

Subjective questions on MET 03

Production of metals

1. List the basic raw materials used in making iron and steel and also explain their functions?
2. List the types of furnaces commonly used in steel making and describe their characteristics.
3. What does refining means and how is it done?
4. Name the alloying elements that have the greatest effect on the properties of steels.
5. What are the major uses of copper? What are the alloying elements in brass and bronze respectively?
6. What is cupola furnace? Explain working principle, construction and applications

Hot and cold working

- 1) Differentiate between hot working and cold working process, making references to advantages, limitations and application?
- 2) Explain cold extrusion, cold drawing, and cold rolling processes.
- 3) Describe the process of hot forging, hot extrusion and hot drawing.
- 4) Define re-crystalline temperature.
- 5) Differentiate between hot and cold working.
- 6) Define hot working of metals. What are its advantages and disadvantages?
- 7) Describe with sketches the three methods of hot working.
- 8) Define cold working of metals. What are its advantages and disadvantages?
- 9) What are the specific advantages, limitations and applications of cold working?
- 10) Write Short notes on:
 - a) Hot spinning
 - b) Hot Extrusion
 - c) Hot forging
 - d) Hot drawing
- 11) Describe the following cold working processes:
 - a) Embossing
 - b) Coining
 - c) Roll forming
 - d) Roll bending
 - e) Shot peening

Smithy and forging

1. What do you understand by forging? What are the advantages?
2. List out the types of forging machines.
3. What are the two basic types of forging process?
4. List out the forging defects
5. What are the general advantages of forging as a manufacturing process?
6. Compare press forging and hammer forging.

Foundry

1. What are foundries?
2. What are melting furnaces? Briefly describe a) Electric arc furnace
b) induction furnace
3. Briefly explain :
a) Crucible furnaces
b) Cupola furnaces

Metal joining

1. What is welding? How is it classified?
2. What are the advantages, disadvantages and applications of welding joints over other joints?
3. Describe gas welding techniques in detail? Give the advantages, limitations and applications of gas welding?
4. Sketch the three types of gas welding flames and give differences between them.
5. Define electric arc welding. Discuss with the help of neat sketch, the principle of arc welding. What is straight polarity and reverse polarity?
6. Compare the merits and demerits of using A.C and D.C for arc welding.
7. Explain TIG welding and MIG welding with its merits, demerits and application.
8. Compare TIG welding with MIG welding.
9. Explain plasma arc welding with neat sketch. Compare plasma arc welding and TIG welding.
10. Describe the process of submerged arc welding stating its advantages and limitations.
11. Discuss the method of resistance welding. What are its advantages and disadvantages?
12. Discuss, with the help of neat sketch, the principle of spot welding,
13. Write short notes on following:
(i) Soldering
(ii) Brazing
(iii) Braze welding
14. Differentiate between soldering, brazing and welding.

Lathe

- 1) What is the difference between a live center and a dead center, when these terms are used in the context of workholding in a lathe?
- 2) How does a turret lathe differ from an engine lathe?
- 3) Name the various ways in which a workpart can be held in a lathe.
- 4) Explain the functions of the saddle on a lathe.
- 5) Explain how external threads are cut on a lathe.
- 6) Describe the types of machining operations that can be performed on a lathe.
- 7) Describe the basic working principle and important parts of the lathe machine.
- 8) How taper turning is done on lathe machine. Explain in detail.
- 9) Explain different types of work holding devices and accessories.
- 10) Explain briefly different types of lathes.

Drilling

- 1) A hole is being drilled in a block of magnesium alloy with a 10-mm drill bit at a feed of 0.2 mm/rev and with the spindle running at $N = 800$ rpm. Calculate the material-removal rate and the torque on the drill.
- 2) Explain the following
 - a) Drilling
 - b) Boring
 - c) Reaming
 - d) Broaching
- 3) Describe the important angles of a drill
 - a) Rake angle
 - b) Clearance angle
 - c) Point angle
 - d) Chisel edge angle
- 4) Through holes of 10mm diameter are to be drilled in a steel plate of 20mm thickness drill spindle speed is 300 rpm feed is 0.2 mm/rev and drill point angle is 120. Assuming drill over travel of 2mm determine the time to produce a hole.
- 5) Explain working principle of Drilling machine and types of operations performed on Drilling machine.
- 6) What is Drilling machine? List various types of drilling machine and what are the principle parts of drilling machine?

Shaper and planar

- 1) What is Shaper? Explain the basic components of shaper machine.
- 2) Describe working principle of shaper and name the various operations that can be performed on shaper machine.
- 3) What is planar. Describe working principle.
- 4) Differentiate between shaper and planar.
- 5) Explain crank and slotted lever mechanism used in shaper.

- 6) A 600mm x 30mm flat surface of a plate is to be machined on a shaper. The plate has been fixed with the 600 mm side along the tool travel direction. If the tool overtravel at each end of the plate is 20 mm , average cutting speed is 8 m/min, feed rate is 0.3 mm/stroke and the ratio of return time to cutting time of the tool is 1:2 what is the time required for machining?

Grinding

- 1) What are the five principal parameters of a grinding wheel?
- 2) What is centerless grinding?
- 3) What are some of the principal abrasive materials used in grinding wheels?
- 4) What is wheel structure and wheel grade in grinding?
- 5) What are the three mechanisms of grinding wheel wear?
- 6) What is dressing, truing, glazing in reference to grinding wheels?

Milling

- 1) What is the difference between peripheral milling and face milling?
- 2) Describe the difference between up milling and down milling.
- 3) What is Milling? Describe the basic working principle of milling machine.
- 4) Briefly explain End milling, Gang milling, Straddle milling.
- 5) A slot 25mm deep is to be cut through a workpiece 200mm long with the help of face cutter whose diameter is 150 mm and has 10 teeth. The cutting speed is 50m/min and feed is 0.25mm per teeth. Find a) Table feed n mm/min. b) Slot machining time
- 6) Write the advantages and disadvantages of climb milling . In connection with the grinding define grinding ratio.

Unconventional machines

- 1) Explain Electric discharge machining (EDM). List advantages and disadvantages.
- 2) Describe Ultrasonic Machining process and the principle of metal removal by materials.
- 3) Describe Laser Beam Machining. Also discuss mechanics of LBM.
- 4) Explain the principle of Electro Chemical Machining process. List advantages and disadvantages.
- 5) What is Abrasive Jet Machining? Explain working principle.
- 6) Describe Electro-chemical Grinding process. Explain working principle. List advantages and disadvantages.