MME 1001

MANIPAL INSTITUTE OF TECHNOLOGY MANIPAL

A Constituent Institution of Manipal University

II SEMESTER B.TECH. END SEMESTER EXAMINATIONS, APRIL 2017

Regd. No.

SUBJECT: BASIC MECHANICAL ENGINEERING [MME 1001]

REVISED CREDIT SYSTEM

(21/04/2017)

Time: 3 Hours

Instructions to Candidates:

- ✤ Answer ALL the questions.
- ✤ Missing data may be suitably assumed.
- Use of Steam Tables is permitted
- **1A.** An equal quantity of steam is supplied to a mixing chamber from two boilers through two pipes. One boiler supplies steam which is 13% wet and the other boiler supplies steam at 325°C. The steam pressure in the boilers and in the mixing chamber is 15 bar. Determine the quality and temperature of steam in the mixing chamber if specific heat of superheated steam is 2.25 kJ/kg°K.
- **1B.** With a neat sketch explain the working of a vapour compression refrigeration system and highlight the thermodynamic properties of an ideal refrigerant.
- 2A. (i) Draw general layout of a Nuclear Power Plant and name the various 03 components.

(ii) With a schematic diagram explain the working of a Gas Turbine.

- 2B. A belt drive transmitting power between two pulleys which are 2 meters apart with a speed reduction ratio of 4 has an angle of contact of 3.91 radians. The diameter of the larger pulley is 120 cm and the driver pulley runs at 1600 rpm. The initial tension in the belt is 0.95KN and coefficient of friction is 0.28 Calculate the length of the belt, power transmitted and width of the belt if the permissible tension per meter of the belt is 10 KN
- **3A.** Draw the neat sketch of an engine lathe, label the parts and explain the functions of the parts of carriage assembly.
- **3B.** Derive an expression for the velocity ratio of a compound gear train having four shafts and with a neat sketch explain the working of a fast and loose pulley.
- **4A.** A six cylinder IC engine developing power in every revolution of the crank shaft has a stroke volume of 1.75 liters per cylinder. The engine develops 42 kW of power at 500RPM. The mean effective pressure is 6bar. Calculate IP, braking torque on the brake drum and mechanical efficiency.
- 4B. With a schematic diagram define the various IC engine terms and differentiate between a four stroke engine and a two stroke engine.
- **5A.** With a neat sketch explain the green sand moulding procedure for a dumb-bell using two box method and highlight the negative pattern making allowances. 05
- **5B.** With a neat sketch explain the gas welding process and differentiate between soldering and brazing. 05

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MAX. MARKS: 50

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