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ATTOOR

DEPARTMENT OF MECHANICAL ENGINEERING
ME 43 MANUFACTURING TECHNOLOGY II
2 MARKS QUESTIONS & ANSWERS

UNIT I

THEORY OF METAL CUTTING

1. Classify the process of metal shaping.

(i)Non-cutting shaping process.

(ii)Cutting shaping process

2. Explain the non-cutting shaping process.

The metal is shaped under the action of force, heating or both. Since there is no cutting of metal, chip formation will not be there. So, it is called as non-cutting process.

3. What are the different types of cutting tool?

a. Single point cutting tool.

b. Multiple point cutting tool.

4. Classify the various angles in cutting tool.

1.Back rake angle

2.Side rake angle

3.End rake angle

4.Side relief angle

5.Side cutting angle

6.End cutting angle

5. What is tool signature?

The various angles of tools are mentioned in a numerical number in particular order. That order is known as tool signature .

6.What is rake angle? What is the effect of nose radius in tools?

The angle between the tool face and the line parallel to the base of the tool is known as side rake angle. It is used to control chip flow.

7.Explain the nose radius.

It is the joining of side and end cutting edges by means of small radius in order to increase the tool life and better surface finish on the work piece.

8.Name the factors that contribute to poor surface finish in cutting.

(i) Cutting speed

(ii) Feed

(iii) Depth of cut

9.What is orthogonal cutting?

The cutting edge of tool is perpendicular to the work piece axis.

10.Define oblique cutting.

The cutting edge is inclined at an acute angle with normal to the cutting velocity vector is called oblique cutting process.

11.What is chip and mention its types?

The sheared material begins to flow along the cutting tool face in the form of small pieces is called chip. Chips are mainly classified into three they are :

(a) Continuous chip.

(b) Discontinuous chip.

(c) Continuous chip with built up edge.

12.Define Chip thickness ratio ?

The ratio of chip thickness before cutting to chip thickness after cutting is called Chip thickness ratio.

13.What are the functions of cutting fluids?

(i) It is used to cool the cutting tool and work piece.

(ii) It lubricates the cutting tool and thus reduces the coefficient of friction between tool

and work.

(iii) It improves the surface finish.

(iv) It causes the chips to break up into small parts.

(v) It protects the finished surface from corrosion.

14. What are the factors responsible for built-up edge in cutting tools?

During cutting process, the interface temperature and pressure are quite high and also high friction between tool chip interfaces causes the chip material to weld itself to the tool face near the nose. This is called built up edge.

15. List the essential characteristics of a cutting fluid.

(i) It should have good lubricating properties to reduce frictional forces and to decrease the power consumption.

(ii) High heat absorbing capacity.

(iii) High flash point.

(iv) It should be odourless.

16. List the types of cutting fluids?

(i) Water based cutting fluids.

(ii) Straight (or) heat oil based cutting fluids.

17. What do you understand by negative rake angle?

The slope given away from the cutting edge is called negative rake angle.

18. When will the diamond tools be used?

Diamond is the hardest material. It is used for machining very hard materials such as glass, plastics, ceramics etc.

19. What are the causes of wear?

The tool is subjected to three important factors such as force, temperature and sliding action due to relative motion between tool and the work piece. So, the tool will wear easily.

20. How tool life is defined?

It is defined as the time elapsed between two consecutive tool resharpening.

UNIT II

CENTRE LATHE AND SPECIAL PURPOSE LATHES

1. What is a lathe?

Lathe is a machine which removes the metal from a piece of work to the required shape and size.

2. What is swing diameter?

The largest diameter of work that will revolve without touching the bed and is twice the height of the center measured from the bed of the lathe.

3. Write down the name of any four lathe accessories.

Lathe centres, catch plates, carriers, chucks, mandrels and rests.

4. What are the functions of feed rod and lead screw?

Feed rod is used to guide the carriage in a straight line when it moves along the bed.

Lead screw is used to move the carriage while thread cutting operation is carried out.

5. Why is it essential that the cutting point of the tool should be level with the spindle center while machining taper on a work piece?

It is done to avoid eccentric taper.

6. Mention three different types of chucks used in a machine shop.

(i)Three jaw chuck (ii) Four jaw chuck (iii) Magnetic chuck.

7. Why power chucks are developed?

Power chucks are primarily developed for the application as work holding devices for automatic machines, Numerical control and CNC machines.

8. What is the application of Air operated chuck?

Heavy work pieces are mounted with the help of air-operated chucks because they will require more power to hold the work piece.

9. What are the advantages of using a collet chuck?

1. Job setting will be easy and quicker.

2. Heavy cut can be taken.

10. What is meant by tapping?

Tapping is the operation of forming internal thread of small diameter by using a multipoint tool.

11. Define “taper”

Taper is defined as a uniform change in the diameter of a work piece measured along its length.

12. What are the various types of headstock for turret lathes?

1)Back geared 2) All geared 3) Pre-selective stock

13. What type of mechanism is used for indexing the turret head for the next operation?

Geneva or indexing mechanism.

