



BHARTIYA SKILL DEVELOPMENT UNIVERSITY
SCHOOL OF MANUFACTURING SKILLS
1st SEMESTER, 3rd In-SEMESTER EXAMINATION
WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019, 2017-18

Course Code: SMS1001
Time (Minutes): 60

Course Name: Hand Skill
Maximum Marks: 20 Marks

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 5 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section-A

(05 x 01 = 05)

1. What is the use of 'cape chisel'?
 - a) To clean up weld seams
 - b) To chisel narrow flat keyways
 - c) To make cavities and slots
 - d) None of the above
2. What is the range of wedge angle for prick punch?
 - a) 10° - 40°
 - b) 20° - 50°
 - c) 30° - 60°
 - d) 40° - 70°
3. What is 'template'?
 - a) To scribe work piece with complex contour that are to be produced in large quantities
 - b) Used to gauge and transfer angles
 - c) To find the center of a cylindrical work piece
 - d) None of the above
4. In 'sawing' a minimum of how many teeth should be engaged with the work piece at all times?
 - a) 2
 - b) 3
 - c) 4
 - d) 5



5. What is the formula of tap depth for blind tap (diameter is d) if thickness of work piece is H ?
- a) $H + 0.5d + 1$
 - b) $H + 0.7d + 3$
 - c) $H + 0.3d + 0.7d + 3$
 - d) $H + 0.5d + 3$

Section- B

(03 x 02 = 06)

- 6. What happens if size of wedge angle is changed?
- 7. What is meant by negative rake angle?
- 8. When V-Block is used during scribing?

Section- C

(03 x 03 = 09)

- 9. Explain the use of Sliding T-Bevel with the help of a diagram.
- 10. Explain the working procedure of 'sawing', Make a sketch if needed.
- 11. In filing explain the cut configuration in sense of better chips evacuation with a sketch.



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5. Section C contains 03 Questions. Each question carries 3 Marks.

Section-A

(05 x 01 = 05)

1. What is the use of 'cape chisel'?
Ans. (b) To chisel narrow flat keyways
2. What is the range of wedge angle for prick punch?
Ans. (c) 30° - 60°
3. What is 'template'?
Ans. (a) To scribe work piece with complex contour that are to be produced in large quantities
4. In 'sawing' a minimum of how many teeth should be engaged with the work piece at all times?
Ans. (b) 3
5. What is the formula of tap depth for blind tap (diameter is d) if thickness of work piece is H?
Ans. (d) $H + 0.5d + 3$

Section- B

(03 x 02 = 06)

6. What happens if size of wedge angle is changed?
Ans. The size of wedge angle affects the cutting force of the metal removal process.
7. What is meant by negative rake angle?
Ans. If the sum of relief angle and wedge angle is more than 90° then the rake angle will be negative.
8. When V-Block is used during scribing?
Ans. During scribing V-Block is used for cylindrical work pieces.

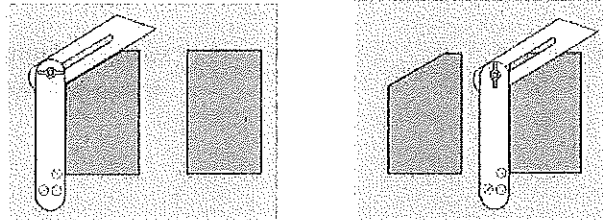
Section- C

(03 x 03 = 09)

9. Explain the use of Sliding T-Bevel with the help of a diagram.

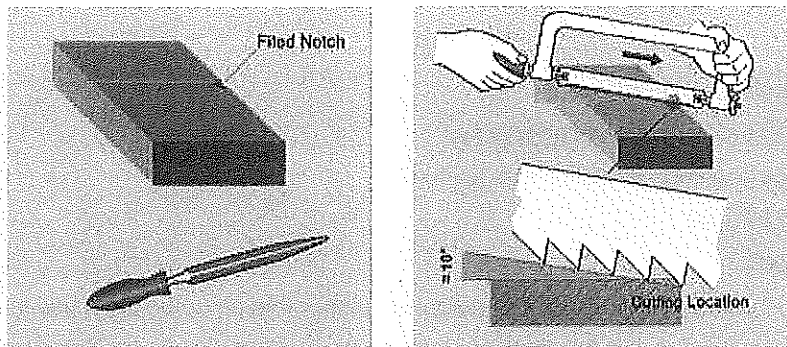
Ans. Sliding T-Bevel is used to gauge and transfer angles, procedure is given below –

First, loosen the clamp screw then the beams are placed over the angle to be copied. Now the clamp screw is tightened. Finally, the sliding T-Bevel is placed on the work piece and the line is scribed.



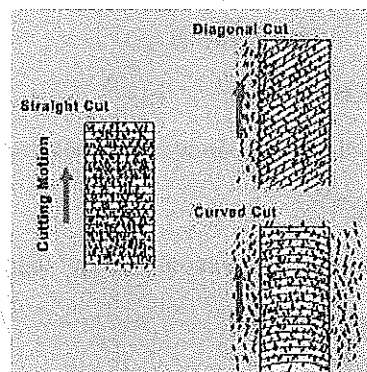
10. Explain the working procedure of 'sawing', Make a sketch if needed.

Ans. File a notch directly next to the scribed line with a triangular file to guide the saw blade. The saw cut is started at the back edge of the work piece. In so doing, the saw is inclined slightly about 10°. Pressure is applied in forward stroke and released in backward stroke, Use the entire length of the saw blade. In addition, make sure that the scribed line remains visible.



11. In filing explain the cut configuration in sense of better chips evacuation with a sketch.

Ans. The form of the cut and its orientation to the filing direction greatly influence the evacuation of chips from the chip gullets. A straight cut, perpendicular to the longitudinal axis lead to build-up of chips in the chip gullets and reduces the file's cutting action. A diagonal or curved cut allows for better evacuation of the chips.





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1st SEMESTER, 3rd In-SEMESTER EXAMINATION
WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019

Course Code: SMS1002
Time (Minutes): 60

Course Name: Conv. Milling
Maximum Marks: 20 Marks

Instructions:

1. Attempt all questions.
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4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section-A

(1x5=5 Marks)

1. What is the Normal Clearance angle in Tool?
 - a) 8 -10°
 - b) 6-8°
 - c) 4-6
 - d) 5-7°
2. Wedge angle is the angle between _____ and _____.
 - a) Tool flank & face
 - b) Face & finish surface
3. For lower cutting forces, the axial rake angle as well as the radial rake angle are _____.
 - a) Positive
 - b) Negative
4. Which tool holder is used for clamping edge finder?
 - a) Collet type tool holder
 - b) Reducing bushes
 - c) Weldon type tool holder
 - d) Arbor type tool holder



5. What is the range for V_c on mild steel work piece with HSS cutter?
- a) 25-30
 - b) 400-500
 - c) 100-120
 - d) 80-100

Section- B

(3x2=6 Marks)

6. Write any 5 Milling Processes.
7. Describe the Steps to calculate R.P.M for $\varnothing 63$ Face mill with $V_c = 400$ and also calculate its Feed Rate with feed per tooth 0.1.
8. Define the following formula Parameter?

$$V_c = d \times \pi \times N$$

Where $V_c =$ _____

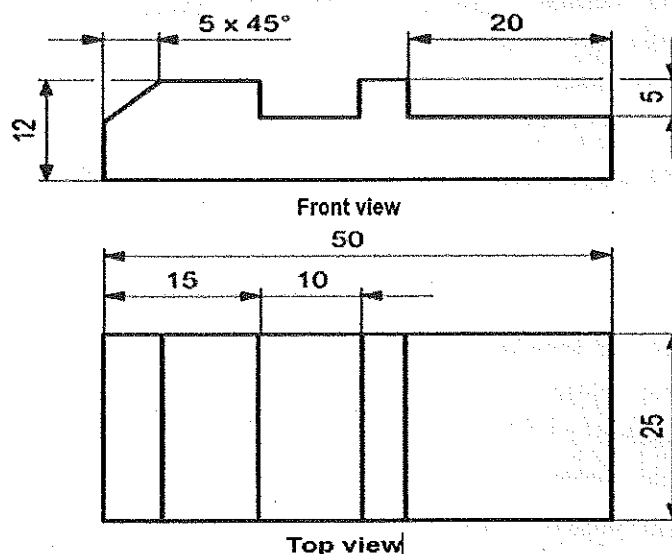
$D =$ _____

$N =$ _____

Section- C

(3x3=9 Marks)

9. Explain the following terms:
- a) Cutting speed
 - b) Feed rate
10. Name the types of Tool Holders with their applications.
11. Describe the steps for preparing work plan for the following Drawing:





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Course Code: SMS1002
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Course Name: Conv. Milling
Maximum Marks: 20 Marks

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3. Section A contains 5 Questions. Each question carries 1 Marks.
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5. Section C contains 03 Questions. Each question carries 3 Marks.

