Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

II SEMESTER B.TECH END SEMESTER EXAMINATIONS, MAY 2016

SUBJECT: BASIC MECHANICAL ENGINEERING [MME 1001]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.
- Use of Steam Table is permitted

1A. With neat sketches explain the working of a I.C. engine in which power is generated in every revolution of the crank shaft and heat addition takes place at constant volume. (05)

1B. 500kg of wet steam at a pressure of 0.05 MPa is generated in a boiler per hour. The temperature of feed water is 20°C and the total amount of heat added in the boiler is 1236MJ/Hr. The steam from the boiler enters the super heater after a heat loss of 300kJ/kg, where its temperature is to be raised to 200°C. Determine (05)

(i) Dryness fraction of the steam at the entry point of the super heater?

(ii) Heat absorbed per hour in the super heater?

Assume the specific heat of water as 4.187 kJ/Kg°K and that of super heated steam as 2.25 kJ/Kg°K.

2A. With neat sketches illustrating the propelling forces and pressure velocity changes explain the working of a reaction turbine. (05)

2B. Five spur gears A,B,C,D & E respectively having 20,24,25,26 &28 teeth, four helical gears L,M,N& O respectively having 40,44,48 & 52 teeth and five bevel gears P,Q,R,S & T respectively having 30,31,32,33 & 36 teeth all having same module are available to form a gear train. Calculate and sketch the arrangement of gears to get maximum possible speed reduction ratio using a compound gear train and five shafts. Mention the conditions used. (05)

3A. Explain the principle of operation of a engine lathe and describe the functions of the parts of carriage assembly. (05)

3B. The following data refers to a twin cylinder two stroke petrol engine. (05)

Stroke Volume per Cylinder: 10 liters, Mean Effective Pressure: 0.2MPa, Number of Cycles per Second: 4, Fuel Consumption: 0.1 litres/ min, Calorific Value of the Fuel:

43,900kJ/kg, Specific Gravity of the Fuel : 0.78, Brake Load; 70 Kg, Mean Circumference of Brake Drum: 4m

Calculate Brake Thermal Efficiency and Indicated Thermal Efficiency?

4A. Define the unit of refrigeration and explain any three each thermodynamic and physical properties of an ideal refrigerant. (04)

4B. Draw the general layout of a Hydel Power Plant and name the various components? (03)

4C. With a neat sketch explain the oxy acetylene gas welding process. (03)

5A. Draw the neat sketch of a Babcock Wilcox boiler and label the various parts. (04)

5B. Give the composition of moulding sand and explain any four casting defects (03)

5C. With a neat sketch explain the Splash lubrication system used in IC engines? (03)