Seat No.	

S–1224

Total No. of Pages : 3

F.E. (Part - I) (Semester - I) (Revised) Examination, May - 2015
BASIC MECHANICAL ENGINEERING (New)
Sub. Code : 59186

Day and Date : Monday, 18 - 05 - 2015

Time : 10.00 a.m. to 01.00 p.m.

Total Marks : 100

Instructions :
1) **Solve any three questions from each section.**
2) **Figures to the right indicate full marks.**
3) **Assume suitable data if necessary and indicate clearly.**
4) **Use of non-programmable calculator is allowed.**

SECTION - I

Q1) a) Define system, state & property. Classify the following properties along with reasons whether they are intensive or extensive. **[9]**

i) Potential energy

ii) Pressure

iii) Temperature

iv) Volume

v) Viscosity

vi) Density

b) Air flows steadily at the rate of 22.68 kg/min through an air compressor. At the entrance section velocity is 6.1 m/s, the pressure is 1.02 bar and the specific volume is 0.845 m^3/kg. The corresponding values at the exit section are 4.6 m/s, 7.03 bar and 0.163 m^3/kg respectively. The internal energy of air increases by 88.2 kJ/kg across the compressor. Cooling water in the compressor jackets absorb heat from the air at the rate of 3693 kJ/min.

i) Compute the rate of shaft work input to the air in KW.

ii) Find the ratio of inlet pipe diameter to the outlet pipe.

[9]

P.T.O.

Q2) a) What are the similarities and difference between heat & work. [6]

b) What is the difference between a refrigerator & heat pump. [2]

c) A centrifugal compressor delivers 960 kg of air per hour. The inlet & exit conditions of air are given below.

	Volume (m^3/kg)	Pressure (bar)	Velocity (m/s)
Inlet	0.5	1	6
Outlet	0.16	7	8

While passing through compressor enthalpy increases by 170 kJ/kg and heat lost to surrounding is 750 kJ/min. Determine power required to drive compressor. [8]

Q3) a) Compare petrol & diesel engine. [6]

b) Explain the Joule cycle with schematic diagram. Derive an expression for thermal efficiency along with P-V diagram & state where it is used. [10]

Q4) a) Draw the P-V & T-S diagram for Carnot refrigerator & derive the expression for its C.O.P. [8]

b) Explain with neat sketch window air conditioner. [8]

SECTION - II

Q5) a) Differentiate renewable and nonrenewable energy sources. Enlist Different Application of Solar Energy. [8]

b) What is Biodiesel? State its advantages and limitations. [8]

Q6) a) Define : [4]

i) Pitch Circle

ii) Addendum Circle

iii) Dedendum

iv) Circular Pitch

b) Compare Reciprocating and Centrifugal pump. [4]

c) Explain Axial flow Compressor With Neat Sketch. [8]

Q7) a) Define Manufacturing Processes. Explain Metal Joining in Detail. [8]

b) Explain Metal removing Processes in detail. [8]

Q8) a) Explain Solar Refrigeration. [6]

b) Explain Types of Bearings. [6]

c) Explain Steps in Sand Casting Processes. [6]

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