BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Winter Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

Course Code: SMS1103 **Time: 1 Hour**

Course Name: Conventional milling **Max. Marks: 20**

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 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

05X01 = 05 Marks

1. What is coolant concentration range for milling?
   a) 8-10%
   b) 12-15%
   c) 5-7%
   d) 18-20%

2. Rake angle is the angle which is useful for_____
   a) Cutting the work piece
   b) Coolant flow
   c) Chip removal
   d) Surface finish

3. Wedge angle is the angle between _____ and _____..
   a) work piece surface & rake face
   b) tool flank & face
   c) tool flank & line perpendicular to the axis
   d) work piece surface & face

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. Select the name of milling machine
   a) EMCO MAT FB-450L
   b) EMCO MAT FB-500L
   c) EMCO MAT FB-300L
   d) EMCO MAT FB-350L

Section – B

03X02 = 06 Marks

6. Define the following formula Parameter?

   $V_f = f_z \times z \times n$

   Where V_f =_____

   F_z =_____

   Z=_____

   N=_____

7. What is Milling? Explain different types of Milling based on cutting motion and feed motion.

8. Difference between shoulder mill and face mill.

Section – C

03X03 = 09 Marks

9. Explain different types of tool holder and their application.
10. Explain the following
    a) Clearance angle
    b) Wedge angle
    c) Rake angle
11. Explain any three types of tool wear.

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Answer Key

Section – A

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Section – B

03X02 = 06 Marks

6. Define the following formula Parameter?

$V_f = f_z \times z \times n$

Where V_f =_Cutting velocity

F_z =_Feed per tooth

Z= No of cutting edges

N= rpm

7. What is Milling? Explain different types of Milling based on cuting motion and feed motion?

Milling is a material removal process in which we use geometrically define cutting edges. In milling our workpiece is stationary and tool is rotating

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

8. Difference between shoulder mill and face mill ?

Shoulder mill- Shoulder mill is used to make a shoulder or a perpendicular profile on workpiece face

Face mill- Face mill is used to make a 45 profile on workpiece face

Section – C

03X03 = 09 Marks

9. Explain different types of tool holder and their application ?

Arbor type tool holder- It is used for tools dont have shank

Side clamp- It is used for roughing tools

Collet type – It is used for finishing tools

Reducing buss- It is used for big drills or tools have taper shank

10. Explain the following

a) Clearence angle

Clearence angle is between workpiece surface and tool face

b) Wedge angle

wedge angle is between tool face and flank

c) Rake angle

rake angle is between tool flank and line perpendicular to central axis

11. Explain any three types of tool wear

Flank wear-

It is caused by the friction between tool flank and workpiece

Crator wear- crator wear ocurs when the tool temperature is too high.Crator wear is a loss of carbon due to over heating during process.

Edge fracture- If idexable inserts are of insufficent strength they fractured due to high stresses

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Course Code: SMS1104 **Time: 1 Hour**

Course Name: Conv. Turning **Max. Marks: 20**

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 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

05X01 = 05 Marks

1. Which of the following is not a part of tool geometry?
   a) Nose radius
   b) Wedge angle
   c) Rack angle
   d) Clearance angle
2. Which machining operation does not require geometrically defined edges?
   a) Turning
   b) Milling
   c) Grinding
   d) Drilling
3. In which machining process tool does not make a mutual contact with work piece?
   a) Drilling machine
   b) Milling machine
   c) Lathe machine
   d) Non-Traditional machine
4. What is the unit of cutting velocity?
   a) Meter/min
   b) Feed/min
   c) Rotation/min
   d) None of the above
5. Which thread can withstand the force in both the direction?
   a) Metric thread
   b) Trapezoidal thread
   c) Butters thread
   d) Round thread

Section – B

03X02 = 06 Marks

6. Write difference between right hand tool and left hand tool? (with neat sketch)
7. Define:

   Tool wedge angle

   Clearance angle

   Rake angle
8. If cutting velocity (Vc) is 30 m/min & workpiece diameter is 7cm. Calculate the rpm for facing of Aluminum workpiece

Section – C

03X03 = 09 Marks

9. How to classify the indexable insert with the help of an example?
10. Define Upright lathe machine?
11. Explain chips and different types of chip formation?

