Total No. of Questions : 8]

SEAT No. :

P4356

[Total No. of Pages : 2

[5458]-103

F.E. (Semester - I)

BASIC MECHANICAL ENGINEERING

(2015 Pattern)

Time : 2 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) *Assume suitable data, if necessary.*
2) *Figures to the right indicate full marks.*
3) *Neat diagrams must be drawn wherever necessary.*
4) *Use of non-programmable electronic calculator is permitted.*
5) *Attempt four questions out of eight. Q.1 or Q.2, Q.3 or Q.4 , Q.5 or Q.6, Q.7 or Q.8.*

Q1) a) Draw neat sketches of ball bearing & disc brake. **[6]**

b) Explain any six mechanical properties of material. **[6]**

OR

Q2) a) compare belt drive, chain drive and spur gear drive on the basis of Elements of drive, centre distance, Power transmitting capacity and Application. Draw simplified diagram of cross section of flat belt with pulley and cross section of V belt with Pulley. **[6]**

b) Draw self-explanatory diagrams of four bar mechanism & slider crank mechanism. State their application. **[6]**

Q3) a) Differentiate between hot & cold working process. (Four points). Draw neat sketch of hot forging process setup. **[7]**

b) Draw self-explanatory diagrams of cylindrical grinding, surface grinding and centre less grinding process. **[6]**

OR

Q4) a) Explain any three sheet metal working process with neat sketches. **[6]**

b) Draw block diagram of a lathe machine. Explain function of headstock, tailstock and carriage of lathe machine. **[7]**

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Q5) a) State & explain two statements of second law of thermodynamics. **[4]**

b) Define atmospheric pressure, gauge pressure, absolute pressure and state units of pressure. **[4]**

c) A reversible heat engine operates with efficiency of 30%. Find the heat supplied and power output if heat rejected from the engine is 70 kW. Estimate COP of heat pump if the engine is reversed to work as heat pump. Draw sketch of the heat engine and heat pump. **[5]**

OR

Q6) a) Discuss limitations of first law of thermodynamics with two examples. **[4]**

b) Explain the following. **[4]**

i) Open System and Isolated System.

ii) Intensive properties and Extensive properties.

c) The pressure of gas flowing through a pipe is to be measured with simple U-tube manometer containing water. Left arm of manometer is connected to the pipe while right arm is open to atmosphere. Water level in left arm is 60 cm higher than water level in right-arm. Calculate gauge pressure & absolute pressure of the gas. Draw sketch of the barometer and U tube manometer setup. **[5]**

Given: Density of water = 1000 kg/m^3

Specific gravity of mercury = 13.6

Acceleration due to gravity = 9.81 m/s^2

Atmospheric pressure = 750 mm of mercury column.

Q7) a) Explain working of wind power plant. State its limitations. **[6]**

b) Explain working principle of four stroke cycle; compression ignition; C I (or Diesel) engine. **[6]**

OR

Q8) a) Draw block diagrams of nuclear power plant and hydro-electric power plant. **[6]**

b) What is refrigeration? Explain working of vapour compression refrigeration cycle. **[6]**

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