BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session 2021-2022 (Summer Semester)

B. Voc. Program, I Semester

2nd In-Sem. Examination

Course Code: SMS1102 **Time: 1 Hour**

Course Name: Handskills **Marks: 20**

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 05 Questions. Each question carries 1 Marks.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section- A **01X5= 5 Marks**

1. What happens if the size of clearance angle / relief angle becomes very less?
   a) The friction will be more and the surface quality will be bad
   b) Chips will break very easily
   c) Tool will penetrate deeper
   d) None of the above
2. 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
3. Which of the following indicates the enlarging scale?
   a) 3:1
   b) 3:3
   c) 1:3
   d) None of the above
4. Point angle of a twist drill is.
   a) 45°
   b) 115°
   c) 118°
   d) 90°
   e) None of the above

5. The penetration of the cutting wedge does not depend on the following.
   a) Wedge angle
   b) Cutting force
   c) Relief angle
   d) Workpiece Material

Section- B **02X3= 6 Marks**

6. Write difference between positive rake angle and negative rake angle?
7. Derive the expression to calculate the chamfer value for making radius by using file with diagram.
8. Write the properties of the granite surface plate.

Section- C **03X3= 9 Marks**

9. Write the formula of cutting speed .Also define its nomenclature with its unit. If cutting speed is 30 m/min and tool diameter is 7 mm then calculate the RPM.
10. Explain the geometry of the cutting tool with diagram.
11. Define the following;
    a) Drilling b) Reaming c) Tapping d) Countersinking

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Manufacturing Skills

Session 2021-2022 (Summer Semester)

B. Voc. Program, III Semester

2nd In-Sem. Examination

Course Code: SMS1102 **Time: 1 Hour**

Course Name: Handskills **Max. Marks: 20**

Answer Key

Section – A

05X01 = 05 Marks

1. What happens if the size of clearance angle / relief angle becomes very less?
   a) The friction will be more and the surface quality will be bad
2. What would be the procedure for reaming process?
   c) Spot drill – drill – CSK – core drill – reamer
3. Which of the following indicates the enlarging scale?
   a) 3:1
4. Point angle of a twist drill is?
   c) 118°
5. The penetration of the cutting wedge does not depend on the following?
   c) Relief angle

Section – B

03X02 = 06 Marks

6. Write difference between positive rake angle and negative rake angle?

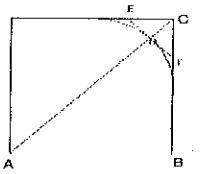
Ans.

Positive rake angle	Negative Rake angle
Cutting tool with positive rake offers a sharp cutting edge.	Cutting tool with negative rake has less sharpness at the cutting edge.
Wedge angle of these tools is small.	For the same clearance angle, wedge angle of the tool is large.
Due to small wedge angle, tool tip has less strength and is prone to sudden breakage or catastrophic failure.	Large wedge angle provides a strong tool tip, which is more resilient to catastrophic failure.
Positive rake does not allow high chip load. So feed and depth of cut should be low.	Due to stronger tool tip, it allows higher chip load. This higher feed and depth of cut can be employed to increase MRR.
Positive rake results in less share deformation of chips during machining.	Negative rake results in large share deformation of the chips.

7. Derive the expression to calculate the chamfer value for making radius by using file with diagram.

Ans.

Derivation to Calculate Chamfer Value for Radius-



Let: AB = BC = AD = R

So in triangle ABC, angle C and A is of 45°

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

$AC = R\sqrt{2} = R \times 1.414 = 1.414R$

$AC = AD + CD \rightarrow CD = AC - AD \rightarrow CD = 1.414R - R = 0.414R$

In triangle FDC –

Angle D is of 90°, C is of 45°, so angle F is also of 45°

Then, $CF^2 = FD^2 + CD^2$

$\rightarrow (0.414R)^2 + (0.414R)^2$

$CF = 0.414R\sqrt{2} = 0.414R \times 1.414$

$CF = 0.5853R = CF \approx 0.6R$

8. Write the properties of the granite surface plate.

Ans. Granite surface plates are best known due to their rustles properties. Granite surface plates remain unaffected by the change in temperature and Heat as well so hence it can maintain the flatness for a longer period of time. The hardness of the granite surface plates is more than the C. I Surface Plates.

