calculate the following. Water is flowing through a pipe of  $100\text{ mm}$  diameter under a Pressure of  $19.62\text{ N/cm}^2$  and with mean velocity of  $3.0\text{ m/s}$ . Find the total head of the water of a cross section which is  $8\text{ m}$  above the datum line.



## Part B

1. (a) Explain various types of Engineering materials with the help of their hierarchical view.  
(b) State the effects of any two of the alloying elements Cr, Mo and V on the properties of steel.
2. (a) State the desirable properties of materials used for making cutting tools. Discuss diamond tools or Ceramic tools.  
(b) What do you understand from term composites. Explain with examples & uses.
3. (a) Discuss allowances , used for making pattern.  
(b) Explain the properties of moulding sand.
4. (a) Discuss the working principle of Oxy-Acetylene welding with neat sketches.  
(b) Explain the various types of Welding defects.
5. (a) Explain Hot Die Casting process .  
(b) State the operations, which can be performed on a milling machine. Sketch and explain any one milling cutter.
6. (a) What is Comparator? Explain the working principle of an optical comparator.  
(b) Differentiate between the line standard and End Standard.
7. (a) Explain either an external micrometer, or a dial indicator with the help of appropriate sketches.  
(b) What is the difference between standard gauges and limit gauges? Sketch progressive limit plug gauges.