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Answer Key

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   - b) Wedge angle
   - c) Rack angle
   - d) Clearance angle
2. Which machining operation does not require geometrically defined edges?
   - a) Turning
   - b) Milling
   - **c) Grinding**
   - d) Drilling
3. In which machining process tool does not make a mutual contact with workpiece?
   - a) Drilling machine
   - b) Milling machine
   - c) Lathe machine
   - **d) Non-Traditional machine**
4. What is the unit of cutting velocity?
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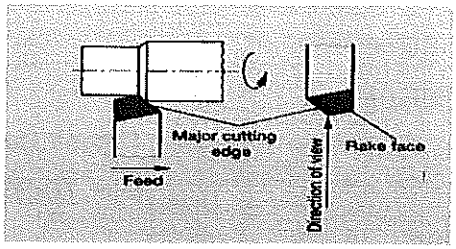
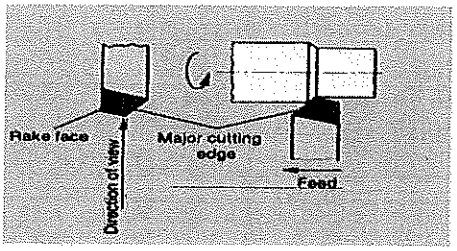
   - d) None of the above
5. Which thread can withstand the force in both the direction?
   - a) Metric thread
   - **b) Trapezoidal thread**
   - c) Butters thread
   - d) Round thread

Section – B

03X02 = 06 Marks

6. Write difference between right hand tool and left hand tool? (with neat sketch)





Left hand and right hand tools

Cutting tools are also characterised 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 used.
  When viewed from the workpiece the major cutting edge lies on the left side of the cutting tool.

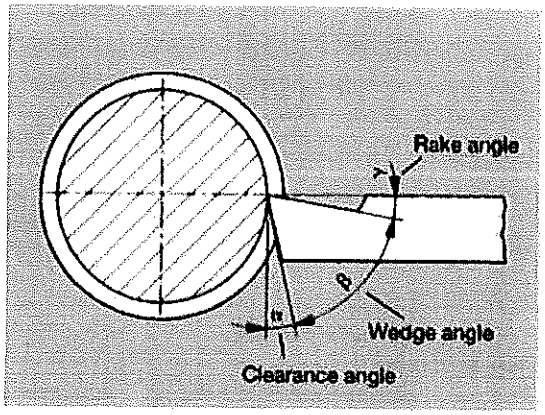
- **Right hand tool**
  With the right hand cutting tool the direction of feed is from right to left.
  Looking at the cutting head of the lathe tool the main cutting edge is on the right hand side.

7. Define:

   Tool wedge angle

   Clearance angle

   Rake angle



Tool wedge angle β (beta)
This is the angle between the rake 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 α (alpha)
This is the angle between the surface of the workpiece and the flank of the cutting wedge. Clearance angles of 6° to 8° are effective for metal working purposes.

Rake angle γ (gamma)
The rake angle has a major impact on chip formation. The rake angle lies between the horizontal line from the cutting surface and the rake face.

On lathe tools the rake angle, wedge angle and clearance angle always add up to 90°.

8. If cutting velocity (Vc) is 30 m/min & workpiece diameter is 7cm. Calculate the rpm for facing of Aluminum workpiece

Ans. $VC = \frac{\pi dn}{1000}\ m/min$

$= \frac{3.14X70Xn}{1000}\ m/min$

= 135 rpm

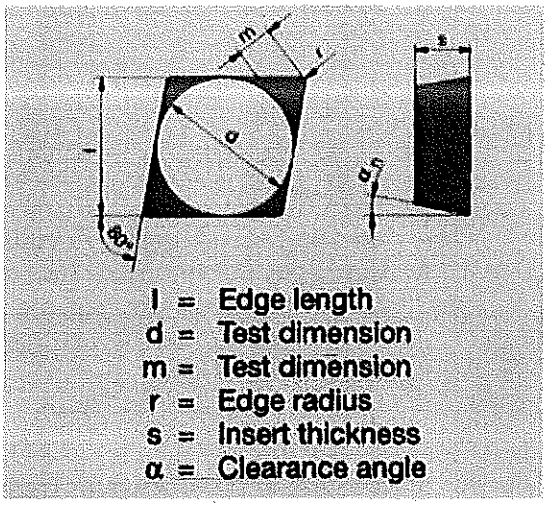
= 270 RPM Approx.

