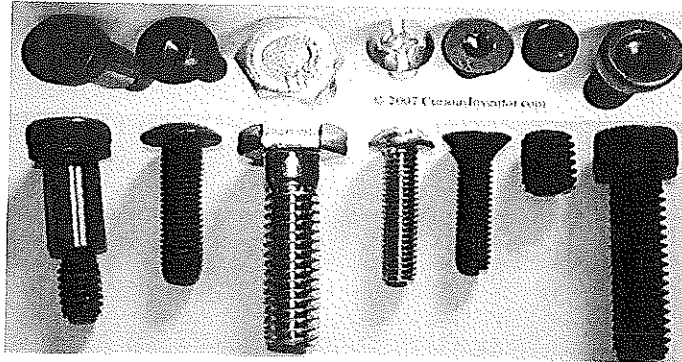


12. What is the difference between accuracy and precision?
13. Write down the Advantages and Disadvantages of v-belt over flat belt drive.
14. Which factors should we consider to select measuring tool?

Section – C

04X06 = 24 Marks

15. What is the importance of Least count? Also calculate the least count of Bevel Protractor.
16. Write down the names of any five from the picture given below.



17. Explain any Five:

- (a) Calibration of Measuring Instruments
- (b) Surface table
- (c) Geometrical Dimensions & Tolerances
- (d) Grade 8.8 in Bolt
- (e) Dial caliper
- (f) Repeatability of Measuring Instruments

18. (A) Calculate the least count of Vernier caliper which has 50 divisions on secondary scale with write down the formula.

(B). Write down the different parts of micrometer with their application.

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(B)

Registration No.:

School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

Course Code: SMS1101

Time: 2 Hour

Course Name: Assembly & Measurement

Max. Marks: 50

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 04 Questions. Each question carries 4 Marks.
5. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Which measuring instrument can be used to measure internal diameter of 20.015 mm?
 - (a) Digital Vernier caliper
 - (b) Micrometer
 - (c) Hole test Micrometer
 - (d) Plug gauge
2. Which one is the example of form gauge?
 - (a) Feeler gauge
 - (b) Micrometer
 - (c) Vernier Depth gauge
 - (d) None of these
3. Which one of the following is not a part of a micrometer?
 - (a) Thimble
 - (b) spindle
 - (c) probe
 - (d) Anvil
4. For Which applications plunger dial indicators are not used?
 - (a) Inspecting surface for flatness.
 - (b) Aligning Work piece
 - (c) Inspecting shaft roundness
 - (d) Measuring boring diameter



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.:

School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

Course Code: SMS1101

Time: 2 Hour

Course Name: Assembly & Measurement

Max. Marks: 50

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 04 Questions. Each question carries 4 Marks.
5. Section C contains 04 Questions. Each question carries 6 Marks.

Answer Key

Section – A

10X01 = 10 Marks

1. Which measuring instruments can be used to measure internal diameter of 20.015 mm?
(d) Hole test Micrometer
2. Which one of the example of form gauge?
(a) Feeler gauge
3. Which one of the following is not a part of a micrometer?
(c) probe
4. For Which applications plunger dial indicators are not used?
(d) Measuring boring diameter
5. V-belts have a cross section-
(c) Trapezoidal
6. Outside Taper can be checked by-
(d) Taper Ring Gauge
7. "Stem and stylus must be at right angle to the measurement surface." This sentence suit for-
(a)Plunger Type Test Indicator
8. Standard Temperature for measurement is-
(b) 20 C
9. Least size available in Slip Gauge block set which you have used:
(d) 1.005
10. Radius gauge is type of-
(a) Form gauge.



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Section – B

04X04 = 16 Marks

1. Write the name of the following parts.
 - A. Plain Bearing
 - B. Deep groove ball bearing
 - C. Linear guideways
 - D. Two-point contact micro meter
2. What is the difference between accuracy and precision?

Ans. Accuracy is how close a measured value is to the actual (true) value.
Precision is how close the measured values are to each other.

3. Write down the Advantages and Disadvantages of v-belt over flat belt drive.

Advantages

- Friction is high due to wedge action, results in power transmitting capacity.
- Slip is negligible due to wedge action.
- Can operate vertically also.

Disadvantages

- Cost is high, creep is high.
- Construction is complicated.

4. Which factors should we consider to select measuring tool?

Ans:- (1) Tolerances of given size
(2) Range of given dimension
(3) Availability of measuring instruments
(4) Time consumption in measurements

Section – C

04X06 = 24 Marks

1. Importance of Least count and Calculate the least count of Bevel Protractor.

Answer: - Importance of least count: -

1. Without least count we cannot take Measurement.
2. To define any kind of reading in measuring instruments we should know the least count.
3. With the help of least count of measuring instruments we can define the precision.