Section – C

03X03 = 09 Marks

9. Write the formula of cutting speed. Also define its nomenclature with its unit. If cutting speed is 30 m/min and tool diameter is 7 mm then calculate the RPM.

Ans.

Vc= πDN/ 1000 where D tool dia. and Vc cutting speed and N revolution per minute.

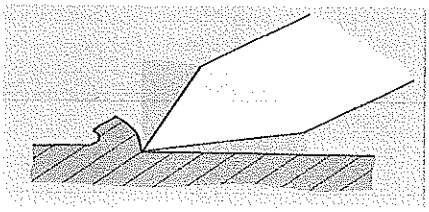
N=30x1000/3.14x7=1364 RPM

10. Explain the geometry of the cutting tool with diagram.

Ans. Wedge angle(β)

Relief angle (α) * (α+β+γ)=90

Rake angle(γ)



Wedge angle-

The angle between the cutting face and the flank face is known as wedge angle. It is denoted by beta (β).

The size of the wedge angle influences the cutting force on the metal removal process.

Relief angle-

The angle between the flank and the machined surface.it is denoted by alpha α

The size of the relief angle affects the friction between the tool and the work piece and resulting surface of the work piece.

Rake angle-

The rake angle is the angle between the machined surface and a line perpendicular to the working face.

The size of the rake angle mainly influences the chip formation and also the cutting force.

11. Define the following;

a) Drilling b) Reaming c) Tapping d) CSK

Ans.

a) Drilling – It is a process of making hole onto the work piece.

b) Reaming – It is a process of enlarging a hole with high surface quality and within tolerance of 10 – 20 microns.

c) Tapping – It is a process of making internal thread with a special tool named 'tap'.

d) CSK – It is a process of making a conical shape at the entrance of the hole.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer 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=_____

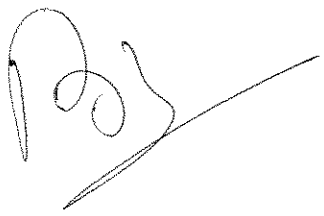
   N=_____

7. What is Milling? Explain different types of Milling.
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.



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

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

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

Answer Key

Section – A

05X01 = 05 Marks

1. What is coolant concentration range for milling?
   a) 8-10%
2. Rake angle is the angle which is useful for_____
   c) Chip removal
3. Wedge angle is the angle between _____ and _____..
   b) tool flank & face
4. Which tool holder is used for tools having no shank?
   d) Arbor type tool holder
5. Select the name of milling machine.
   a) EMCO MAT FB-450L

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.

   Milling is a material removal process in which we use geometrically define cutting edges. In milling our work piece 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 don't 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

Clearance angle - Clearance angle is between workpiece surface and tool face.

Wedge angle - wedge angle is between tool face and flank.

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 overheating during process.

Edge fracture- If indexable inserts are of insufficient strength they fractured due to high stresses

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

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

Course Name: Conventional 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 the unit of the feed?
   a) mm / sec
   b) mm / revolution
   c) mm * minute
   d) none of the mentioned
2. _____ is the distance the tool advances for each revolution of the work.
   a) feed
   b) depth of cut
   c) metal removal rate
   d) none of the mentioned
3. Which of the following represent the unit of cutting speed?
   a) meter*minute
   b) meter*meter*minute
   c) meter / minute
   d) none of the mentioned
4. Which of the following process is not grouped under metal removal process?
   a) boring
   b) milling
   c) welding
   d) turning
5. 0.01 mm is equivalent to _____ microns.
   a) 1 microns
   b) 10 microns
   c) 100 microns
   d) None of these

