Reg. No.

A Constituent Institute of Manipal University, Manipal

I SEMESTER B.TECH END SEMESTER EXAMINATIONS,

NOVEMBER, 2017

SUBJECT: BASIC MECHANICAL ENGINEERING [MME 1001] REVISED CREDIT SYSTEM

Time: 3 Hours

MAX. MARKS: 50

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data if any may be suitably assumed.
- ✤ Use of Steam Tables is permitted

1A. 2000kg of wet steam at a pressure of 0.009 MPa is generated in a boiler per hour. The temperature of feed water is 15°C and the total amount of heat added in the boiler is 4944MJ/hr. The steam from the boiler enters the super heater after a heat loss of 400kJ/kg, where it is superheated such that the degree of superheat is 200°C. Determine

(i) Dryness fraction of the steam at the entry point of the super heater?
(ii) Heat absorbed per hour in the super heater?

1B. With neat sketches illustrating the propelling forces and pressure velocity changes explain the working of a reaction turbine.
24. (i) Draw the general layout of a Hydel Power Plant and name the 03+07

- **2A.** (i)Draw the general layout of a Hydel Power Plant and name the **03+02** various components?
 - (ii)Define the unit of refrigeration and the parameter used to specify its performance
- 2B. Design a set of stepped cone pulleys for driving a machine by a belt drive from a counter shaft running at 850 rpm. The machine is to run at 350, 450 and 550 rpm and the smallest step on the countershaft is 300 mm in diameter. The distance between the centers of the two shafts is 3 meters. Sketch the arrangement.
- 3A. Give the specification of a lathe and with a neat sketch explain the os working of a Radial Drilling Machine
- **3B.** Explain the phenomena of slip and creep in a belt drive and **05** differentiate between simple and compound gear trains.
- 4A. A diesel engine generating power in every revolution of the crank shaft is operating with a compression ratio of 15:1 and at the rate of 750 cycles per 30 seconds. The cylinder has a clearance volume of MME 1001

200cc and fuel consumption per brake power hour is 0.257kg/kW-hr. The net brake load is 50 kg and the mean circumference of the brake drum is 4m. Determine the indicated thermal efficiency of the engine if the mean effective pressure is 0.9 MPa and the calorific value of diesel is 43900kJ/kg.

- **4B.** With neat sketches and illustrating the pressure volume changes **05** explain the working of a four stroke petrol engine.
- 5A. With neat sketches explain in detail how arc welding is carried out 05 using a DC power source.
- **5B.** (i) Explain the positive pattern making allowances and highlight the **03+02** importance of cores in sand casting.

(ii)Differentiate between Annealing and Normalizing