# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

## School of Manufacturing Skills

## Session: 2019-20 (Summer Semester)

## B. Voc. Program, I Semester,

## 2nd In-Sem. Examination

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

**Course Name: Hand Skills** **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 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 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
3. Which one is not a part of file?
   a) Face length
   b) Tang
   c) Bow
   d) Handle
4. Point angle of a twist drill is (degree)?
   a) 45
   b) 115
   c) 118
   d) 90

5. Jaw protectors can be made of-
    a) Plastic
    b) High speed steel
    c) ceramics
    d) None of the above

## Section – B

03X02 = 06 Marks

6. Write the types of saw cut with figures.
7. Write down the process for the reaming and tapping operation.
8. Which working rules must be observed when sawing?

## Section – C

03X03 = 09 Marks

9. Write the formula of cutting speed. Also define its nomenclature with its unit. If cutting speed is 70 m/min and tool diameter is 5.5 mm then calculate the RPM.
10. Describe free cutting in sawing. Explain various types of saw blades on the basis of free cutting with the help of diagrams.
11. Write the short notes on following:
    a) Reaming
    b) Scribing
    c) Reference plane
    d) Circular saw

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**Answer key**

**Section – A**

05X01 = 05 Marks

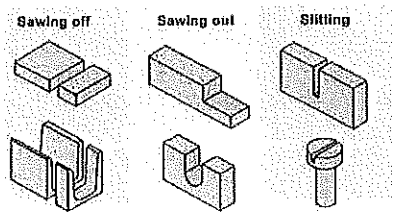
1. What happens if the size of clearance angle / relief angle becomes very less?
   a) The friction will be more and the surface quality will be bad
2. What is the application of the anvil plate?
   b) To use as a base plate
3. Which one is not a part of file?
   b) Tang
4. Point angle of a twist drill is (degree)?
   c) 118
5. Jaw protectors can be made of-
   a) Plastic

**Section – B**

03X02 = 06 Marks

6. Write the types of saw cut with figures.

   There are three types of saw cuts –



7. Write down the process for the reaming and tapping operation.

**Ans.**

**Reaming-**

> Spot drilling
> Drilling
> Countersinking
> Core drill
> Reaming

**Tapping**

> Spot Drilling
> Drilling
> Counter Sinking
> Tapping

8. Which working rules must be observed when sawing?

**Ans.**

- choose suitable TPI saw blade according to work piece material
- saw blade must be tight properly
- scribing lines should be visible
- Before start the sawing, a notch must be made to guide the saw blade.
- Use light pressure. Start slow at the back edge of the work piece (in so doing, the saw is inclined slightly (about 10 degree).
- Don't twist the blade. Keep it perpendicular to your work.

## Section – C

03X03 = 09 Marks

9. Write the formula of cutting speed. Also define its nomenclature with its unit. If cutting speed is 70 m/min and tool diameter is 5.5 mm then calculate the RPM.

10. The formula of cutting speed is –

11. $Vc = \pi DN / 1000$,

12. Where, Vc = cutting speed in m/min

13. D = diameter of tool/work piece in mm

14. N = RPM

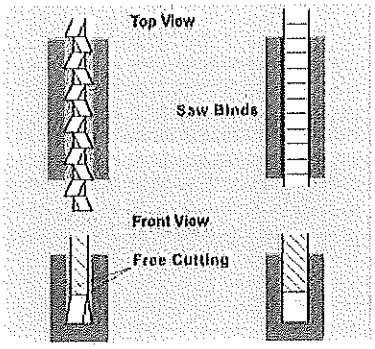
15. With this formula, $70 = 3.14 \times 5.5 \times N / 1000$

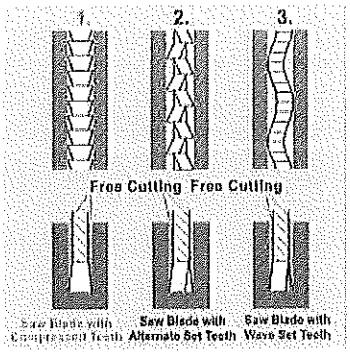
16. N = 4053 rev/min

17. Describe free cutting in sawing. Explain various types of saw blades on the basis of free cutting with the help of diagrams.

**Ans.**

To prevent the saw blade from binding, the kerf must be wider than the thickness of the saw blade. If this is not the case, the saw blade will bind. Therefore the saw blades are designed so that they cut themselves free.