14. Name any four work holding devices.

1)Collets 2) Chucks 3) Fixtures 4) Power chucks.

15. What is collapsible tap?

It is used for making internal threads. During making threads, the cutting edges of the tap collapses to reduce its over all diameter.

16. What is bar stop?

It is used for setting the required length of the work piece.

17. What is tooling?

Planning of operation sequence and preparation of turret or capstan lathe are termed as tool-layout or tooling.

18. Define automatic machine.

Automatic machine are machines tools in which all the operations required to finish off the work piece are done automatically without the attention of an operator.

19. What are the advantages of automatic lathes?

a) Mass production of identical parts.

b) High accuracy is maintained.

c) Time of production is minimized.

d) The bar stock is fed automatically.

20. What are the types of single spindle automatic lathes?

1. Automatic cutting off machine

2. Automatic screw cutting machine.

3.Swiss type automatic screw machine.

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UNIT III

OTHER MACHINE TOOLS

1. What is shaper?

The machine which is having a reciprocating type of machine tool with single point cutting tool used to produce flat surfaces called as shaper.

2. In which stroke, the speed of the ram is faster?

Return stroke.

3. What are the types of feed ?

1)Hand feed 2) Automatic feed

4. List any four types of work holding devices.

1)Vice 2) Table 3) V-block 4) Fixture.

5. Write down any four operations performed by a shaper.

1. Machining horizontal surfaces.

2. Machining vertical surfaces.

3. Machining inclined surfaces.

4. Machining irregular surfaces.

6. Mention the operations performed by a planer.

1. Planing horizontal surfaces.

2. Planing vertical surfaces.

3. Planing of an angle.

4. Planing curved surface.

7. What is the main difference made in divided table planer?

The working principle is similar to that of a standard planer. But it has two reciprocating tables.

8. What is the function of clapper block in a planer?

During cutting stroke, the tool block fits inside the clapper block rigidly. During the return stroke the tool block lifts out of the clapper block to avoid rubbing of the tool on the job.

9. Define “milling process”

Milling is the process of removing metal by feeding the work past against a rotating multipoint cutter.

10. What are the common work holding devices used on milling machines?

a) V- blocks.

b) Machine vices.

c) Milling fixture.

d) Dividing heads.

11. What are the cutter holding devices?

1. Arbors.

2. Adaptors.

3. Collets.

12. What is a shell mill?

It is a large type of face or end mill that mounts onto an arbor, rather than having an integral shank. Typically, there is a hollow in the centre of the shell mill for mounting hardware onto a separate arbor.

13. Define “face milling”

It is the operation performed by a milling cutter to produce flat-machined surfaces perpendicular to the axis of rotation.

14. What is thread milling?

It has no chamfer. The mill inserted into the hole along the axis of the spindle, deep enough to produce full thread depth required.

15. How do you specify radial drilling machine.

A drilling machine is specified by the following items.

1. Maximum size of the drill in mm that the machine can operate.

2. Table size of maximum dimensions of a job can mount on a table in square meter.

3. Maximum spindle travel in mm.

4. Number of spindle speed and range of spindle speeds in r.p.m.

16. Write down any four operations that can be performed in a drilling machine.

1. Drilling

2. Counter sinking

3. Tapping

4. Trepanning

17. What is meant by "Sensitive hand feed"?

In drilling machines, manual sensing of the hand feeding of the tool towards the work piece. It is called sensitive hand feed.

18. Define drilling process.

It is the process of producing hole on the work piece by using a rotating cutter called drill.

19. Define tapping process.

It is the process used for making internal threads in a machine component by a tool called tap. Internal thread can be cut in existing drilled holes.

20. What is boring?

It is the process of enlarging and locating previously drilled holes with a single point cutting tool.

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UNIT IV

ABRASIVE PROCESS AND GEAR CUTTING

1. What is meant by grinding?

It is a metal removing process in which the metal is removed with the help of rotating grinding wheel.

2. What is the use of a portable grinder?

It is used for rough grinding of tools and other small lparts.

3. What is the use of plunge grinding?

It is used for grinding shoulders, stepping and various contours on the workpiece.

4. State the various methods of centreless grinding.

a) Through feed.

b) In feed.

c) End feed.

5. State the various types of internal grinders.

a) Chucking type.

b) Planetary type.

c) Centreless type.

6. What is planetary grinding?

The motion of the grinding wheel is in the form of planet and hence it is called planetary grinding.

7. What are the two methods used in gear teeth grinding?

(i)Gear generating process.

(ii)Gear forming process

8. Classify tool and cutter grinders?

(i)Single purpose and cutter grinders.

(ii)Universal tool and cutter grinders.

9. Classify the types of abrasives.

(i)Natural abrasives.

(ii)Artifical abrasives.

10. Name the two types of bond.

(i)Organic

(ii)Non-organic

11. Define the term “grade” used in grinding wheel?

Grade or hardness indicates the strength with which the bonding material holds the abrasive grains in the grinding wheel.