Section-A

(1x5=5 marks)

1. What is the Normal Clearance angle in Tool? 1 mark
Ans.(b) 6° to 8°
2. Wedge angle is the angle between _____ and _____. 1 mark
Ans.(a) Tool flank and the face.
3. For lower cutting forces, the axial rake angle as well as the radial rake angle are _____. 1 mark
Ans. (a) Positive
4. Which tool holder is used for clamping edge finder? 1 mark
Ans. (a) collet type tool holder
5. What is the range for V_c on Mild Steel Work piece with HSS cutters? 1 mark
Ans.(a) 25-30

Section- B

(2x3=6 marks)

6. Write any 5 Milling Processes. 2 marks
Ans. 1. Surface milling 2. circular milling
 3. Thread milling 4. Form milling
 5. profile milling 6. Hobbing



7. Describe the Steps to calculate R.P.M for $\varnothing 63$ Face mill with $V_c = 400$ and also calculate its Feed Rate with feed per tooth 0.1? 2 marks

Ans. We know that

$$\text{For R.P.M. } V_c = \pi \times D \times N / 1000 \text{ m/min}$$

$$400 = 3.14 \times 63 \times n / 1000 \text{ m/min}$$

$$N = 1000 \times 400 / 3.14 \times 63 \text{ m/min}$$

$$N = 2022 \text{ min}^{-1}$$

For feed rate $V_f = F_z \times z \times N$

$$V_f = 0.1 \times 6 \times 2022$$

$$V_f = 1213 \text{ mm/min}$$

8. Define the following formula Parameter? 2 marks

$$V_c = d \times \pi \times N$$

Ans. Where $V_c =$ cutting speed in m/min

$D =$ diameter of milling cutter in mm

$N =$ rotational speed in revolution in (min^{-1})

Section- C

(3x3=9 marks)

9. Explain the following terms: 3 marks

- a) Cutting speed: -Cutting speed is defined as the speed at which the work moves with respect to the tool.

It is calculated by this formula

$$V_c = d \times \pi \times N / 1000 \text{ m/min}$$

Where $V_c =$ cutting speed in m/min

$D =$ diameter of milling cutter in mm

$N =$ rotational speed in revolution in (min^{-1})

- b) Feed rate: - it is defined as the distance the tool travels during one revolution of the part.

It is calculated by this formula

$$V_f = F_z \times z \times N$$

Where $V_f =$ feed rate

$F_z =$ feed per tooth

$Z =$ no of teeth in cutter

$N =$ R.P.M.



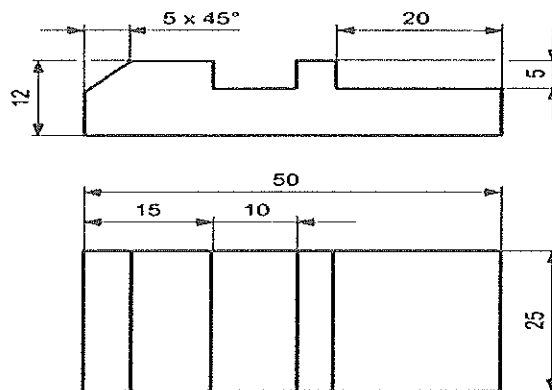
10. Name the types of Tool Holders with their applications.

3 marks

- Ans. 1. collet type tool holder: - used for finishing tool & edge finder.
 2. Weldon type tool holder: -used for roughing tool.
 3. reducing bushes: -used for Morse taper shank tool.
 4. arbor type tool holder: - used for tools which have no shank.

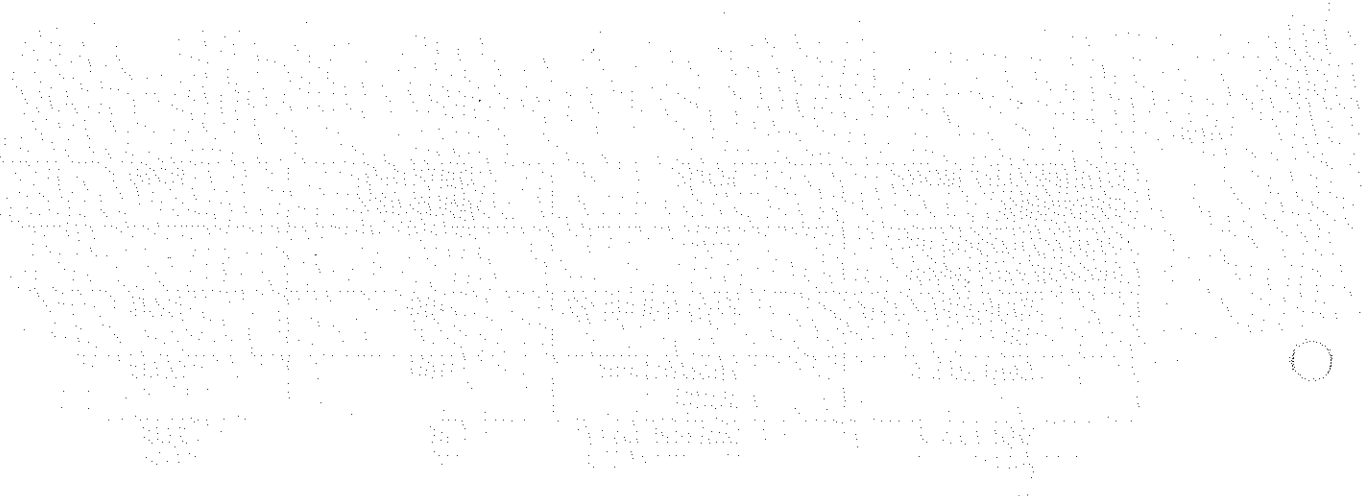
11. Describe the steps for preparing work plan for the following Drawing.

3 marks



Ans.

OPERATION WORK PROCESS	TOOL	CUTTING VELOCITY	RPM
Drawing reading and material verification	-----		
Sizing 50 x 25 x 12	Face mill dia 63	400	2000
Step 20 x 5	Shoulder mill dia 63	400	2000
Slot 10 x 5	Slot drill dia 10	80	2200
Chamfer 5 x 45°	Face mill dia 63	400	2000





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Course Code: SMS1001

Time (Minutes): 180

Course Name: Hand Skill

Maximum Marks: 100 Marks

Instructions:

1. Attempt all questions.
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3. Section A contains 20 Questions. Each question carries 1 Mark.
4. Section B contains 06 Questions. Each question carries 5 Marks. (In total 8 questions Attempt only 6)
5. Section C contains 05 Questions. Each question carries 10 Marks.

Section-A

(20 x 01 = 20)

1. Which type of chisel is used in making cavities and slots?
 - a) Flat chisel
 - b) Cape chisel
 - c) Web chisel
 - d) Round nose chisel
2. In 'straight cut' and 'curved cut' configuration, which one has better chip evacuation?
 - a) Both straight cut and curved cut
 - b) Curved cut
 - c) Straight cut
 - d) None of the above
3. Two tools having different wedge angles (material is same), when the same force is applied for the same work piece material which one penetrates deeper?
 - a) The tool with smaller wedge angle
 - b) The tool with larger wedge angle
 - c) Both will penetrate same
 - d) None of the above
4. What would be the 'tap depth' formula for 'throughout tap' if work piece thickness is H and tap dia is d?
 - a) $H + 0.3d + 3$
 - b) $H + 0.5d + 3$
 - c) $H + 0.7d + 3$
 - d) $H + 0.3d + 0.7d + 3$



5. What is counter sinking?
 - a) On a drill conical shape is formed
 - b) Drill diameter is increased
 - c) Drill diameter is decreased
 - d) None of the above
6. If the hardness of a work piece increases, the wedge angle of a cutting tool will also increase:
 - a) True
 - b) False
7. During filing what distance should be there between elbow and upper edge of vise?
 - a) 5 – 10 mm
 - b) 10 – 20 mm
 - c) 10 – 20 cm
 - d) 5 – 10cm
8. To check parallelism of a work piece which measuring instrument is used?
 - a) Knife edge ruler
 - b) Try square
 - c) Vernier caliper
 - d) None of the above
9. Which one is not correct for lay out punch mark?
 - a) Start point for drill
 - b) Check marks for scribed lines
 - c) Locating points for scribing tool
 - d) A tool uses for scribing
10. What would be the procedure for reaming process?
 - a) Drill – core drill – reamer
 - b) Spot drill – drill – csk – reamer
 - c) Spot drill – drill – csk – core drill – reamer
 - d) None of the above
11. Which one is not the application of filing?
 - a) Hole
 - b) Flat surface
 - c) Radii
 - d) fits
12. What is the use of flat chisel?
 - a) To make narrow flat keyways
 - b) To make cavities and slots
 - c) To make lubricating grooves
 - d) To clean up weld seams