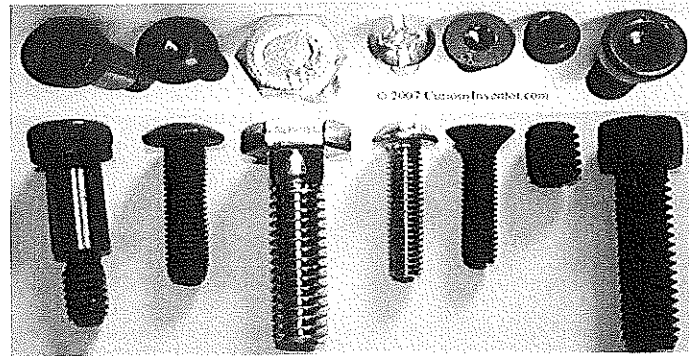
Least count of Bevel Protractor = value of one division on main scale/ Total No of division on sub scale

$$= 1/12$$

$$= 1 \times 60 / 12 \quad (\text{Because } 1^{\circ} = 60 \text{ minute})$$

$$= 5'$$

2. Write down the names of any five from the picture given below. (5)
- Set screw
 - Button head cap screw
 - CSK screw
 - Button head cap screw
 - Hexa head cap screw
 - Round head slotted cap screw



3. Explain any Five.

Answer: -

(1) Calibration of measuring Instruments: -

Calibration means to check the correctness of measuring instruments with a standard.

It is very important otherwise we cannot be sure about perfect measurement.

With the help of Slip gauge grade 00 we can check or calibrate the measuring instruments.

(2) Surface plate in measuring

Surface plate is a standard base plate used for measuring. This is very precise and accurate & provide the flat datum to measure any kind of dimension.

It can be made of Cast Iron and Granite.

Granite Surface table is very precise and costly.

It is having a very good compressive strength.

(3) Geometrical Dimensions & Tolerances

Geometrical Dimension & Tolerance is used in drawing to control the geometrical feature in a part.

With the help of GD&T we can achieve better geometry & best fits.

There are so many geometrical symbols are used:-

Like Concentricity, Parallelism, flatness, run out, total run out, Cylindrical, Eccentricity, surface of line, surface of profile etc.



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(4) Grade 8.8 in Bolt

This grade 8.8 refers the fastener grade

First letter 8 denotes the ultimate tensile strength which is 800 N/mm²

And second letter 8 denotes the yield strength which is 80% of UTS.

(5) Dial caliper

Dial caliper is measuring instruments to check the various dimension like length, width, thickness, depth etc

It is having a least count of 0.01 mm.

Dial caliper is an advance Vernier with having dial.

With the help of dial caliper we can identify the measurement variation also.

4. A)

Calculate the least count of Vernier caliper which has 50 divisions on secondary scale with write down the formula.

Ans:- **Formula:**

L.C = One values of smallest division on main scale / Total division on secondary scale

OR

L.C = Main scale division – Vernier scale division

Calculate least count:

L.C = 1 / 50 = 0.02mm

Or

L.C = 1 – 0.98 = 0.02mm

(B) Write down the different parts of micrometer with their application.

Answer.

- **Ratchet**- used to apply constant and limited measuring force and also used for fine movement.
- **Thermal insulation pad**- does not allow transferring the body heat to micrometer.
- **Anvil and spindle**- Anvil used to support the work piece and create reference face and spindle create measuring face, it consists linear and rotational motion.
- **Measuring scale**- works on the pitch principle or can be defined as one rotation of circular scale gives one division linear movement on main scale.
- **Frame** – it is required for providing support to all components of micrometer.



School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

Course Code: SMS1102

Time: 2 Hour

Course Name: Handskills

Max. Marks: 50

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 04 Questions. Each question carries 4 Marks.
5. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Core drill is clamped in-
 - a) Drill chuck
 - b) Collet holder
 - c) Sleeve
 - d) Tap holder
2. Which of the file cut configuration has the worst chip evacuation?
 - a) Straight cut
 - b) Curved cut
 - c) Diagonal
 - d) Both a &
3. Core drilling process can be done without pre drill-
 - a. True
 - b. False
4. To make lubricating grooves which types of chisel is used?
 - a) Web chisel
 - b) Flat chisel
 - c) Cap chisel
 - d) None
5. Punching is a process of-
 - a) Making conical depression on to the surface of work piece
 - b) Transferring the dimension and contour onto the work piece surface
 - c) Both a & b
 - d) None of them



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6. The size of the relief angle mainly influences-
 - a) Work piece surface
 - b) Friction between tool and work piece
 - c) Chip formation
 - d) None of the above
7. What would be the procedure for reaming process?
 - a) Drill – reaming
 - b) Drill – core drill – reaming
 - c) Drill – csk – reaming
 - d) Spot drill – drill – csk – reaming
8. Which chisel is used in making narrow keyways?
 - a) flat chisel
 - b) Web chisel
 - c) Cape chisel
 - d) Round nose chisel
9. What is the application of the anvil plate?
 - a) To support the work piece for scribing
 - b) To use as a base plate
 - c) To measure the angle
 - d) None of the above
10. Which is not an application of punching?
 - a) Start point for drill
 - b) Locating center point
 - c) Cutting
 - d) Make more visible scribed lines