12. Mention four important factors that influence the selection of grinding wheel.

1.Constant factors

(i)Physical properties of materials to be ground

(ii)Amount and rate of stock to be removed

(iii)Area of contact

(iv)Type of grinding machine

2.Variable factors

(i)Work speed

(ii)Wheel speed

(iii)Condition of the grinding machine

(iv)Personal factor

13. What for lapping is used?

a) Removing small amounts of material from the surfaces of tools.

b) Removing small defects and surface cracks left during previous operations.

c) Eliminating small distortion.

14. What is meant by honing?

An abrading process of finishing previously machined surfaces is known as honing.

15. What are the advantages of honing process?

1. Simple process which can be done on any general purpose machines such as lathes and drilling machines.

2. This process can be applied for both internal cylindrical and flat surfaces.

3. Honing enables the maximum stock removing capacity out of entire surface finishing operations.

16. What is superfinishing?

The process of obtaining a surface of the highest degree of surface finish is known as superfinishing.

17. What are the advantages of speed shaping process?

1. It is the quickest process.

2. Both external and internal spur gears can be cut.

18. What are the limitations of gear hobbing?

1. Internal gears cannot be generated.

2. Hobbing process cannot be applied very near to shoulders.

19. What are the physical properties of aluminum oxide?

(i)Silicon carbide is harder than aluminium oxide.

(ii)Aluminium oxide can withstand greater stresses than silicon carbide.

(iii)Aluminium oxide is more tough than silicon carbide.

20. Mention the types of grinding operation performed on a cylindrical grinding.

(i)Traverse grinding.

(ii)Plunge grinding.

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UNIT V

CNC MACHINE TOOLS AND PART PROGRAMMING

1. Define NC.

Controlling a machine tool by means of a prepared program is known as Numerical control or NC.

2. What are the classifications of NC machines?

1. Point to point NC system

2. Straight cut NC system

3.Contouring NC system

3. State the advantages of NC machines

(i) Greater accuracy.

(ii) Lesser production cost per piece due to reduction in lead time and set `up time.

(iii) Improved product quality.

4. Name the various elements of CNC machines.

1. Tape reader.

2. Minicomputer.

3. Servos and interface logic.

4. Motion feedback.

5. What is meant by hybrid CNC?

In Hybrid CNC, the controller consists of soft-wired and hardwired logic circuits.

6. Mention the main difference between CNC and DNC.

CNC system can do operations on only one machine at a time. But Direct Numerical Control involves that at a time a large central computer to direct the operations of a number of separate NC machines.

7.Classify CNC machines.

1. CNC Machining centre.

2. CNC Turning centre.

3. CNC Lathes.

4. CNC milling/drilling machines.

5. CNC Special purpose machines.

8. State any four applications of CNC.

1. Welding machines.

2. Press working machine tools.

3. Assembly machines.

4. Inspection machines.

9. What are the requirements of spindles in CNC?

1. High stiffness-both static and dynamics.

2. Running accuracy.

3. Axial load carrying capacity.

4. Thermal stability.

5. High speeds of operation.

10. Mention the advantages of stepping motor.

(i) Stepping motors can be used in open loop NC system.

(ii) The system is cheaper.

(iii) More accuracy is achievable.

11. What is the function of servovalve?

The electro-hydraulic servovalve controls the flow of the high pressure oil to the hydraulic motor. The servo valve receives a voltage actuating signal and it drives a solenoid device to move the valve spool.

12. Classify machining centres.

1. Horizontal spindle machining centre.

2. Vertical spindle machining centre.

3. Universal machining centre.

13. List the commonly used coordinate systems of CNC machine tools.

a) Cantilever construction.

b) Bridge construction.

c) Column construction.

d) Gantry construction.

14. List the commonly used coordinate systems of CNC machine tools.

a. Manual part programming.

b. Computer-assisted part programming.

c. Manual data input.

d. Computer automated part programming.

15. What are the important steps to be followed while preparing part

program?

1. Fixation of coordinate system.

2. Reference of G and M codes.

3. Dimensions of work and tools.

4. Locating the fixture and machine table.

16. What is meant by MACRO?

It is similar to subroutine used in FORTRAN language. It would be used where certain motion sequences would be repeated several times ,within a program.

17. Define Subroutine.

If the same machining operation, which was carried out already, is to be performed at many different positions on the work piece, it can be executed by means of a program called as subroutines.

18. What is meant by APT program?

APT program is used to command the cutting tool through its sequence of machining process. APT is also used to calculate the cutter positions. APT is a three dimensional system controlling upto five axis including rotational co- ordinates.

19. Mention the types of EDM.

1. RAM type EDM.
2. Orbital type EDM.
3. Wire cut EDM.

20. Write down the types of statements in APT language.

1. Geometric statements.
2. Motion statements.
3. Postprocessor statements.
4. Special control or Auxiliary statements.

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