13. In 'sawing' a minimum of how many teeth should be engaged with the work piece at all times?
- a) 1
 - b) 2
 - c) 3
 - d) 4
14. Over size soft jaws are used for:
- a) To prevent the work piece from deformation
 - b) To clamp the round work piece
 - c) To reduce vibration of thin work piece
 - d) None of the above
15. Which holder is used for edge finder?
- a) Drill chuck holder
 - b) Collet chuck holder
 - c) Sleeve type holder
 - d) None of the above
16. What would be the CSK value for M6 (tap)?
- a) 0.5 mm
 - b) 0.8 mm
 - c) 1.0 mm
 - d) 1.3 mm
17. Circular saw is a power saw:
- a) True
 - b) False
18. A notch should be done before sawing because:
- a) To guide the saw blade
 - b) To make better finish
 - c) To give more allowance
 - d) None of the above
19. Which one is not the applications of divider:
- a) Circle
 - b) Radii
 - c) Hole spacing
 - d) To scribe complex contour
20. By which one of the following instruments we can find the center of a cylindrical work piece?
- a) Sliding T bevel
 - b) Center head
 - c) Divider
 - d) Template



Section- B (Attempt Any 6 questions)

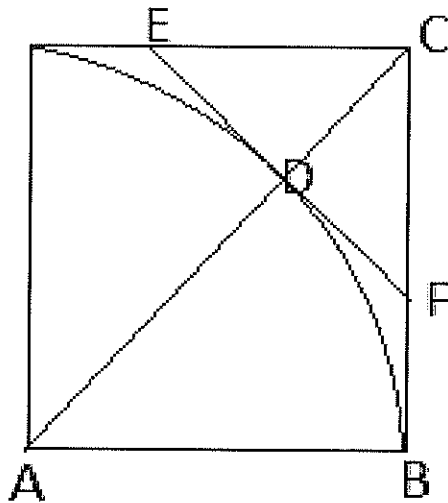
(06 x 05 = 30)

21. Why wedge angle should always be as small as possible but as large as necessary?
22. How the following get influenced during metal removal process:
 - a) Wedge angle
 - b) Relief angle
 - c) Rake angle
23. What occupational safety should be considered during 'sawing'?
24. Write the formula of cutting speed. Define its nomenclature with its unit.
25. Explain the chip formation process with a sketch.
26. What is reference plane/line? Explain it with a sketch.
27. Write down the types of saw cut with figures.
28. Draw bench vise and label its parts.

Section- C

(05 x 10 =50)

29. What is penetration? On which factors it depend, explain each factor?
30. Derive the formulae of chamfer ($CF = CE$) for radius 'R', where $AB = BC = AD = R$ for radius R.



31. In filing, explain cut configuration in sense of better chips evacuation with a sketch.
32. What is a chisel? Explain its types with applications.
33. What is reaming? Explain its process step by step. What is its tolerance range? What are its applications, give an example?



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5. Section C contains 05 Questions. Each question carries 10 Marks.

Section-A

(20 x 01 = 20)

1. Which type of chisel is used in making cavities and slots?
Ans. (c) Web chisel
2. In 'straight cut' and 'curved cut' configuration, which one has better chip evacuation?
Ans. (b) Curved cut
3. Two tools having different wedge angles (material is same), when the same force is applied for the same work piece material which one penetrates deeper?
Ans. (a) The tool with smaller wedge angle
4. What would be the 'tap depth' formula for 'throughout tap' if work piece thickness is H and tap dia is d?
Ans. (d) $H + 0.3d + 0.7d + 3$
5. What is counter sinking?
Ans. (a) On a drill conical shape is formed
6. If the hardness of a work piece increases, the wedge angle of a cutting tool will also increase:
Ans. (a) True
7. During filing what distance should be there between elbow and upper edge of vise?
Ans. (d) 5 – 10cm



8. To check parallelism of a work piece which measuring instrument is used?
Ans. (c) Vernier caliper
9. Which one is not correct for lay out punch mark?
Ans. (d) A tool uses for scribing
10. What would be the procedure for reaming process?
Ans. (c) Spot drill – drill – csk – core drill – reamer
11. Which one is not the application of filing?
Ans. (a) Hole
12. What is the use of flat chisel?
Ans. (d) To clean up weld seams
13. In 'sawing' a minimum of how many teeth should be engaged with the work piece at all times?
Ans. (c) 3
14. Over size soft jaws are used for:
Ans. (c) To reduce vibration of thin work piece
15. Which holder is used for edge finder?
Ans. (b) Collet chuck holder
16. What would be the CSK value for M6 (tap)?
Ans. (b) 0.8 mm
17. Circular saw is a power saw:
Ans. (a) True
18. A notch should be done before sawing because:
Ans. (a) To guide the saw blade
19. Which one is not the applications of divider:
Ans. (d) To scribe complex contour
20. By which one of the following instruments we can find the center of a cylindrical work piece?
Ans. (b) Center head

Section- B (Attempt Any 6 questions)

(06 x 05 = 30)

21. Why wedge angle should always be as small as possible but as large as necessary?
Ans. Because, If tool's wedge angle is very less so it can penetrate deeper more easily but the chances of breaking the tool is also more so for a particular type of material there should always be a required wedge angle so that it can not break during penetration.
22. How the following get influenced during metal removal process:
Ans.
- a) Wedge angle – The size of wedge angle affects the cutting force of the metal removal process.
 - b) Relief angle – The size of relief angle influences the friction between the relief surface of the cutting wedge and the resulting surface of the work piece.



- c) Rake angle – The rake angle influences the chip formation and the cutting force of the metal removal process.

23. What occupational safety should be considered during 'sawing'?

Ans. Occupational safety during sawing –

- Clamp the work piece firmly in the vise.
- Prevent the saw from slipping off the work piece by filing a notch.
- Shortly before separation of the work piece, reduce the cutting pressure.
- Don't remove saw chips with fingers.
- Deburr the work piece after sawing.

24. Write the formula of cutting speed. Define its nomenclature with its unit.

Ans. The formula of cutting speed is –

$$V_c = \pi DN / 1000,$$

Where, V_c = cutting speed in m/min

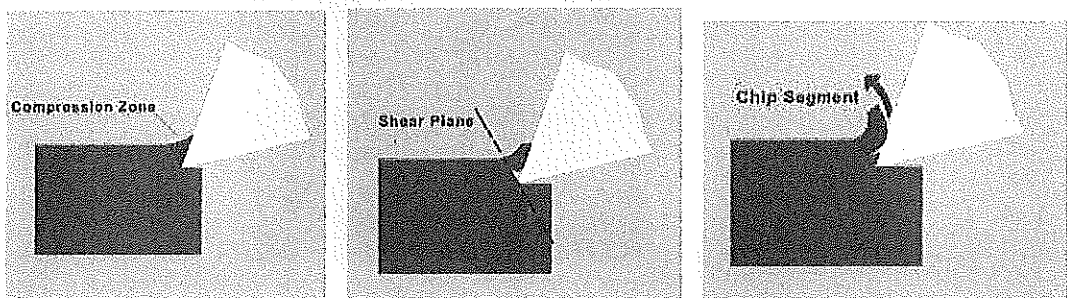
D = diameter of tool/work piece in mm

N = RPM

25. Explain the chip formation process with a sketch.

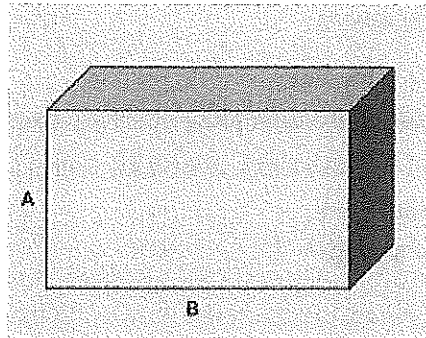
Ans. Chips formation process can be divided into mainly three phases:

- Compression – when tool come in contact with the raw material then the material is started compressing and it compresses at a certain limit.
- Shearing – when chips want to shift from its position due to tool load then a friction force starts working and so that there are two forces and these forces are in opposite direction and parallel, this process is shearing.
- Sliding – in this process chip just slides through the rake angle of the tool.