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

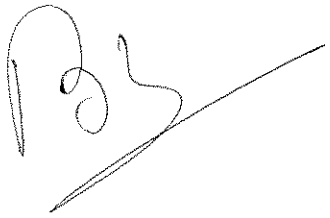
03X02 = 06 Marks

6. Write down the advantages of coolant?
7. What is the difference between milling and turning?
8. Calculate the rpm (n) of the shaft If diameter (d) =25 mm, c0utting speed (Vc) =50 m/min.

Section – C

03X03 = 09 Marks

9. Describe the angles at the cutting edge of tool.
10. Explain the types of chips formation while machining.
11. What are the major safety precautions should be use while machining?



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2021-22 (Summer Semester)

B. Voc. Program, I Semester,

2nd In-Sem. Examination

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

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

Answer Key

Section – A

05X01 = 05 Marks

1. Which of the following is the unit of the feed?
   b) **mm / revolution**
2. _____ is the distance the tool advances for each revolution of the work.
   a) **feed**
3. Which of the following represent the unit of cutting speed?
   c) **meter / minute**
4. Which of the following process is not grouped under metal removal process?
   c) **welding**
5. 0.01 mm is equivalent to _____ microns.
   b) 10 microns

Section – B

03X02 = 06 Marks

6. Write down the advantages of coolant?
   Ans. **For the better lubrication and cooling purpose. It prevents from corrosion of work piece surface. It is helpful for chemical, physical and technical stability while in use.**
7. What is deference between milling and turning?
   Turning rotates the workpiece against a cutting tool. It uses primarily round bar stock for machining components.
   Milling spins, the cutting tool against a stationary workpiece. It uses primarily square or rectangular bar stock to produce components.
8. Calculate the cutting speed when main axis spindle speed is 700min-1and external diameter is Φ50?

   Ans. **Substitute π=3.14, Φ =50, n=700 into the formula.**

   Vc=(π×D×n)/1000

   =(3.14×50×700)/ 1000

   =110(m/min)

   Cutting speed is 110m/min.

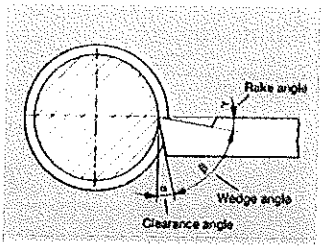
BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – C

03X03 = 09 Marks

9. Describe the angles at the cutting edge of tool.

Ans.



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.

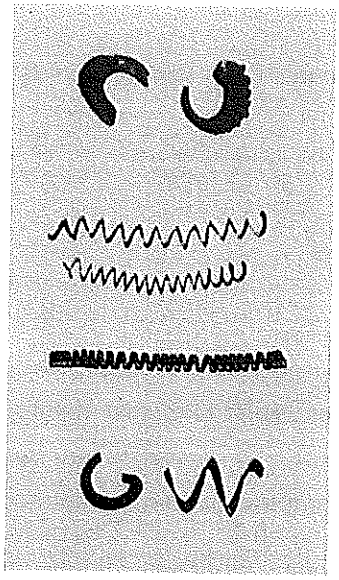
Clearance angle α (alpha)
This is the angle between the surface of the workpiece and the flank of the cutting wedge. Clearance angles of 6° to 8° are effective for metal working purposes.

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°.

10. Explain the types of chips formation while machining.

Ans.



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.

11. What are the major safety precautions should be use while machining?

Ans.

- **Operate equipment only when guards are in place and properly adjusted.**
- **Do not use unauthorized or damaged guards.**
- **Do not wear loose clothing, jewelry, or long hair around machines—these increase the risk of being caught in the machinery.**
- **Ask your supervisor if you have any questions about a machine safety or how to work with machine guards safely.**
- **Wear safety glass, shoes and safety gloves.**