Section – B

04X04 = 16 Marks

11. What do you understand by Bench vice? Write the names of its parts.
12. Define the scribing and punching. Explain on which factors the accuracy of punching depends?
13. Write the formula for cutting speed. Also define its nomenclature with its units. If rpm is given 3500 and tool diameter is 10 cm, then calculate cutting speed.
14. Write short notes on following:
 - a) Drilling
 - b) Reaming
 - c) Counter sinking
 - d) Boring



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Section – C

04X06 = 24 Marks

15. What occupational safety should be considered during the work in the workshop (any ten)?
16. Explain the following terms with a neat and clean diagram:
 - a) Cutting speed
 - b) Revolution per minute(RPM)
 - c) Feed
17. a) Write the application of filing
b) Describe the difference between cut files and milled files
18. Explain the accessories for the work piece clamping.

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Registration No.:

School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

B

Course Code: SMS1102
Course Name: Handskills

Time: 2 Hour
Max. Marks: 50

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 1 Marks.
4. Section B contains 04 Questions. Each question carries 4 Marks.
5. Section C contains 04 Questions. Each question carries 6 Marks.

Answer Key

Section – A

10X01 = 10 Marks

1. Core drill is clamped in
 - a) Drill chuck
 - b) Collet holder
 - c) Sleeve
 - d) Tap holder

Ans. c

2. Which of the file cut configuration has the worst chip evacuation-
 - a) Straight cut
 - b) Curved cut
 - c) Diagonal
 - d) Both a &

Ans. a

3. Core drilling process can be done without pre drill
 - a. True
 - b. False

Ans. a

4. To make lubricating grooves which types of chisel is used
 - a) Web chisel
 - b) Flat chisel
 - c) Cap chisel
 - d) None

Ans. d



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5. Punching is a process of

- a) Making conical depression on to the surface of work piece
- b) Transferring the dimension and contour onto the work piece surface
- c) Both a & b
- d) None of them

Ans. a

6. The size of the relief angle mainly influences-

- a) Work piece surface
- b) Friction between tool and work piece
- c) Chip formation
- d) None of the above

Ans. c

7. What would be the procedure for reaming process?

- a) Drill – reaming
- b) Drill – core drill – reaming
- c) Drill – csk – reaming
- d) Spot drill – drill – csk – reaming

Ans. d

8. Which chisel is used in making narrow keyways?

- a) flat chisel
- b) Web chisel
- c) Cape chisel
- d) Round nose chisel

Ans. c

9. What is the application of the anvil plate?

- a) To support the work piece for scribing
- b) To use as a base plate
- c) To measure the angle
- d) None of the above

Ans. a

10. Which is not an application of punching

- a) Start point for drill
- b) Locating center point
- c) cutting
- d) make more visible scribed lines

Ans. c



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Section – B

04X04 = 16 Marks

11. What do you understand by Bench vice? Write the names of its parts.

Ans.

Bench vice is a clamping device which is mounted on the bench and it used to clamp the work piece.

- The main parts of a vice
- Handle
- Spindle
- Fix jaw
- Movable jaw
- Lead screw
- Dovetail guide ways
- Anvil plate
- Height adjusting lever

12. Define the scribing and punching. Explain on which factors the accuracy of punching depend?

Ans.

punching is a process of making a small cone shaped depression into the work piece by the help of hammer and layout punch

Scribing- scribing a process of transfer the drawing dimension and contours onto the work piece.

The accuracy of punching depends:

- a) Accurate scribing
- b) How sharp the tip of the punch.
- c) How the punch is used.
- d) The position of the punch
- e) When the hammer is hit correctly

13. Write the formula for cutting speed. Also define its nomenclature with its units. If rpm is given 3500 and tool diameter is 10 cm, then calculate cutting speed.

Ans.

The formula of cutting speed is –

$$V_c = \pi DN / 1000$$

Where, V_c = cutting speed in m/min

D = diameter of tool/work piece in mm

$$N = \text{RPM}$$

With this formula,

$$V_c = (3.14 \times 100 \times 3500) / 1000$$

$$V_c = 105 \text{ m/min}$$



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14. Write short notes on following:

- a) Drilling b) Reaming c) Counter sinking d) Boring

Ans.

- a) Drilling – It is a process of making hole in the workpiece.
- b) Reaming – It is a process of enlarging a hole with high surface quality and within tolerance of 10 – 20 microns.
- c) CSK – It is a process of making a conical shape at the entrance of the hole.
- d) Boring- It is a process to enlarge a drill.