26. What is reference plane/line? Explain it with a sketch.

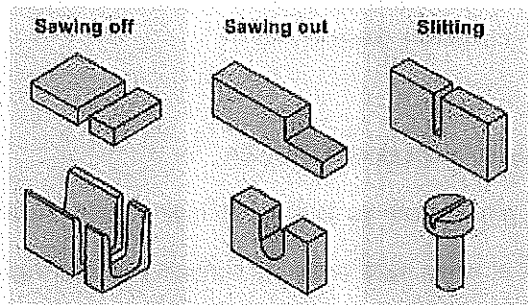
Ans. Reference plane/line works as a origin, means when any plane/line is considered as reference then that plane/line becomes zero for the measuring process.



In this sketch the red color lines works as reference lines and all the value will be measured from this red lines.

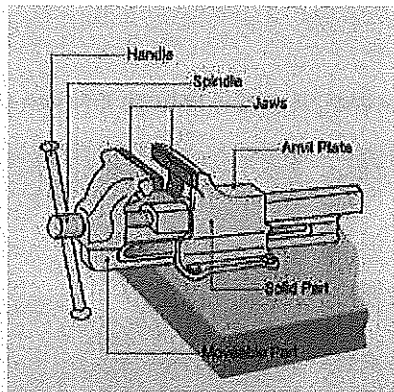
27. Write down the types of saw cut with figures.

Ans. There are three types of saw cuts –



28. Draw bench vise and label its parts.

Ans.



Section- C

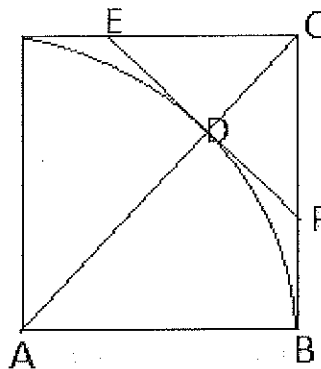
(05 x 10 =50)

29. What is penetration? On which factors it depend, explain each factor?

Ans. Entering a wedge shaped tool into the work piece surface is called penetration. It depends on four factor-

- a) Wedge angle – the smaller the wedge angle, the deeper the wedge will penetrate.
- b) Force – the greater the force applied to the wedge, the deeper it will penetrate into the work piece.
- c) Work piece material – the softer the work piece material, the deeper the wedge will penetrate.
- d) Tool material – the wedge will only penetrate when it is harder than the work piece material.

30. Derive the formulae of chamfer (CF = CE) for radius 'R', where AB = BC = AD = R for radius R.



Ans.

In triangle ABC –

$$AB^2 + BC^2 = AC^2$$

$$AC = \sqrt{(AB^2 + BC^2)} = \sqrt{(R^2 + R^2)} = \sqrt{2R^2} = R\sqrt{2} = 1.414R$$

$$\text{Since, } AC = AD + DC ; \quad DC = AC - AD = 1.414R - R = 0.414R$$

In triangle CDF –

Since DC and DF are equal,

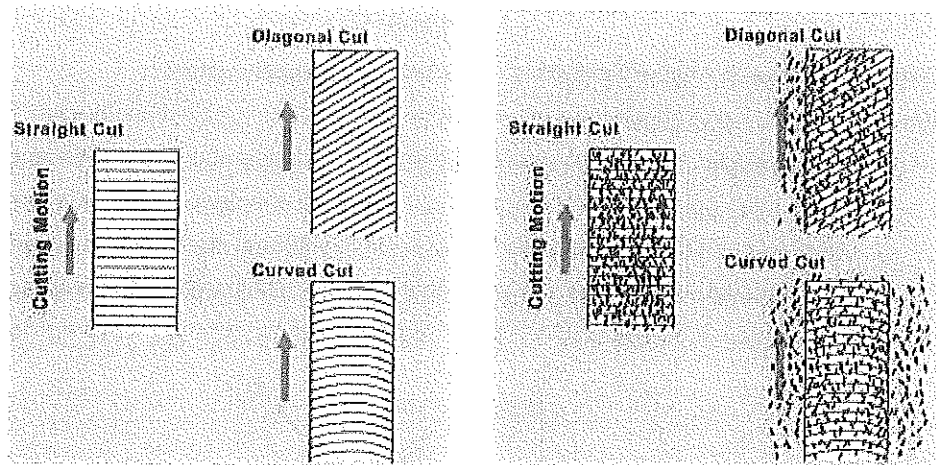
$$\text{Hence, } CF^2 = DC^2 + DF^2 = 0.414R^2 + 0.414R^2$$

$$CF = \sqrt{(0.414R^2 + 0.414R^2)} = 0.414R\sqrt{2} = 0.414R \times 1.414$$

$$CF = 0.58R$$

31. In filing, explain cut configuration in sense of better chips evacuation with a sketch.

Ans. The form of the cut and its orientation to the filing direction greatly influence the evacuation of chips from the chip gullets. A straight cut, perpendicular to the longitudinal axis, leads to a build-up of chips in the chip gullets, and reduces the file's cutting action. A diagonal or curved cut allows for better evacuation of the chips.

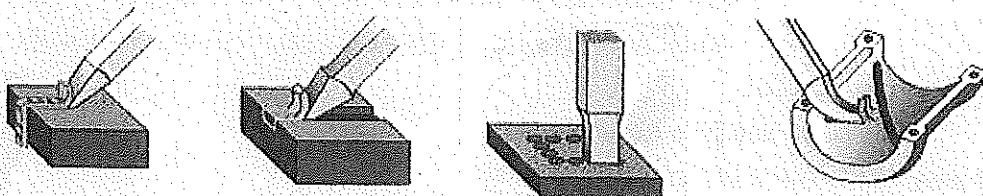


32. What is a chisel? Explain its types with applications.

Ans. Chisel is the simplest form of the metal removal tools. Cold chisels are manufactured out of tool steel. In addition, the chisel's cutting wedge is hardened.

Types of chisel –

- Flat chisel – the flat chisel is used to work on flat surfaces and to clean up weld seams.
- Cape chisel – the cape chisel is used mainly to chisel narrow, flat keyways.
- Web chisel – it is used in making cavities and slots.
- Round nose chisel – it is used to make lubricating grooves.



33. What is reaming? Explain its process step by step. What is its tolerance range? What are its applications, give an example?

Ans. It is a process to enlarge a hole with high surface quality and in tolerance range of 10 – 20 microns.

Process:

Spot drill – it guides the drill.

Drill – by this process a hole is created onto the work piece, its tolerance range is 100 – 200 microns.

CSK – by this process a chamfer is done on that hole.

Core drill – this tool cleans the drilled hole surface and enlarge the hole diameter near to reamer dimension.

Reamer – this tool makes the hole surface very smooth and in tolerance range of 10 – 20 microns.

Its application is mainly for the assembly of two parts with press fit. Exp – Dowell pin is used to assemble the two parts in lever press drawing.



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SCHOOL OF MANUFACTURING SKILLS
1st SEMESTER, END-SEMESTER EXAMINATION
WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019

Course Code: SMS1002
Time (Minutes): 90

Course Name: Conv. Milling
Maximum Marks: 50 Marks

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 04 Questions. Each question carries 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

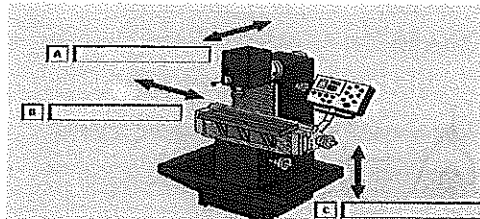
Section-A

(01x10= 10 Marks)

1. What is another name for Up Milling...?
 - a) Conventional Milling
 - b) Climb Milling
2. During Rough Milling, high Cutting Forces arise. Here axial and radial angle must be:
 - a) Positive
 - b) Negative
3. Type 'H' milling cutters are used to cut materials:
 - a) Soft & stringy
 - b) Hard & tough
4. Which tool holder is used for tools having no shank?
 - a) Collet type tool holder
 - b) Reducing bushes
 - c) Weldon type tool holder
 - d) Arbor type tool holder



5. Which type of wear is caused due to fluctuations in temperature?
- a) Edge fractures
 - b) Thermal cracks
 - c) Edge build -up
 - d) Chips & splinters
6. What are the types of Milling Process used for position of the cutting edge in use?
- a) Up milling
 - b) External milling
 - c) Internal milling
 - d) Face milling
 - e) Peripheral Milling
 - f) Down milling
 - g) End milling
7. What is coolant concentration range for milling?
- a) 8-10%
 - b) 12-15%
 - c) 5-7%
 - d) 18-20%
8. Rake angle is the angle which is useful for _____
- a) Cutting the work piece
 - b) Coolant flow
 - c) Chip removal
 - d) Surface finish
9. Identify the Feed Axis in the given figure:
- a) Transverse
 - b) Longitudinal
 - c) Vertical
 - d) Horizontal





10. Wedge angle is the angle between _____ and _____.

- a) Tool flank & face
- b) Face & finish surface

Section- B

(4x5=20 Marks)

11. Define the following formula Parameter?

$$V_f = f_z \times z \times n$$

Where $V_f =$ _____

$F_z =$ _____

$Z =$ _____

$N =$ _____

12. Fill in the blanks:

- a) Small
- b) Large

	Classification W	Classification H
Number of Teeth	<input type="text"/>	<input type="text"/>
Chip Space	<input type="text"/>	<input type="text"/>
Helix Angle	<input type="text"/>	<input type="text"/>

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. What is Milling? Explain different types of Milling.

