

Model Questions

Subject : Basic Mechanical Engg. (BE-203)

UNIT I

1. Define Mechanical properties of material.
2. Explain the Iron-Carbon diagram.
3. What is modulus of Elasticity? Give its unit of measurement.
4. State the composition of grey cast Iron and its applications.
5. Define Hardness and explain the Brinell hardness test.
6. Draw the stress-strain curve for a ductile metal and point out its salient features.
7. Explain the following reactions in relation to iron-carbon equilibrium diagram.
i) Eutectic reaction ii) Eutectoid reaction iii) Peritectic reaction.
8. Give the broad classification of engineering materials.
9. What are alloy steel? Why alloying is done. Explain

UNIT II

1. Explain the following properties of any measuring device:
 - a. Hysteresis
 - b. Sensitivity
 - c. Accuracy and Precision
 - d. Errors
 - e. Response Time
 - f. Resolution
2. What is the use of micrometer? Explain its working.
3. Explain the use of sine bar.
4. Write short notes on slip gages.
5. With the help of a simple sketch, explain different components of Lathe machine.
6. With the help of a simple sketch, explain different components of Drilling Machine.
7. Explain various operations performed on Lathe Machine.
8. Explain construction and working of Rotameter
9. Explain construction and working of venturimeter

10. Define Pressure. Explain *any one* pressure measurement device with neat sketch.

UNIT III

1. What is Bernoulli's theorem for incompressible fluid. How is it used to measure flow in a pipe. Also mention the assumptions made for deriving it.
2. Differentiate between viscous and non-viscous flow
3. Explain the working of a fluid coupling.
4. How hydraulic pumps are classified. Explain.
5. What is a Hydraulic turbine? Draw a neat sketch of Pelton turbine and explain its working.
6. State the Newton's law of viscosity and give examples of its application.
7. What factors decide whether Kaplan, Francis or a Pelton type turbine would be used in a hydroelectric project?
8. Define the terms: a) Viscosity b) Pressure c) Kinetic energy d) Datum energy e) Compressible fluid.
9. Define pump, compressor, turbine, positive displacement machine, Pneumatic Machine.
10. A pipe 300 meters long has a slope of 1 in 100 and tapers from 1m diameter at the high end to 0.5m at the low end. Quantity of water flowing is 5400 liters per minute. If the pressure at the high end is 70KPa, find the pressure at the low end.

UNIT IV

1. Explain with neat sketch vapour compression refrigeration system also draw P-V and T-S diagrams.
2. Find enthalpy of steam at 10 bar in the following conditions.
 - a. Dry and saturated
 - b. Wet having dryness fraction 0.95
 - c. Superheated to a degree of superheat = 50°C.
3. Give classification of boilers on different basis.
4. A coal fired boiler plant consumes 400kg of coal per hour. The boiler evaporates 3200kg of water at 44.5°C into superheated steam at a pressure of 12 bar and 274.5°C. If the calorific value of fuel is 32,760kJ/kg of Coal, determine:

- a.* Equivalent evaporation
 - b.* Thermal efficiency of boiler.
5. State and explain second law of thermo dynamics
 6. Steam at 18 bar and dryness fraction 0.9 is heated at constant pressure until it becomes dry and saturated. Find the increase in volume, heat supplied and work done per kg of steam. Further if volume of steam is kept constant, find how much heat be extracted to reduce the pressure of steam to 14 bar.
 7. With the help of a neat sketch explain the working of a Babcock and Wilcox Boiler.
 8. Show the various process of steam in a T-S diagram.
 9. Differentiate between Boiler Mountings and Accessories. Also Explain any one boiler mounting with neat sketch.
 10. Explain Draught. Derive expression for height of Chimney for natural Draught.

UNIT V

1. What is Carnot cycle and its importance?
2. Write any four advantage of 4 stroke petrol engine over 2 stroke petrol engine.
3. Explain the working of a 4 stroke diesel engine.
4. Draw the p-v diagram of Carnot cycle and derive its efficiency.
5. Define the following terms as applied to a steam engine. a) Clearance b) Swept volume c) Mean piston speed d) Dead centers e) Crank throw f) Piston stroke g) Cylinder bore
6. An engine working on Otto cycle is supplied with air at 0.1MPa and 35°C. The compression ratio is 8. Heat supplied is 2100 kJ/kg. Calculate the maximum pressure and temperature of the cycle, cycle efficiency and mean effective pressure.
7. With the help of theoretical P-V diagram explain working of four stroke petrol engine.
8. Differentiate between SI and CI engines.
9. a) With the help of theoretical P-V diagram explain working of single acting steam engine.
10. Explain Otto cycle. Derive expression for efficiency of Otto cycle.