18. Write the short notes on following:
    a) Reaming
    b) Scribing
    c) Reference plane
    d) Circular saw

**Ans.**

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

b) Scribing- Scribing refers to the transferring the contours and dimensions onto the wok piece to be processed.

c) Reference plane - Reference plane is the plane on the behalf of it, all the drawing dimensions are measured. The point at which two reference plane intersect, is called reference point.

d) Circular saw- The circular saw blade cuts with an uninterrupted circular motion.
Due to their high cutting performance, circular saw are used especially in high volume production.

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## School of Manufacturing Skills

## Session: 2019-20 (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.
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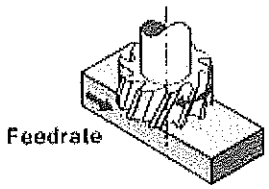
### Section – A

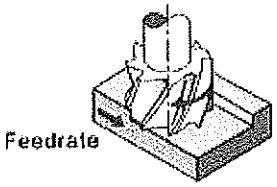
05X01 = 05 Marks

1. Which one is End Peripheral Milling procedure?

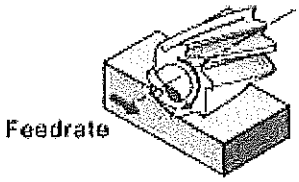
a)



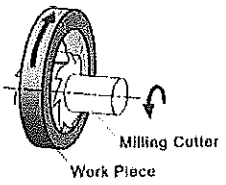

b)




c)




d)




2. Which type of wear is caused due to fluctuations in temperature?
   a) Edge fractures
   b) Thermal cracks
   c) Edge build –up
   d) None of these

3. Which tool holder is used for shell milling cutter?
    a) Collet type tool holder
    b) Reducing bushes
    c) Weldon type tool holder
    d) Arbor type tool holder
4. Type 'S' milling cutters are used to cut which of the following materials.
    a) Soft & stringy
    b) Hard & tough
5. What is the range for Vc on Al work piece with HSS cutter?
    a) 25-30
    b) 400-500
    c) 100-120
    d) 80-10

## Section – B

03X02 = 06 Marks

6. Which coolant is used in our workshop as a cutting oil and concentration? Write any 3 uses of cutting oil.
7. Describe the Steps to calculate R.P.M for ⌀20mm end mill with Vc= 100 and also calculate its Feed Rate with feed per tooth 0.15.
8. What is the difference between end mill and slot drills?

## Section – C

03X03 = 09 Marks

9. Explain any three types of wear to the following:

a) Flank wear
b) Thermal cracks
c) Edge fracture
d) Crater wear

10. Explain the following: -

a) Name the types of Tool Holders with their applications.
b) Right hand rule to determine the axis directions.

11. What is Milling? Explain types of Milling (on the basis of relation between cutting & feed motion).

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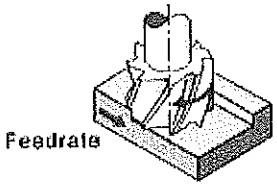
**Answer Key**

**Section – A**

05X01 = 05 Marks

1. Which one is End Peripheral Milling procedure?

b)




2. Which type of wear is caused due to fluctuations in temperature?

b) Thermal cracks

3. Which tool holder is used for shell milling cutter?

d) Arbor type tool holder

4. Type 'S' milling cutters are used to cut which of the following materials.

a) Soft & stringy

5. What is the range for Vc on Al work piece with HSS cutter?

d) 80-10

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## Section – B

03X02 = 06 Marks

6. Which coolant is used in our workshop as a cutting oil and concentration? Write any 3 uses of cutting oil.

   Ans: we are using strub made water soluble coolant with 7-8% concentration.

   Use of the coolant:

   a. Reduced tool war
   b. Reduced the frication
   c. Remove of chips

7. Describe the Steps to calculate R.P.M for ⌀20mm end mill with Vc= 100 and also calculate its Feed Rate with feed per tooth 0.15.

   $Vc = \pi DN/1000$

   Where Vc= cutting speed
   D= dia of tool
   N= R.P.M

   100 = 3.14x20xN/1000
   N= 100x1000/3.14x20
   N=1592.35

   Approx. 1590 or 1600 RPM

   $V_f = f_z \times z \times N$

   Ans. Where $V_f$ = feed rate
   $F_z$ = feed per tooth
   Z = no of teeth in cutter
   N = R.P.M.