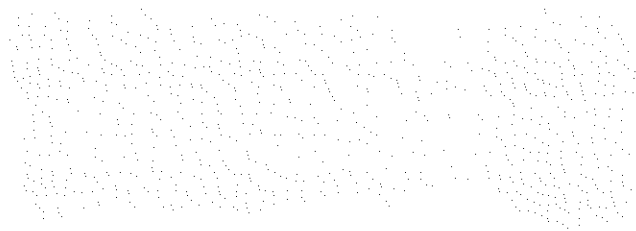
Section- C

(10x2=20 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 five types of tool wears?





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SESSION 2018-2019

Course Code: SMS1002

Time (Minutes): 90

Course Name: Conv. Milling

Maximum Marks: 50 Marks

Instructions:

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 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

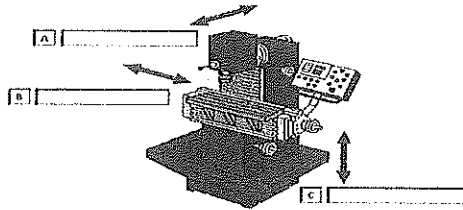
(1x10=10 marks)

1. What is another name for Up Milling...? 1 mark
Ans. (a) Conventional milling
2. During Rough Milling, high Cutting Forces arise. Here axial and radial angle must be: 1 mark
Ans.(a) Positive
3. Type 'H' milling cutters are used to cut materials: 1 mark
Ans. (b) Hard & tough
4. Which tool holder we use for tools having no shank? 1 mark
Ans.(d) Arbor type tool holder
5. The type of wear which is caused due to fluctuations in temperature? 1 mark
Ans.(b) Thermal cracks & (d) Chips & splinters
6. What are the types of Milling Process used for position of the cutting edge in use? 1 mark
Ans.(d) face milling
(e) peripheral milling
(g) end milling
7. What is coolant concentration range for milling? 1 mark
Ans. (a) 8-10%



8. Rake angle is the angle which is useful for _____ 1 mark
 Ans. (c) chip removal

9. Identify the Feed Axis in the given figure: 1 mark
 Ans. Y= Transverse
 X= Longitudinal
 Z=Vertical



10. Wedge angle is the angle between _____ and _____ 1 mark
 Ans.(a) tool flank and face

Section- B

(5x4=20 marks)

11. Define the following formula Parameter? 5 marks
 $V_f = f_z \times z \times n$

Ans. Where V_f = feed rate

F_z = feed per tooth

Z = no of teeth in cutter

N = R.P.M.

12. Fill in the blanks 5 marks
 Ans.

	Classification W	Classification H
Number of teeth	small	Large
Chip space	Large	Small
Helix angle	Large	Small

13. Match the following 5 marks

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. What is Milling? Explain different types of Milling.

5 marks

Ans. Milling is a material removal process in which we use geometrically define cutting edges. It advances in X, Y & Z directions with good precision

Types of milling

Conventional milling: - in this process the feed motion runs contrary to the cutting motion of the milling cutter. The cutting edges slides over the work piece surface and cut into the material at the interface with high pressure .it is also known as **up milling**.

Down milling: - in this process the work piece feed motion operates in the same direction as the cutting motion of the milling cutters. the cutting edge cut abruptly into the surface of the work piece and make the largest cut right at the beginning. it is also known as climb milling

Section- C

(10x2=20 marks)

15. Explain the following milling machine parts.

10 marks

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.

16. Explain any five type of tool wear?

10 marks

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 workpiece.

2.crater wear: -crater wear occurs hen 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.





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1st SEMESTER, END-SEMESTER EXAMINATION
WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019

Course Code: SMS1003
Time (Minutes): 90

Course Name: Assembly
Maximum Marks: 50Marks

Instructions:

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 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

1. When there is heavy thrust load, we use-
 - a) Ball Bearing
 - b) Roller Bearing
 - c) Self-Aligning Bearing
 - d) Roller Thrust Bearing
2. When correctly tensioned, these belts have no slippage-
 - a) Round belt
 - b) Flat belt
 - c) Timing belt
 - d) V-belt
3. Oil that solidify and becomes fat at low temperature is-
 - a) Vegetable oil
 - b) Crude oil
 - c) Mineral oil
 - d) Kerosene oil
4. Thin annular shaped metal disk is called-
 - a) Nut
 - b) Washer
 - c) Stud
 - d) Bolt



5. When there is no place to accommodate nuts, we use-
 - a) Bolt
 - b) Stud
 - c) Cap screws
 - d) Washer
6. Non-metallic gaskets are made up of _____, _____, _____ or _____.
7. When there is some misalignment between axis of shaft and housing, we use-
 - a) Ball bearing
 - b) Roller bearing
 - c) Self-aligning bearing
 - d) Deep groove ball bearing
8. Teeth are parallel to axis in-
 - a) Helical gear
 - b) Spur gear
 - c) Bevel gear
 - d) Herringbone gear
9. Example of semisolid lubricant is-
 - a) Mineral oil
 - b) Grease
 - c) Graphite
 - d) Vegetable oil
10. Examples of animal oil are _____ and _____.

Section- B (Attempt Any 6 questions)

11. Define Temporary and Permanent joints with example.
12. Explain any five advantages of flat belts over v-belts.
13. Explain any four conditions for using studs. Give one Example.
14. What is bearing. Explain three functions of bearing.

Section- C

15. What is Gear? Explain any four types of Gears.
16. Describe any five types of keys with diagrams.



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WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019

Course Code: SMS1003
Time (Minutes): 90

Course Name: Assembly
Maximum Marks: 50Marks

Answer Key

Section-A

(1X10 = 10 Marks)

1. When there is heavy thrust load, we use- *Max. Marks = 01*
d) Roller Thrust Bearing
2. When correctly tensioned, these belts have no slippage- *Max. Marks = 01*
c) Timing belt
3. Oil that solidify and becomes fat at low temperature is- *Max. Marks = 01*
a) Vegetable oil
4. Thin annular shaped metal disk is called- *Max. Marks = 01*
b) Washer
5. When there is no place to accommodate nuts, we use- *Max. Marks = 01*
c) Cap screws
6. Lock nut is also known as: *Max. Marks = 01*
b) Jam nut
7. When there is some misalignment between axis of shaft and housing, we use- *Max. Marks = 01*
c) Self-aligning bearing
8. Teeth are parallel to axis in- *Max. Marks = 01*
b) Spur gear
9. Example of semisolid lubricant is- *Max. Marks = 01*
b) Grease
10. Flat belts are used in: *Max. Marks = 01*
b) Belt conveyor



Section- B

(5X4 = 20 Marks)

11. Define Temporary and Permanent joints with example.

Max. Marks = (2X2) + (0.5x2) = 05

Ans. Temporary Joints

- a) The joints which can be assembled and dismantled whenever required.
- b) The joints that can be removed or dismantled without damaging the joining components.
- c) Examples are like joining with fasteners like bolt, screw, nut, studs, etc.

Permanent joints

- a) The joints which can be assembled and cannot easily dismantled whenever required.
- b) The joints that cannot be removed or dismantled without damaging the joining components.
- c) Examples are like joining with welding, soldering, riveting, etc.

12. Explain any five advantages of flat belts over v-belts.

Max. Marks = 1X5 = 05

Ans.