Section – C

04X06 = 24 Marks

15. What occupational safety should be considered during the work in the workshop (any ten)?

1. Eating and drinking in the mechanical workshop areas are strictly prohibited.
2. When working with machine tools or other equipment with rotating spindles, jewelry, loose clothing etc. are prohibited and long hair must be completely covered.
3. Personal Protective Equipment (PPE) is supplied and must be used where necessary. Barrier cream, lab coats/overalls, eye and hearing protection, dust masks and safety shoes must be used as the work/risk assessment dictates.
4. The gangway through the workshop must be kept clear. Any oil spillage, grease etc. must be cleaned up immediately.
5. Inform Trainer for Unsafe Conditions
6. Student affected by drugs or alcohol **should not be permitted** in the workshop
7. Make sure your work piece is fixed securely before work commences
8. Immediately notify the workshop trainer of any faulty or broken equipment
9. Wash hands after using equipment and materials
10. If an accident does happen, no matter how small, it must be reported to the trainer.

16. Explain the following terms with a neat and clean diagram:

- a) Cutting speed
- b) Revolution per minute(RPM)
- c) feed

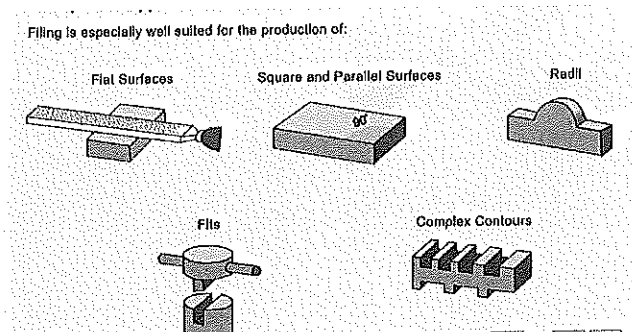
Ans.

- a) Cutting speed- minor diameter is called core diameter
- b) RPM- the linear distance between the peak point of two adjacent thread.
- c) Feed- Linear distance traveled by one revolution of thread

17. a) Write the application of filing
 b) Describe the difference between cut files and milled files

Ans.

- a) Application of filing



- b) Difference between the cut files and milled files

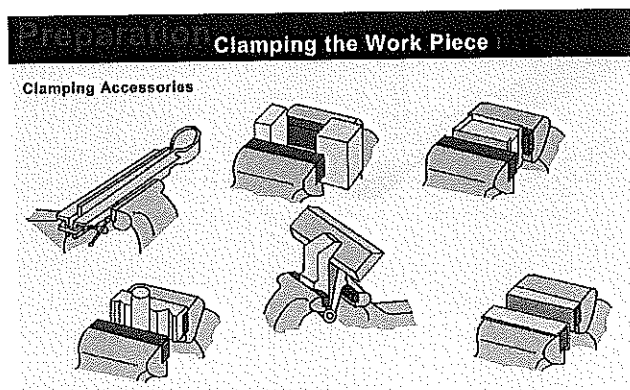
Cut file – cut files are made by chiseling notches into the file face. This results in a file with a negative rake angle and a scraping effect. Therefore, cut files are preferred for hard materials.

Milled file – milled files are made by milling the cutting edge into the file face. Files with milled teeth have a positive rake angle, and therefore cut better than cut files. Milled files are especially suited for use on soft material

18. Explain the accessories for the work piece clamping.

Ans.

- oversize jaw
- Equal width spacer
- Spacer
- File vice
- V-groove Jaw
- Soft jaws







School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

Course Code: SMS1103

Time: 2 Hour

Course Name: Conventional Milling

Max. Marks: 50

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 6 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Which position represent the X axis motion?
 - a) Lateral
 - b) Horizontal
 - c) Longitudinal
 - d) Vertical
2. The infeed of the milling cutter into the work piece is defined by _____ and _____ ?
 - a) Cutting plane & cutting tool
 - b) Cutting depth & cutting width
 - c) Both of the above
 - d) None of these
3. Which geometry allows an almost universal range for good cutting parameters?
 - a) Double positive geometry
 - b) Double negative geometry
 - c) Positive negative geometry
 - d) All of the above
4. Which type of the wear occurs due to loss of carbon?
 - a) Edge fractures
 - b) Edge build –up
 - c) Flank wear
 - d) Crater wear



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5. What is the range of feed per tooth for carbide cutters?
 - a) 0.050 – 0.500 mm
 - b) 0.060 - 0.120mm
 - c) 0.050 – 0.150mm
 - d) 0.100 – 0.250mm
6. What is another name for Up Milling...?
 - a) Conventional Milling
 - b) Climb Milling
7. Which of the milling process in which the shape of the milling tool determines the shape of the work piece?
 - a) Form milling
 - b) Profile milling
 - c) Circular milling
 - d) Surface milling
8. Which kind of tool holder is used for shell type milling cutters?
 - a) Reducing bushes
 - b) Weldon type tool holder
 - c) Collet type tool holder
 - d) Arbor type tool holder
9. Which of the tool is used for making internal radius?
 - a) T- slot cutter
 - b) Ball nose cutter
 - c) Dove tail cutter
 - d) Shell end mill cutter
10. Type 'H' milling cutters are used to cut materials:
 - a) Soft & stringy
 - b) Hard & tough
 - c) Both of the above
 - d) None of these