Section – C

03X03 = 09 Marks

9. How to classify the indexable insert with the help of an example?

Indexable insert parameters: Form C



Indexable inserts are classified according to the following criteria::

① Basic shape of indexable insert

② Standard clearance angle at unstressed indexable insert

③ Tolerance category

④ Design of tool face and attachment characteristics

⑤ Insert size

⑥ Insert thickness

⑦ Corner profile

⑧ Cutting edge

⑨ Cutting direction

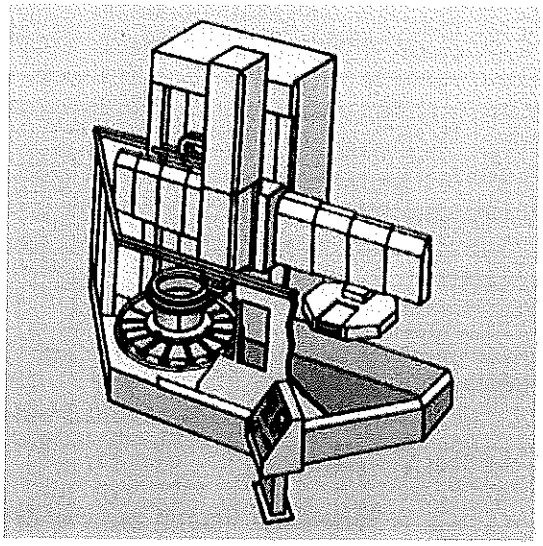
⑩ Cutting material

In order to save costs indexable inserts are generally screwed or clamped to the lathe tool.

Cutting tip DIN 4987- C P M R 12 07 08 F N- P10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

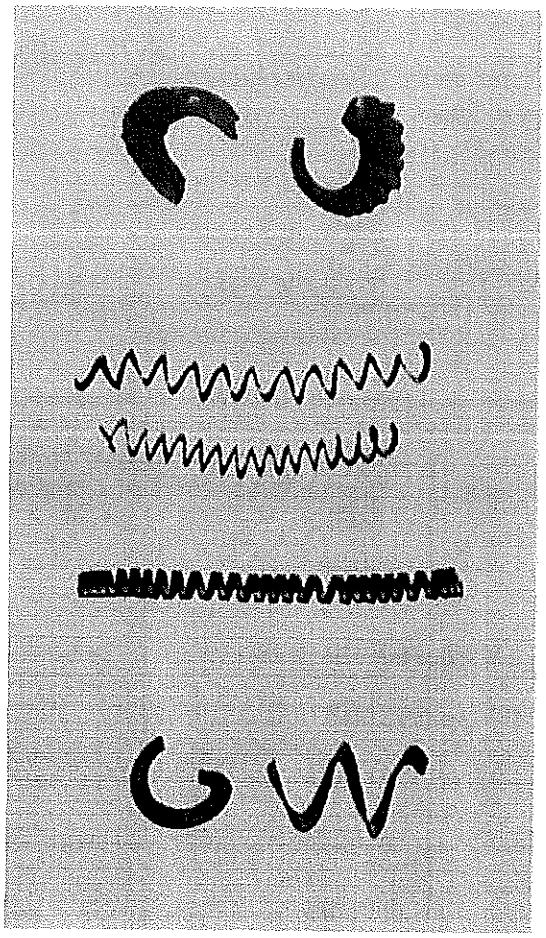
10. Define Upright lathe machine?



Upright (vertical) lathe

Upright lathes are used for machining heavy workpieces that cannot be set on other types of machine because of their weight. The turning axis of the upright lathe is vertical and the machine can accommodate workpieces up to 25 m in diameter.

11. Explain chips and different types of chip formation?



Tear chips

are short and irregular in shape, as they are torn from the material. Tear chips mainly result from rough working, e.g. when using a large depth of cut, low cutting speed and a large rate of feed.

Continuous chips

are long and continuous. They are produced when machining soft, ductile materials and usually result from high cutting speeds using a cutting tool with a large rake angle. Continuous chips tend to interrupt the machining operation because they are often difficult to remove.
They also pose an additional accident risk and can damage the surface of the workpiece.

Shear chips

are irregularly continuous. They are produced when cutting ductile materials using medium cutting speeds and small to medium rake angles. The surface finish of the workpiece is not comparable to that achieved when producing continuous chips.