- Relatively cheap.
- More efficient.
- Can be used in dusty and abrasive environment.
- Design is simple and inexpensive.
- Require little maintenance
- These can be used for longer distances, up to 15m.

13. Explain any four conditions for using studs. Give one Example.

Max. Marks = (1X4) + 1 = 05

Ans. Stud joints are used under following condition:

- One of the parts is thick enough to accommodate a threaded hole.
- The material of the part with threaded hole has sufficient strength to ensure durable threads.
- The material of other part, without tapped hole, cannot ensure sufficient durability of the threads, e.g. light alloy or cast iron.
- The parts that are connected require frequent dismantling and reassembly.
- Studs are particularly used for connecting cylinder with cylinder head.



14. What is bearing. Explain three functions of bearing.

Max. Marks = (2X1) + (1x3) = 05

Ans. Mechanical element that allows relative motion between two parts such as shaft and housing with minimum friction.

➤ **Functions:**

- a. One in the definition.
- b. Supports shaft or axle and holds it in correct position.
- c. Support the load.
 - 1) Radial Load
 - 2) Axial Load
 - 3) Angular Load

Section- C

(10X2 =20 Marks)

15. What is Gear? Explain any four types of Gears.

Max. Marks = (2X1) + (2X4) = 10

Ans. Gears are toothed wheels which transmit power and motion by successive engagement of teeth. They are generally used when the distance between the shafts is less.

Spur Gear:

- Teeth are parallel to axis of shaft.
- Impose radial load on shafts.
- Can be used only where shafts are parallel.

Helical Gear:

- Teeth are at an angle with axis of shaft.
- Imposes both radial and thrust forces on shaft.
- A type of gear, consisting of two helical gears with opposite hand of helix is herringbone gear (generally for parallel shafts).

Bevel Gear:

- Have shape of truncated cone.
- Used normally for shafts which are at (or near to) right angle.
- Teeth can be straight or spiral.
- Impose both radial and thrust loads.

Worm Gear:

- Consists of worm and worm wheel.
- Worm is in the form of threaded screw which meshes with matching wheel.
- Used for shafts at right angle.
- Worm imposes high thrust load and wheel imposes high radial.

16. Describe any five types of keys with diagrams.

Max. Marks = 2X5 = 10

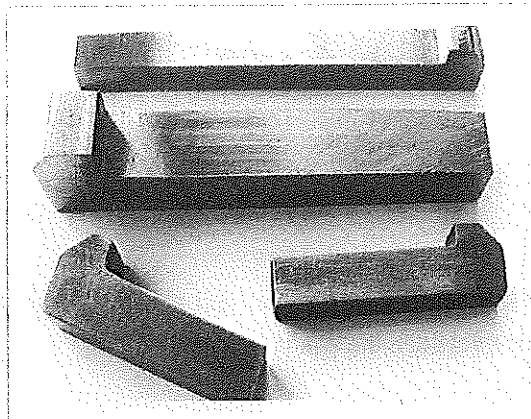
Ans.

Parallel Key:

- A parallel key is the sunk key which is uniform in width as well as height throughout the length of the key.

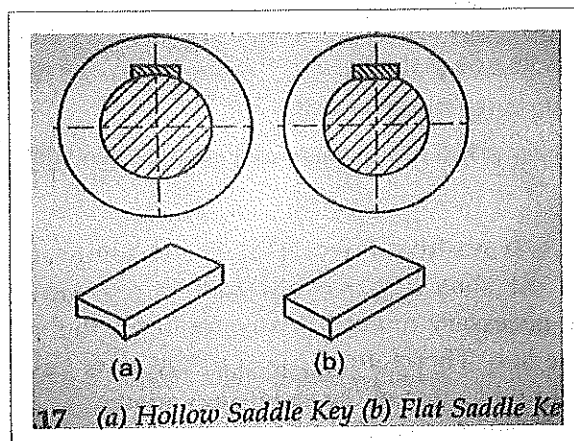
Taper Key:

- A taper key is uniform in width but tapered in height.
- Taper keys are often provided with Gib-head to facilitate removal.



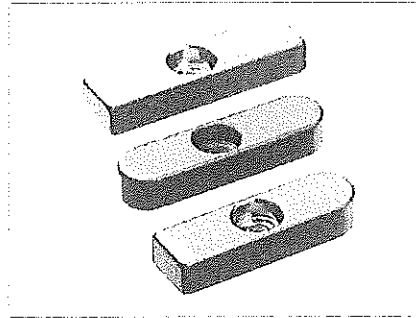
Saddle Key:

- A saddle key is a key which fits in the keyway of the hub only.
- The power is transmitted by means of friction. Therefore, these keys are suitable for low power transmission as compared to sunk key.



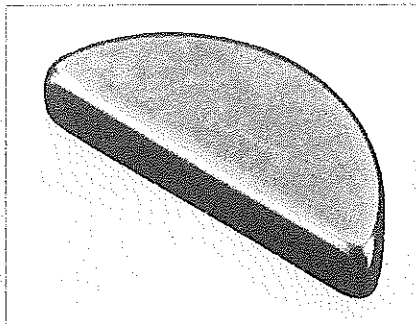
Feather Key:

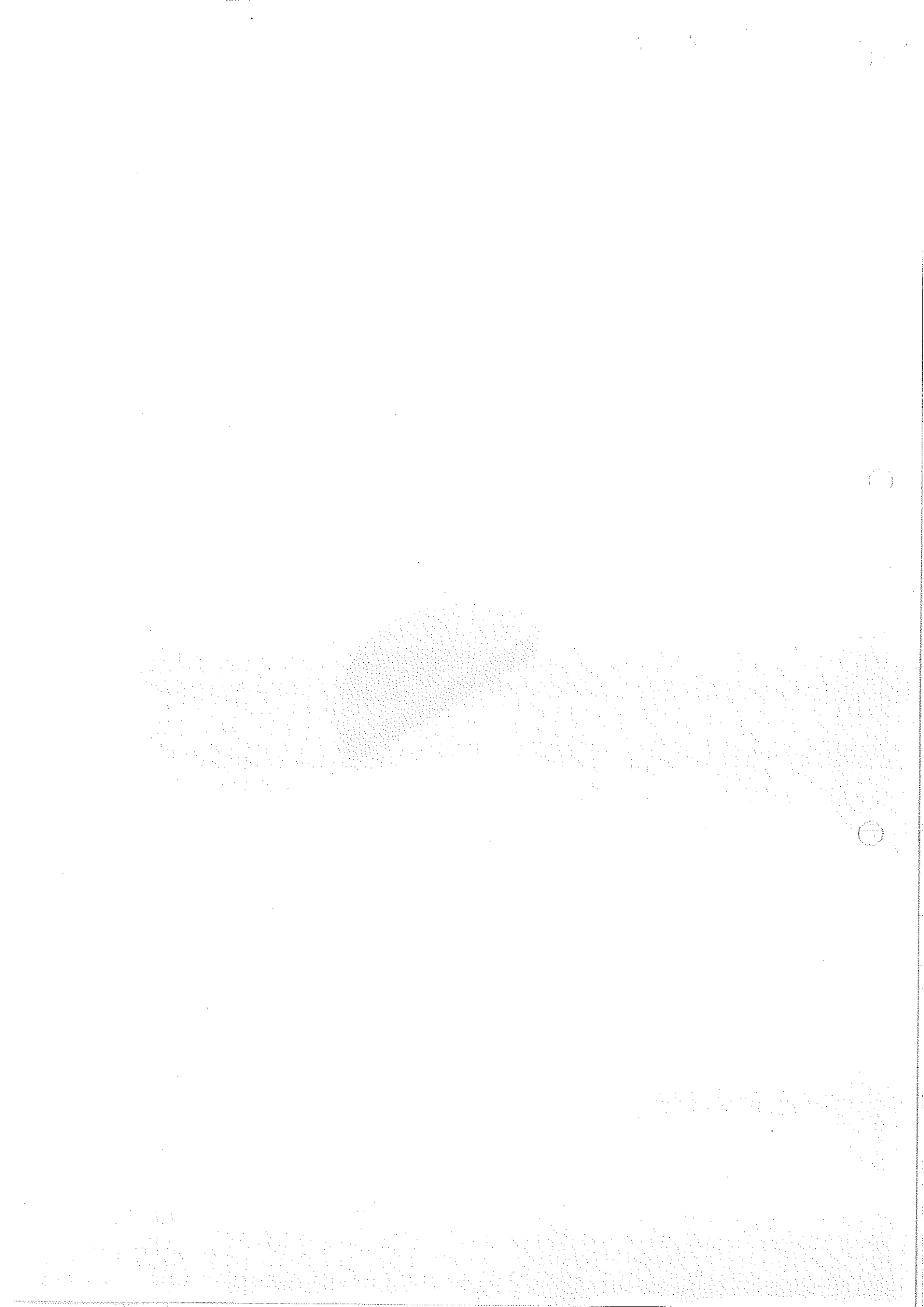
- A parallel key which is either fixed to the shaft or to the hub and which permits relative axial movement between them.



