Reg.No.									

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

II SEMESTER B.S. DEGREE EXAMINATION – APRIL / MAY 2017

SUBJECT: BASIC MECHANICAL ENGINEERING (ME 123)

(BRANCH: MECH / MET)

Wednesday, 26 April 2017

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE full Questions.**
- ✓ **Missing data, if any, may be suitably assumed**
- ✓ **Draw neat and proportionate sketches wherever necessary.**
- ✓ **Use of steam tables is permitted.**

1A) Draw a neat sketch of water tube boiler and lable the parts **(10)**

1B) A dry saturated steam at a pressure of 16 bar is generated in a boiler. Dry saturated steam leaves the boiler to enter a super-heater. In the pipe line it looses heat equal to 600 KJ/kg. In the super heater, steam is superheated to temperature of 380°C. If temperature of feed water is 30°C, determine:
Total heat supplied to feed water in the boiler
Dryness fraction of steam at the entry of super-heater
Total heat supplied in the super-heater. **(10)**

2A) List the differences between impulse and reaction steam turbine. **(10)**

2B) With neat sketch , explain the working of simple carburetor **(10)**

3A) How does a solar power plant works? Explain with neat sketch. **(10)**

3B) A 4 cylinder 4 stroke I.C engine develops an I.P of 50 kW at 25 cycles /second. The stroke of the engine is 90 mm and bore is 0.8 times the stroke.
A) Find the mean effective pressure in each cylinder.
B) If mechanical efficiency is 80%, what effective brake load would be required if the effective **brake drum circumference** is **1m**. **(10)**

4A) With the help of Block diagram and Temperature enthalpy diagram, explain the working of Vapour Compression Refrigeration System. **(10)**

4B) Explain the desirable properties of a good lubricant **(10)**

5A) Draw a neat sketch of spur gear and explain the following
i) Root circle diameter ii) tooth thickness iii) Clearance
iv) face v) circular pitch **(10)**

5B) Power is transmitted by an open belt drive from a pulley 300 mm diameter running at 600rpm to a pulley 500 mm in diameter. The distance between the centre lines of the shaft is 1m and the coefficient of friction in the belt drive is 0.25. If the safe pull in the belt is not to exceed 500 N, determine the power transmitted by the belt drive. **(10)**

6A) List the possible defects that is found in the cast object **(14)**

6B) A compound gear train consists of 6 gears A,B,C,D,E and F, they have 20, 30, 40, 50, 60, 70 teeth respectively. A is fitted to the first shaft and meshed with B. B and C are fitted to the second shaft and C is meshed with D. D and E are fitted to the third shaft and E is meshed with F which is fixed to another shaft. If gear A rotates at 210 rpm, find the speed of F. Show the gear arrangement. **(06)**

7A) Draw the block diagram of radial drilling machine and lable the parts **(10)**

7B) Explain the hardening and tempering heat treatments **(10)**

8A) With neat sketch, explain the process of electric arc welding **(10)**

8B) Explain thread cutting operation in lathe **(10)**