Total No of Questions: [8] *SEAT NO. :*

[Total No. of Pages : 2]

F.E. (Phase III Examination) (Semester - II)

Basic Mechanical Engineering (Subject Code : 102013) [2012Pattern]

Time : 2 Hours *Max. Marks : 50*

Instructions to the candidates:

1) ***Assume suitable data, if necessary.***
2) ***Neat Diagrams must be drawn wherever necessary.***
3) ***Use of non-programmable electronic Calculator is permitted.***
4) ***Attempt four questions out of eight. Q1 or Q2, Q3 or Q4, Q5 or Q6, Q7 or Q8.***

Q1) a) Explain spur gear drive with neat sketch. What is gear ratio? [4]

b) Write the function of following machine elements. [4]
1) Axle 2) Ball Bearing 3) Coupling 4) Clutch

c) Compare mechanism and machine (Four Points) [4]

OR

Q2) a) Compare belt drive, chain drive and gear drive (Four points) [4]

b) Define the following properties of materials. [4]
1) Strength 2) Toughness 3) Hardness 4) Resilience

c) Explain slider crank mechanism with neat sketch. [4]

Q3) a) With neat sketch, explain arc welding process. [6]

b) What is grinding ? Explain cylindrical grinding and centre less grinding process with neat sketch. [6]

OR

Q4) a) Differentiate between hot working and cold working. (4 Points) [4]

b) Explain the following sheet metal working operations with neat sketch, Blanking and Drawing [4]

c) With a block diagram, explain the functions of various parts of a radial drilling machine. [4]

Q5) a) State various statements of first law of thermodynamics. Explain its limitation with an example. [4]

b) Explain the following terms. [4]
1) Barometric Pressure 2) Gauge Pressure 3) Absolute Pressure
4) Units of Pressure

c) A refrigerator with COP of 1.5 absorbs heat from food compartment at the rate of 360 kJ/min. Draw the sketch of system and find [5]
1) Power consumed by the refrigerator and
2) The amount of heat rejected to surrounding.

OR

Q6) a) Draw schematic sketches of various thermodynamic systems. [4]
Identify the thermodynamic system of the following devices,
1) Thermas Flask 2) Air Compressor 3) Pressure Cooker
4) Vapour Compression Refrigeration Unit.

b) Explain the concept of 1) Heat Engine 2) Heat Pump [4]

c) Find the Gauge Pressure and Absolute Pressure of water flowing in the pipe. Kindly refer the given fig. [5]

Assume : $g = 9.81\ m/s^2$,

Density of Water, $\rho_{Water} = 1000\ Kg/m^3$

Specific Gravity of Water, $S_{Water} = 1$

Specific Gravity of Mercury, $S_{Mercury} = 13.6$

Atmospheric Pressure = 1.01325 bar

Q7) a) Explain working of thermal power plant with neat sketch. [7]

b) With neat sketch, explain working of Vapour Compression Refrigeration System. [6]

OR

Q8) a) Draw a layout of wind power plant and explain the energy extraction (transfer). State its limitations. [4]

b) Differentiate between two stroke and four stroke engines. (min 4 important point) [4]

c) Explain working of a single acting, single stage reciprocating air compressor with neat sketch. [5]

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Question 6 C Figure