Woodruff Key:

- A sunk key in the form of an almost semicircular disk of uniform thickness.
- Keyway in the shaft is in the form of semicircular recess with the same curvature as that of the key.







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1st SEMESTER, END-SEMESTER EXAMINATION
WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019

Course Code: SMS1004

Time (Minutes): 90

Course Name: Measuring

Maximum Marks: 50 Marks

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 04 Questions. Each question carries 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

(10 x 02 = 20 Marks)

1. Which measuring tool can be used to measure 20.030 mm?
 - a. Vernier Callipers.
 - b. Micrometer.
 - c. Slip gauge
 - d. Plug gauge

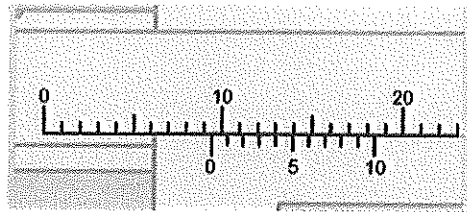
2. Feeler gauge is the type of
 - a. Dimensional gauge
 - b. Form gauge
 - c. Limit gauge
 - d. None of these

3. Convert
 - a. 1 inch = ___ mm
 - b. 25 μ m = ___mm

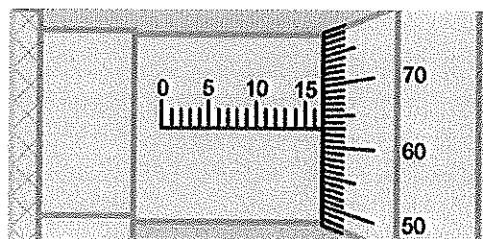
4. Which one of the following is not a part of a micrometer?
 - a. Thimble
 - b. spindle
 - c. Thumb
 - d. Anvil



5. The difference between maximum and minimum limits of size is known as
- a. Tolerance
 - b. Deviation
 - c. Allowance
 - d. None of these
6. What is the reading of a Vernier caliper shown below?



- a. 6.50mm
 - b. 9.90mm
 - c. 9.04mm
 - d. 9.4 mm
7. Which grade of slip gauge is used in measuring module?
- a. K grade
 - b. 00 grade
 - c. 0 grade
 - d. 1 grade
8. What is the reading of a micrometer shown below?



- a. 15.60 mm
- b. 16.60 mm
- c. 16.63 mm
- d. None of these



9. Snap gauge is used to
- Measure internal dimension
 - Measure external dimension
 - Measure internal and external dimension
 - None of these
10. The process to find out the error in a measuring instrument is called
- Tolerance
 - Range
 - Calibration
 - None of these

Section-B

(04 x 05 = 20 Marks)

11. What is the difference between accuracy and precision?
12. Define gauging and explain different types of gauges with the help of a flow chart.
13. Which factors should we consider to select measuring tool?
14. Define Least count. Calculate the least count of Vernier caliper Which has 50 divisions on secondary scale, Write down its formula.


Section-C

(02 x 10 = 20 Marks)

15. Explain different types of errors in measurement.
16. Define the following terms:
- One degree
 - Deviation
 - One meter
 - Basic size
 - Actual size



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SESSION 2018-2019

Course Code: SMS1004 
Time (Minutes): 90

Course Name: Measuring Answer sheet
Maximum Marks: 50 Marks

Instructions:

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 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

1. Which measuring tool can be used to measure 20.030 mm ... ?

Ans. Slip gauge

2. Feeler gauge is the type of

Ans. Dimension gauge

3. Convert

- a) 1 inch = 25.4 mm
- b) 25 μ m = 0.025 mm

4. Which one of the following is not part of a micrometer?

Ans. Thumb.

5. The difference between maximum and minimum limits of size is known as

Ans. tolerance

6. What is the reading of a Vernier caliper shown below?

Ans. 9.4 mm



7. Which grade of slip gauge we are using in measuring module?

Ans. 0 grade

8. What is the reading of a micrometer shown below?

Ans. 16.63 mm

9. Snap gauge is used to check **external dimension**.

10. The process to find out the error in a measuring instrument is called **calibration**.

Section-B

11. 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.

12. Define gauging and explain different types of gauges with flow chart.

Ans. Gauging is a process of inspection in which we compare the work piece which is to be inspected with measuring tool. In this process we don't get numerical value. For Example: Checking of hole with plug gauge

Types of gauges

Dimension Gauge- Dimension gauges are usually supplied in sets and, depending on the gradation, increase in size by a specific value from one gauge to the next.

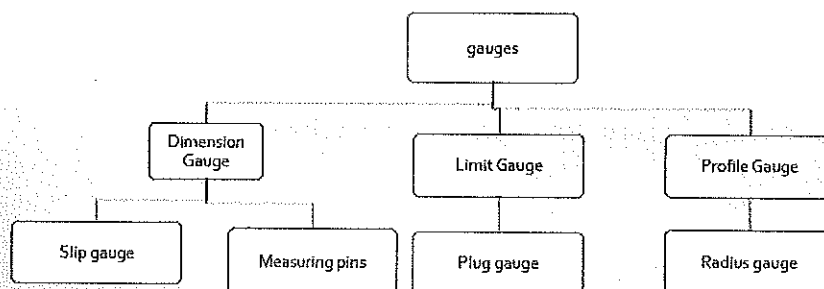
For example, feeler gauge and slip gauge.

Limit Gauge - limit gauge is used to check the limit dimensions of shafts and holes

- Shafts are checked using ring gauges or snap gauges.
- hole sizes are checked with plug limit gauges

Profile gauge- profile gauge are used to examine angle, radil, screw threads and other profile using the light gap method.

For example, Radius gauges, thread gauges.





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

- Range
- Tolerance value
- Geometry/design
- Least count
- Availability
- Application
- Error

14. Define Least count and Calculate the least count of Vernier caliper which has 50 divisions on secondary scale with write down its formula.

Ans. Least count is the Minimum value that can be measured by measuring tool

$$\begin{aligned}\text{Least Count} &= \frac{\text{Value of One division on main Scale}}{\text{Total no.of division on vernier Scale}} = \frac{1}{50} \\ &= 0.02\text{mm} \\ &= 20 \mu\text{m}\end{aligned}$$

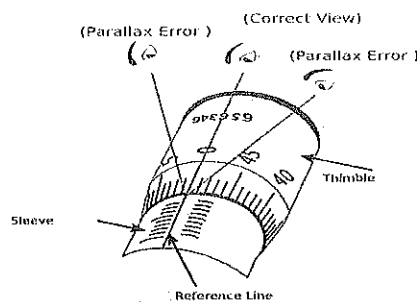
Section-C

15. Explain different type of errors while measurement?

Ans. Error - it is the difference between measured value and true value

Types of Error

- A. Parallax Error –Parallax error is the shift in apparent position of an object due to different viewing position. When we have to take reading from an instrument or do some measurements then different viewing position will give different readings leading to an error. This could be removed by keeping our eyes in front of the thing to be viewed.



- B. Tilt Error - This error occur due to having play between slider and beam. When we applied excessive force on slider to clamp the workpiece then slider may displace from it's original position this lead to error in measuring instruments. To avoid this error, we should apply limited force on jaws.



- C. Cocking Error- when we measure the distance between reference face and measuring face of the work piece or measuring instruments then the reference faces and measuring faces of workpiece and measuring instrument should be parallel if it is not then it will show wrong value.
- D. Dirt or Burrs Error –it is caused by dirt and burr on the work piece and measuring instruments.

