Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

A Constituent Institution of Manipal University

I SEMESTER B.TECH END SEMESTER EXAMINATIONS, DEC 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. Two boilers supply an equal amount of steam to a common storage tank. The first boiler supplies the steam at 5 bar and 300^0C while the second boiler supplies the steam at 5 bar with dryness fraction of 0.85. Estimate the condition of steam after mixing. Also sketch the enthalpy verses temperature graph. **05**

1B. Write in brief the basic difference between fire tube and water tube boiler and list the classification of boilers. **05**

2A. Explain with sketch working of Pelton wheel and also sketch and label the general layout of Hydel power plant. **05**

2B. Explain the major parts of steam turbine and also sketch and label the general layout of refrigeration system. **05**

3A. Power transmitted between two shafts 3.5m apart by a crossed belt drive around two pulleys 0.6m and 0.3m in diameters is 6KW. The speed of the larger pulley is 220 rpm. The permissible load on the belt is 25N per mm width of the belt which is thick. The coefficient of friction between the smaller pulley surface and the belt is 0.35 Determine: **05**

- The necessary length of the belt
- The width of the belt
- The necessary initial tension in the belt

3B. Sketch and explain radial drilling machine and also draw the major specifications line diagram of lathe machine tool. **05**

4A. Explain with neat sketches and pressure velocity diagram working of a 4-stroke C.I engine. **05**

4B. A four cylinder four stroke diesel engine has a bore of 100 mm, stroke of 120 mm and piston speed of 10 m/s. The engine develops 20 kW power per liter of cylinder stroke volume. Brake thermal efficiency of the engine is 30 % with a fuel having calorific value of 40 MJ/kg and specific gravity of 0.90. Determine (i) rpm, (ii) BP, and (iii) engine fuel requirements in liters/h. **05**

5A. Explain with relevant sketches the arc welding process and also explain the different allowances provided in green sand moulding process. **05**

5B. Gear with following details are available. Gear A has a module of 2mm and 60 teeth. Gear B has a diameter of 240 mm and 80 teeth. Gear C has a module of 4mm and diameter of 152 mm. Gear D has a diameter of 60mm and 30 teeth. Gear E has a module of 3mm and 120 teeth. Gear F has a module of 4mm and is 352 mm in diameter. Gear G has a module of 3mm and diameter of 126mm. Gear H has a diameter of 60mm and 30 teeth. Gear I has 60 teeth and 120 mm diameter. Determine the arrangement to obtain the maximum speed possible for the driven shaft if the power is transmitted with four shafts. If the driver gear rotates at 200 rpm determine the speed of the driven shaft. Sketch the arrangement of the gear train. **05**