Section – B

04X04 = 16 Marks

11. Explain the following?
 - a) Type W, N & H milling cutters.
 - b) Why we maintain a slot or a pocket in the middle of the tolerance?
12. What is Milling? Explain different types of Milling. (According to the position of cutting edge in use)



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13. Match the following

COLUMN (A)	COLUMN (B)
(a) Do Not Wear jewelry or a wrist watch while working	(a) Because chips or cutting fluid could cause eye injuries
(b) use a counter brush or chip brush to clear away chips	(b) In order to avoid lacerations (cut injuries) on your hands
(c) Wear safety glasses during metal removal	(c) Otherwise, you could get caught in the milling spindle
(d) Treat hands and forearms with skin lotion	(d) Otherwise, you could get caught in the milling spindle
(e) Wear tight fitting clothes and a hair net	(e) To prevent skin irritation, throw contact with cutting fluid

14. Explain the different types of tool wear?

Section – C

04X06 = 24 Marks

15. Explain the following milling machine parts?

- a) Machine column and base
- b) Knee
- c) Main drive
- d) Feed device
- e) Vertical milling head

16. Explain any two types of milling machines?

- a) Plano milling machine
- b) Vertical milling machine
- c) Horizontal milling machine
- d) CNC milling machine
- e) Universal milling machine

17. Explain different types of milling processes?

18. Difference between face mill & shoulder mill?





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Registration No.:

School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

Course Code: SMS1103

Course Name: Conventional Milling

Time: 2 Hour

Max. Marks: 50

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 6 Questions. Each question carries 6 Marks.

Answer Key

Section – A

10X01 = 10 Marks

1. Which position represent the X axis motion?
c) Longitudinal
2. The infeed of the milling cutter into the work piece is defined by _____ and _____?
b) Cutting depth & cutting width
3. Which geometry allows an almost universal range for good cutting parameters?
c) Positive negative geometry
4. Which type of the wear occurs due to loss of carbon?
d) Crater wear
5. What is the range of feed per tooth for carbide cutters?
c) 0.050 – 0.150mm
6. What is another name for Up Milling...?
a) Conventional Milling
7. Which of the milling process in which the shape of the milling tool determines the shape of the work piece?
b) Profile milling
8. Which kind of tool holder is used for shell type milling cutters?
d) Arbor type tool holder
9. Which of the tool is used for making internal radius?
b) Ball nose cutter
10. Type 'H' milling cutters are used to cut materials:
b) Hard & tough



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Section – B

04X04 = 16 Marks

11. Explain the following?

Type W, N & H milling cutters.

Type W: -type W have a large rake angle and are used for soft, stringy or long chipping materials such as copper, aluminum or PVC. In this we tool have small no of teeth. Type W milling tools always have large tooth spacing. Depending on the diameter of the milling cutter, they have four to eight teeth.

Type N: -type N milling tools are suited for normal to strong materials such as non-refined steel or cast iron.in this tool has eight to twelve teeth & small rake angle approx. 12°.

Type H: -type H milling cutters are used to cut hard, tough but flexible or short chipping materials such as non-refined steel or copper- zinc alloys. Compared to type N milling cutters, the cutting edges have a small rake angle approx. 8°.

Why we maintain a slot or a pocket in the middle of the tolerance?

Ans. Due to thermal expansion material expands during the machine but after the machining metal again comes back to its original size that's why it is advisable to cut material in to the middle of the tolerance so that it would still remain with in tolerance when it shrinks after the machining.

12. What is Milling? Explain different types of Milling. (According to the position of cutting edge in use)

Ans. Milling is a material removal process in which tool is rotate & work piece remain stationary. In this we used multipoint cutting edges tool & they have geometrically define cutting edges.

Milling processes categorized according to the cutting edges in use:

Peripheral milling: -in this process, only the cutting edges on the periphery of the milling cutter (cylindrical milling cutter) are engaged. the milling cutter axis is parallel to the processing surface.

Face milling: -in this process, the minor cutting edges on the face of the milling cutter generate the work piece surface. The milling cutter axis is perpendicular to the processing surface.

Peripheral face milling: -in this process, the major cutting edges on the periphery and the minor cutting edges on the face of the milling cutter generate the work piece surface.



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13. Match the following

Ans.1. Do Not Wear jewelry or a wrist watch while working- Otherwise, you could get caught in the milling Spindle.

2. use a counter brush or chip brush to clear away chips- In order to avoid lacerations (cut injuries) on your Hands.

3. Wear safety glasses during metal removal- Because chips or cutting fluid could cause eye injuries.

4. Treat hands and forearms with skin lotion- To prevent skin irritation, throw contact with cutting fluid.

5. Wear tight fitting clothes and a hair net- Otherwise, you could get caught in the milling spindle.

14. Explain the different types of tool wear?

Ans. 1. flank wear: -flank wear is the most common type of wear on the cutting edges of the milling cutter .it is caused by the friction between the tool flank and the work piece.

