Reg. No.										

MANIPAL INSTITUTE OF TECHNOLOGY

MANIPAL

(A constituent unit of MAHE, Manipal)

II SEMESTER B.TECH END SEMESTER EXAMINATIONS, APRIL 2018

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. In a chemical plant steam generated at a pressure of 0.12N/mm^2, is led through two chambers A and B in succession for process heating. The loss in enthalpy in both the chambers is 66.7%. The resulting condition at the exit point of chamber B is unsaturated water at a temperature of 78.78ºC. Determine the condition and related parameters of the steam at the entry point of both the chambers. Assume specific heat of superheated steam and water as 2.25 kJ/kg°K and 4.187 kJ/kg°K respectively. **05**

1B. Draw the neat sketch of a Babcock Wilcox boiler, label the parts and give the classification of boilers. **05**

2A. With neat sketches illustrating the propelling force and pressure velocity changes explain the working of a single stage impulse turbine. **05**

2B. (i)Explain the thermodynamic and physical properties of an ideal refrigerant. **02+03**
(ii) With a neat sketch explain the working of a radial drilling machine.

3A. A compound gear train consists of six gear wheels A, B, C, D, E & F. A is the driver gear and F is the driven gear having 100 and 16 teeth respectively. Gear A meshes with gear B and gear B & C are mounted on the same shaft. Gear C has 80 teeth and meshes with gear D. Gears D & E are mounted on the same shaft and gear E meshes with gear F. The velocity ratio from gear A to F is 64 and the velocity ratio from A to B is equal to the velocity ratio from C to D and E to F. Determine the number of teeth for gears B, D & E. If the circular pitch of the gears is 2π determine the centre distance between the driver and driven shafts. **05**

3B With line diagrams explain the various gear systems used in mechanical power transmission. **05**

4A. A diesel engine generating power in every revolution of the crank shaft is operating with a compression ratio of 20:1 and at the rate of 1500 cycles per minute. The cylinder has a clearance volume of 200cc and fuel **05**

consumption per brake power hour is 0.286kg/kW-hr. The net brake load is 70 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 1.1 MPa and the calorific value of diesel is 43900kJ/kg.

4B. With neat sketches and illustrating the pressure volume changes explain the working of a four stroke diesel engine. **05**

5A. With a neat sketch explain the green sand moulding procedure for a three step cone pulley and highlight the negative pattern making allowances. **05**

5B. With a neat sketch explain the electric resistance spot welding process and differentiate between soldering and brazing **05**