

Total No. of Questions :8]

SEAT No. :

P4030

[Total No. of Pages :3

[5351] - 110

F. E.

BASIC MECHANICAL ENGINEERING

(2015 Pattern) (Semester - I & II)

Time : 2 Hours]

[Max. Marks :50

Instructions to the candidates:

- 1) *Figures to the right indicates full marks.*
- 2) *Use of electronic pocket calculator is permitted.*
- 3) *Use of cell phone is prohibited in the examination hall.*
- 4) *Neat diagrams must be drawn whenever necessary.*
- 5) *“Assume suitable data, if necessary and clearly state.”*
- 6) *“Attempt Q.1 or Q.2, Q.3 or Q.4 Q.5 or Q.6 and Q.7 or Q.8”.*

- Q1)** a) Explain construction and working of rigid flange coupling with neat sketch. **[6]**
- b) Compare mechanism and machine (3 points). Draw a sketch of four bar mechanism. State its application. **[6]**

OR

- Q2)** a) Compare belt drive, chain drive and gear drive. (6 points) **[6]**
- b) Classify engineering materials. State 2-3 important properties and 2-3 engineering application of high carbon steel and aluminium. **[6]**

- Q3)** a) What is welding? Draw neat sketch of arc welding and brazing process setup. **[7]**
- b) Explain reaming, counter sinking, tapping operation performed on radial drilling machine. **[6]**

OR

P.T.O.

Q4) a) Differentiate between arc welding, brazing and soldering process. (6 points). [6]

b) Explain drilling, reaming, boring, tapping operation performed on radial drilling machine. [7]

Q5) a) What is thermodynamic system? Explain various types of thermodynamic systems with example. [4]

b) Define atmospheric pressure. What is difference between gauge pressure and absolute pressure? Draw a sketch/ diagram which represents relation between them. [4]

c) A heat pump is used to maintain the house at 25 °C. The house is losing the heat at the rate of 60,000 kJ/hr to the surrounding. While the heat generated in the house by various appliances is 4,000 kJ/hr. If COP of heat pump is 1.5. Find the power required to drive the heat pump. Define heat pump and draw its sketch. [5]

OR

Q6) a) State any two statements and discuss any two limitations of first law of thermodynamics. [4]

b) Define & explain the following devices with sketch: Heat engine and Refrigerator. [4]

c) The pressure of kerosene flowing through a pipe is to be measured with simple U-tube mercury manometer. Left arm of U tube is connected to pipe while right arm of the U tube is open to atmosphere. Calculate [5]

i) Absolute pressure of the kerosene in pipeline and

ii) Kerosene level in left arm of manometer above datum. Draw the sketch of the setup. Given : Atmospheric Pressure = 10m of water column
mercury level in right-arm of manometer above datum = 20 cm
Gauge Pressure of kerosene = 22 kPa
Specific gravity of the kerosene = 0.8
Density of mercury = 13600 kg/m³
Acceleration due to gravity, $g = 9.81 \text{ m/s}^2$.

- Q7)** a) What are the types of energy resources? Draw block diagram of wind power plant. Explain energy extraction (transfer) in the plant. [6]
- b) Explain working of reciprocating pump with the help of sketch. [6]

OR

- Q8)** a) Explain working of window air conditioner with neat sketch. Why smoking is prohibited in the air conditioned room/ office. [6]
- b) Explain working principle of reaction steam turbine with simple sketch. [6]