2.crater wear: -crater wear occurs when the tool temperature is too high. Crater wear is the loss of carbon in the tool cutting edges as a result of overheating during the cutting process.

3.edge fracture: -if indexable cutter inserts of insufficient strength are used, edge fracture result from the impact stress that develops.

4.thermal cracks: -the expansion and contraction resulting from frequent changes temperature cause the cutting material to fatigue and give rise to thermal cracks in the cutting edges.

5.chips and splinters: -excessive cutting pressure, fluctuating temperature and insufficient cutter insert strength cause chipping and splintering.

6.edge build -up: -edge build -up forms on the cutting edge from the bonding of small pieces of material on the tool flank when the cutting speed is too low and the material is too strong.

Section – C

04X06 = 24 Marks

15. Explain the following milling machine parts?

Ans. 1. machine column and base: - it is made of cast iron. This material damps vibration. The machine column and base carries the important element such as the knee, main drive with spindle, feed device and the vertical milling head.

2.knee: - the knee is made up of the angle table and the machine table. The angle table is mounted on the machine column and can be adjusted vertically. The machine table is connected to the angle table.it can be adjusted longitudinally or transversely.

3.main drive: -the main drive consists of the electric motor, main gear unit and horizontal milling spindle. The horizontal milling head is driven by an electric motor via the main gear unit.

4.feed device: -mechanical feed can be performed in all directions (x, y, z, axis). modern milling machines are driven by infinitely adjustable feed motors via an electronic control.

5.vertical milling head: -the vertical milling head is driven by the main motor with gear unit, either via the horizontal milling spindle or by a separate drive shaft that is housed in the steady.



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16. Explain any two types of milling machines?

Ans. **Universal milling machine:** -Because universal milling machines have both a horizontal and vertical spindle, they can be employed as horizontal or vertical milling machines. Due to its versatile design which includes a pivoting or sliding milling head, a tilting, rotating and pivoting milling table, as well as other special equipment.

Plano milling machine: -Plano milling machine do not have a vertical adjustable table. The milling table only moves along the longitudinal axis. The milling head is used for cross feed and height adjustment. thus, Plano-milling machine are highly suited for large, long, high and heavy work pieces.

Horizontal milling machine:-on a horizontal milling machine, the milling spindle is positional horizontal. a steady with an adjustable support bearing enables the milling cutter to shift axially. It is used to mill longer work piece with uniform surface profiles.

Vertical milling machine:-on a vertical milling machine, in contrast to horizontal milling machines, the milling spindle is positioned vertically. The milling head pivots and the milling cutter can be adjusted vertically with in the milling head.

CNC milling machine: -CNC=computerized numerical control typically has a three-axis-continuous-path-control. Each axis is driven by its own feed drive through a direct sensing measuring path system. The axes have backlash-free ball-type liner drives. The auto-mated tool exchange requires a quick -release clamping fixture for steep-angle taper tools or hollow-shank taper tools with electro -hydraulic control.

17. Explain different types of milling processes?

- (a) surface milling
- (b) profile milling
- (c) hobbing
- (d) threading
- (e) form milling
- (f) circular milling

18. Difference between face mill & shoulder mill?

SHOULDER MILL- shoulder mill is used for generating a shoulder on workpiece. Shoulder mill inserts are inserted at an angle of 90

FACE MILL- Face mill is used for generating an angular surface. Face mill inserts are inserted at an angle of 45.



School of Manufacturing Skills
Session: 2019-20 (Summer Semester)
B. Voc. Program, I Semester,
End-Sem. Examination

Course Code: SMS1104
Course Name: Conventional Turning

Time: 2 Hour
Max. Marks: 50

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 6 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. ASB-45° Tool is Used for-
 - (A) Internal Grooving
 - (B) Boring Finish
 - (C) Boring Rough
 - (D) Internal Threading
2. Pitch is defined as-
 - (A) The distance between two consecutive threads
 - (B) The distance between major diameter to minor diameter
 - (C) The distance between major diameter to Pitch circle diameter
 - (D) The diagonal Distance between flank face to root
3. In lathe machine, the correct sequence for external thread
 - (A) Undercut, chamfer, turning & threading
 - (B) Chamfer, undercut, turning & threading
 - (C) Turning, undercut, chamfer & Threading
 - (D) Turning, chamfer, threading & Undercut
4. Why we make undercut in thread?
 - (A) Thread tool relaxation & Self-looking.
 - (B) To clean the face
 - (C) To reduce the diameter
 - (D) None of the above