16. Define to below terms.

Ans

- A. One degree – one degree is one 360th of a full circle
- B. Deviation - It is the algebraic difference between a limit of size and the corresponding basic size.
- C. One meter-one meter is the distance that light travels in a vacuum in one 299,729,458 of a second.
- D. Basic size - It is the size of a part with all limits of variation are determined.
- E. Actual size - Measured size of the finished part after machining



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1st SEMESTER, END-SEMESTER EXAMINATION
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SESSION 2018-2019

Course Code: SMS1005
Time (Minutes): 90

Course Name: Conventional Turning
Maximum Marks: 50 Marks

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 04 Questions. Each question carries 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

(10x1= 10 Marks)

1. 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) $V_c = \frac{\pi dn}{1000} \text{ m/sec.}$

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

- a) V – shaped Threads
- b) Acme Threads
- c) Knuckle Threads
- d) Buttress Threads

3. What is the normal clearance angle in tool?

- a) 55° to 80°
- b) 11° to 15°
- c) 6° to 8°
- d) 8° to 12°



4. 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

5. What is the formula for minimum depth of cut?
 - a) $3/2^{\text{rd}}$ of Nose radius
 - b) $4/3^{\text{rd}}$ of Nose radius
 - c) $1/3^{\text{rd}}$ of Nose radius
 - d) $2/3^{\text{rd}}$ of Nose radius

6. 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

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. Use of tailstock in lathe machine?
 - a) Supporting long shaft
 - b) Drilling
 - c) A & B Both
 - d) Grooving

9. Why we make undercut in thread?
 - a) Thread tool relaxation & Self-locking.
 - b) To clean the face
 - c) To reduce the diameter
 - d) None of the above

10. What is the full form of DRO?
 - a) Digital run out
 - b) Direct reading out
 - c) Digital read out
 - d) Distance read out



Section- B

(04x05= 20 Marks)

11. Why do we do centering of turning tools before machining? (with a sketch)
12. Which are the five operations that are carried on lathe? Define one operation.
13. If cutting velocity (V_c) is 30 m/min & work piece diameter is 7cm. Calculate the rpm for facing of Aluminum work piece.
14. Write a short note on Acme thread along with a figure.

Section- C

(02x10=20 Marks)

15. Define Average roughness value (R_a) and Average maximum height of the profile (R_z). For which value is greater for the same surface roughness?
16. Calculate the following parameter for External Thread M20.
 - a. Pitch
 - b. Major Diameter
 - c. Thread Depth
 - d. Minor Diameter
 - e. Required Chamfer



BHARTIYA SKILL DEVELOPMENT UNIVERSITY
SCHOOL OF MANUFACTURING SKILLS
1st SEMESTER, END-SEMESTER EXAMINATION
WINTER SEMESTER, B.VOC. PROGRAM
SESSION 2018-2019

Course Code: SMS1005
Time (Minutes): 90

Course Name: Conventional Turning
Maximum Marks: 50 Marks

Instructions:

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 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

(10x1=10 Marks)

1. Which one is correct answer?

Ans. (C) $V_c = \frac{\pi d n}{1000} \text{ m/min}$

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

Ans. (B) Acme thread.

3. What is the normal clearance angle in tool?

Ans. (C) 6° to 8°

4. What is the use of rake angle in a tool?

Ans. (A) Chip removal

5. What is the formula for minimum depth of cut?

Ans. (D) $2/3^{\text{rd}}$ of Nose radius.

6. Pitch is defined as

Ans. (A) Distance between two consecutive thread.

7. Why do we use coolant?

Ans. (D) All of the above

8. Use of tailstock in lathe machine?

Ans. (C) A & B Both

9. Write the importance of undercut in thread?

Ans. (A) Thread tool relaxation & Self-looking.

10. What is the full form of DRO?

Ans. (C) Digital read out.



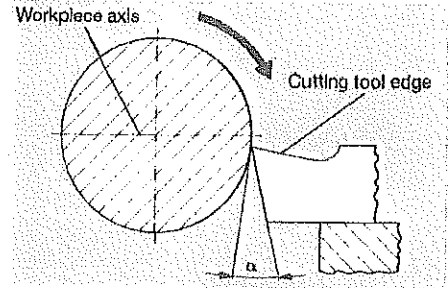
Section- B

(04x05= 20 Marks)

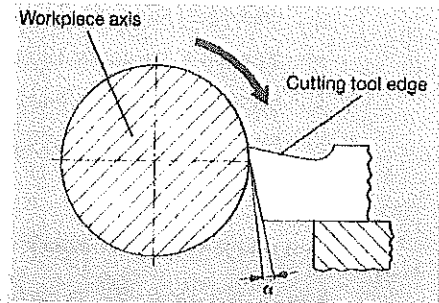
11. Why do we do centering of turning tools before machining? (with a sketch)

Ans.

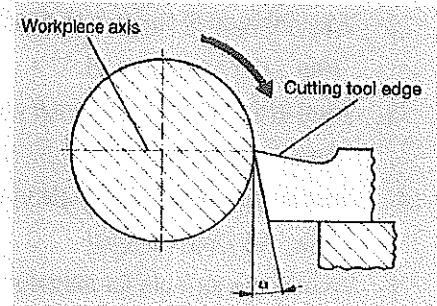
Positioning the tool below the midpoint of the workpiece increases the clearance angle and reduces the rake angle, the tool will catch and cause an uneven surface to be produced.



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.



12. Which are the five operations that are carried on lathe? Define one operation.

Ans. Turning

Facing

Grooving

Boring

Threading: - Threading is an operation of to cut the thread in cylindrical work piece. For this we have to engage the carriage on the lead screw.



For threading we will use 2 K tool.

For threading we have to calculate

Major Diameter,

Minor Diameter,

Pitch Circle diameter,

Thread depth

Chamfer calculation

Helix Angle etc.

Step to perform Threading operation

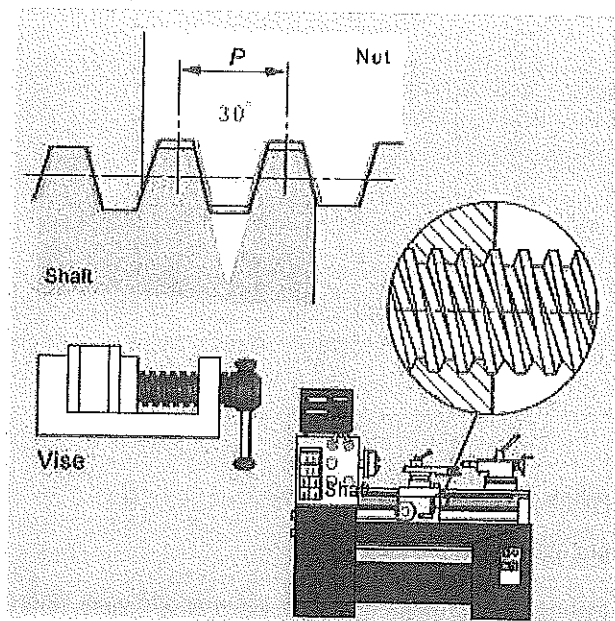
- 1) First calculate all parameters according to drawing
- 2) Perform the turning operation and make major diameter according to calculation.
- 3) Perform the chamfering operation.
- 4) Clamp the threading tool and provide helix angle
- 5) Perform the threading operation according the calculation with Minimum RPM.
- 6) Check the threads with the help of thread gauge.

13. If cutting velocity (V_c) is 30 m/min & workpiece diameter is 7cm. Calculate the rpm for facing of Aluminum work piece.

Ans.
$$V_c = \frac{\pi dn}{1000} \text{ m/min}$$
$$= \frac{3.14 \times 70 \times n}{1000} \text{ m/min}$$
$$= 135 \text{ rpm}$$
$$= 270 \text{ RPM Approx. (RPM Double for facing operation)}$$

14. Write a short note on Acme thread along with a figure.

Ans.



Cross Section

Acme Thread

Acme threads have a small thread angle of 30° .

This results in a low frictional force.

Acme threads are capable of bearing heavy loads in both directions.

This cross section is used with threads for adjustment.

Acme threads are used to clamp work pieces and to adjust slides on machine tools.

Section- C

(02x10=20 Marks)

15. 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_a) 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.

16. Calculate the following parameter for External Thread M20.

- Pitch
- Major Diameter
- Thread Depth
- Minor Diameter
- Required Chamfer

Ans.



- a. Pitch = 2.5 mm
- b. Major Diameter = Nominal dia. – 10% of pitch
= 20 – 0.25
= 19.8mm (approx.)
- c. Thread Depth = 0.614 X pitch
= 0.614 X 2.5
= 1.535mm (Radially)
Thread depth (diametrically) = 2 X 1.535
= 3.1mm (approx.)
- d. Minor Diameter = Major dia. – thread depth
= 19.8 – 3.1
= 16.7mm
- e. Required Diameter = $\frac{\text{major dia.} - \text{minor dia.}}{2} + 0.5$
= $\frac{19.8 - 16.7}{2} + 0.5$
= 2mm (approx.)