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5. In lathe machine, tailstock is used for:
 - (A) Supporting long shaft
 - (B) Drilling
 - (C) Reaming
 - (D) All of the above
6. ECS-90° Tool is Used for :
 - (A) Internal Grooving
 - (B) Boring Finish
 - (C) Boring Rough
 - (D) Internal Threading
7. Why do we use coolant?
 - (A) To increase tool life
 - (B) To improve the surface finish of the work piece
 - (C) To reduce the surface temperature of the work piece
 - (D) All of the above
8. Which one is the correct answer?
 - (A) $V_c = \frac{\pi dn}{1000} \text{ cm/min}$
 - (B) $V_c = \frac{\pi dn}{1000} \text{ mm/min}$
 - (C) $V_c = \frac{\pi dn}{1000} \text{ m/min}$
 - (D) $V_c = \frac{\pi dn}{1000} \text{ m/sec.}$
9. Which thread is capable to bear heavy load in both direction?
 - (A) V – shaped Threads
 - (B) Acme Threads
 - (C) Knuckle Threads
 - (D) Buttress Threads
10. What is the use of rake angle in a tool?
 - (A) Chips removal
 - (B) Provide space between work piece and tool
 - (C) To give relief
 - (D) None of these



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Section – B

04X04 = 16 Marks

11. What are the factor which influence tool life?
12. Write difference between right hand tool and left hand tool? (with neat sketch)
13. Define:
 - Tool wedge angle
 - Clearance angle
 - Rake angle
14. A shaft of 60 mm diameter is to be plain turned. The lathe is turning at a speed of 120min⁻¹.
What is the cutting speed v_c in m/min?

Section – C

04X06 = 24 Marks

15. For thread M16X2, calculate: -
 - (a) Thread depth
 - (b) Required chamfer
 - (c) Minor diameter
16. Define Average roughness value (R_a) and Average maximum height of the profile (R_z).
Which value is greater for the same surface roughness?
17. Explain at least 6 components of lathe machine.
18. Why do we do centering of turning tools before machining? (with a neat sketch)





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B

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Answer Key

Section – A

10X01 = 10 Marks

1. ASB-45° Tool is Used for

(c) Boring Rough

Q2 Pitch is defined as

(A) The distance between two consecutive threads

Q3 In lathe machine, the correct sequence for external thread

(C)Turning, undercut, chamfer & Threading

Q4 Why we make undercut in thread?

(A) Thread tool relaxation & Self-looking.

Q5 In lathe machine, tailstock is used for

(D)All of the above

Q6 ECS-90° Tool is Used for :

(B)Boring Finish

Q7 Why do we use coolant?

(D)All of the above

Q8 Which one is the correct answer?

(C) $V_c = \frac{\pi dn}{1000} \text{ m/min}$

Q9 Which thread is capable to bear heavy load in both direction?

(B) Acme Threads

Q10 What is the use of rake angle in a tool?

(A) Chips removal

Section – B

04X04 = 16 Marks

Q11 What are the factor which influence tool life?

Ans.

Machine cutting imposes mechanical and thermal stress on the cutting edge. This alter its original properties and it becomes blunt.

tool life is influenced by:

The cutting condition (cutting speed, bit shape, cutting profile)

The tool itself (cutting material, grinding quality)

The workpiece (material and shape)

The coolant lubricant used

Q12 Write difference between right hand tool and left hand tool?

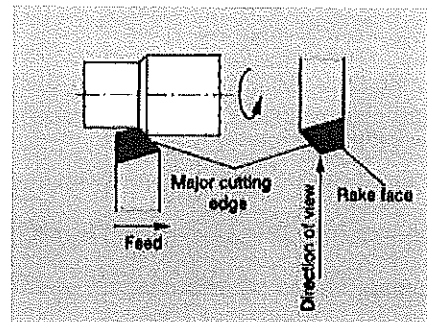
Ans

cutting tool are also characterized by the arrangement of their main cutting edge

Left hand tool

When the direction of tool feed is from left to right then a left hand cutting tool must be in used.

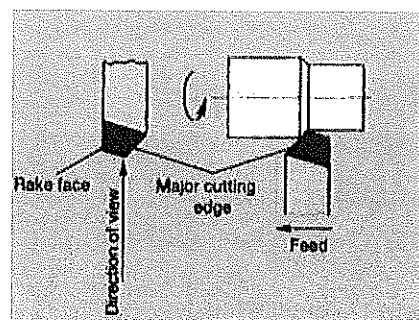
When viewed from the workpiece the major cutting edge lies on the left side of the cutting tool.



Right hand tool

With the right hand cutting tool the direction of feed is from right to left.

Looking at the cutting head of the lathe tool the main cutting edge is on the right hand side.





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Q13 Define:

- Tool wedge angle (beta)
This is the angle between the rake angle face and the flank face. A larger wedge angle is required when the material being cut is of high strength. When cutting softer materials, the wedge angle can be correspondingly smaller
- Clearance angle (alpha)
This is the angle between the surface of the workpiece and the flank of the cutting wedge. Clearance angle of 6 degrees to 8 degrees are effective for metal working purposes.
- Rake angle (gamma)
The rake angle has a major impact on chip formation. The rake angle lies between the horizontal line from the cutting surface and rack face

Q14 A shaft of 60 mm diameter is to be plain turned. The lathe is turning at a speed of 120 min^{-1} .

What is the cutting speed v_c in m/min?

Ans given: $d=60 \text{ mm}$

$$n=120 \text{ min}^{-1}$$

required: v_c

$$\text{Answer: } v_c = d \cdot \pi \cdot n$$

$$v_c = 60 \text{ mm} \times 3.14 \times 120 \text{ min}^{-1}$$

$$v_c = 0.60 \text{ m} \times 3.14 \times 120 \text{ min}^{-1}$$

$$v_c = 22.6 \text{ m/min}$$

Section – C

04X06 = 24 Marks

Q15. For thread M16X2, calculate: -

- (a) Thread depth
- (b) Required chamfer
- (c) Minor diameter

Ans. (a). Thread depth = $0.614 \times \text{pitch}$
= 0.614×2
= 1.228 mm (radially)
Thread depth (diametrically) = 2×1.228
= 2.456 mm



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$$\begin{aligned} \text{(b). Required Chamfer} &= \frac{\text{major dia.} - \text{minor dia.}}{2} + 0.5 \\ &= \frac{15.8 - 13.3}{2} + 0.5 \\ &= 2 \text{ mm (approx.)} \end{aligned}$$

$$\begin{aligned} \text{(c). Minor diameter} &= \text{major dia.} - \text{thread depth} \\ &= 15.8 - 2.5 \\ &= 13.3 \text{ mm} \end{aligned}$$

Q16. Define Average roughness value (R_a) and Average maximum height of the profile (R_z).

Which value is greater for the same surface roughness?

Ans.

R_a = Mean Peak to Valley Height

The Mean Peak to Valley Height (R_a) is the mean of all deviations in the roughness profile from the median line. It is given in Microns.

R_z = Averaged peak to valley Height

The Averaged peak to valley Height is mean figure obtained from five successive individual Sections. For this purpose, an assessment length (l_e) divided up into five equal measurement section. This distance between highest and lowest profile point is then measured for each section. This distance is referred to as the individual peak to valley height (Z). The formula for calculating the mean peak to valley height is as follow

$$R_z = 1/5 (Z_1 + Z_2 + Z_3 + Z_4 + Z_5)$$

For same surface roughness R_z value is greater.

Q17. Explain at least 6 components of lathe machine

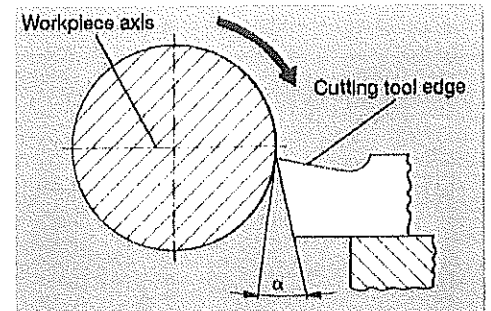
Ans.

- 1.) **Lathe bed** – The lathe bed is fixed to the lathe frame and made of grey cast iron which is extremely rigid and vibration free.
- 2.) **Head stock** – The headstock is used to transmit working energy to the workpiece.
- 3.) **Tailstock** – The tailstock serves as a steady for long workpiece and is also used for holding tools.
- 4.) **Saddle**- The longitudinal slide runs on the guide ways of the lathe bed. It can move by hand or through lead screw or feed shaft.
- 5.) **Cross Slide**- The cross slide is driven by threaded spindle. For transverse movement cross slide is required.
- 6.) **Compound Slide**- The adjustable top slide carries the tool post or tool rest. For precise movement we can use compound slide.

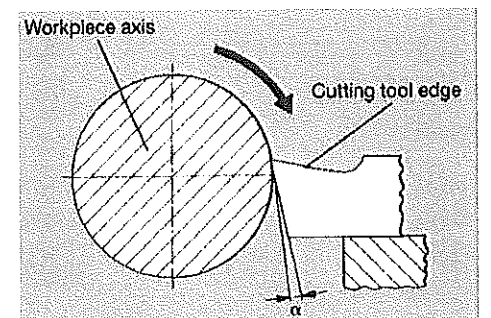
Q18. Why do we do centering of turning tools before machining? (with a neat sketch)

Ans.

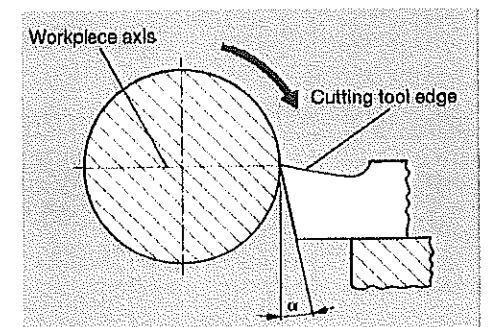
Positioning the tool below the midpoint of the workpiece increases the clearance angle and reduces the rake angle, the tool will catch and cause an uneven surface to be produced.



Positioning the tool above the midpoint of the work piece reduces the clearance angle and increases the rake angle, the lathe tool will dig in.



Optimum machining is only possible when the lathe tool is accurately aligned to the midpoint of the work piece, as the clearance and Rake angles are then in the correct relationship to the work piece.



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