   =0.15x2x1600
   Vf = 400 with RPM 1600
   =477 with RPM 1590

8. What is the difference between end mill and slot drills?

   End Mill: The bottom cutting edge is not continuously connected. i.e. not having the center cutting edge.

   Slot drill: The bottom cutting edge is continuously connected. i.e. having the center cutting edge.

# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

## Section – C

03X03 = 09 Marks

9. Explain any three types of wear to the following:

a) Flank wear

b) Thermal cracks

c) Edge fracture

d) Crater 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 workpiece.

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

3.**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.

4.**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.

10. Explain the following: -

a) Name the types of Tool Holders with their applications.

b) Right hand rule to determine the axis directions.

11. What is Milling? Explain types of Milling (on the basis of relation between cutting & feed motion).

**Ans.**

Milling is a material removal process in which we use geometrically define cutting edges. 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.

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## Session: 2019-20 (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. Under which condition tear chips can be formed-
   a) Using a large depth of cut, low cutting speed.
   b) Using a large depth of cut, high cutting speed.
   c) Using a smaller depth of cut, low cutting speed.
   d) None of the above
2. Why do we use coolant?
   a) To increase the tool life
   b) To remove the heat
   c) To improve the surface finish
   d) All of the above
3. Thread angle of metric thread is-
   a) 30 degrees
   b) 60 degrees
   c) 120 degrees
   d) None of the above
4. Which type of chips will occurred while performing operation on ductile materials?
   a) Shear
   b) Continuous
   c) Tear
   d) None of the above

5. What is the unit of cutting velocity?
   a) m/rev
   b) m/sec
   c) m/min
   d) None of the above

## Section – B

03X02 = 06 Marks

6. Why do we do centering of turning tools before machining? (with sketch)
7. Write down the procedure of making center drill.
8. Write down any three operations of lathe machine. Explain any one of the operation.

## Section – C

03X03 = 09 Marks

9. Explain Knurl threads with short designation.
10. Calculate the following parameter for External Thread M20.
11. Write the steps to perform threading operation on lathe.

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**Course Code: SMS1102**

**Course Name: Conventional Turning**

**Time: 1 Hour**

**Max. Marks: 20**

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**Answer Key**

### Section – A

05X01 = 05 Marks

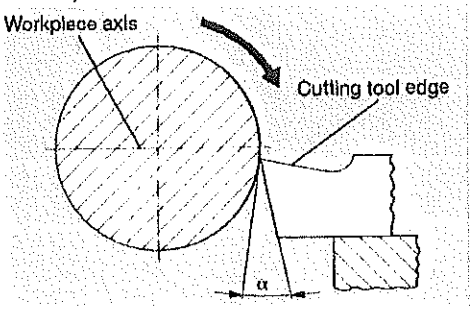
1. Under which condition tear chips can be formed-
   a) Using a large depth of cut, low cutting speed.
2. Why do we use coolant?
   d) All of the above
3. Thread angle of metric thread is-
   b) 60 degrees
4. Which type of chips will occurred while performing operation on ductile materials?
   b) Continuous
5. What is the unit of cutting velocity?
   c) m/min

### Section – B

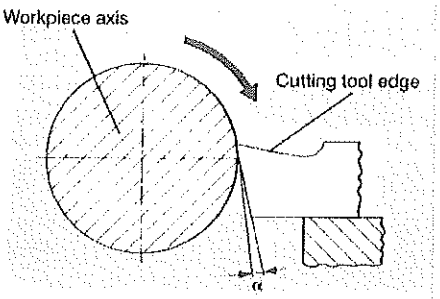
03X02 = 06 Marks

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

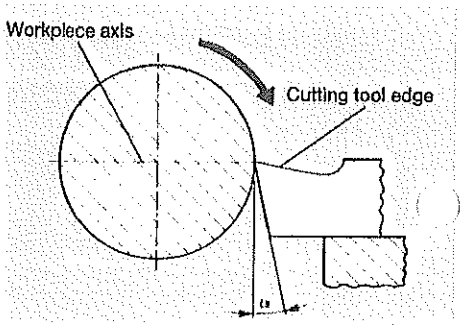
   Ans. Positioning the tool below the midpoint of the work piece increases the clearance angle and reduces the rake angle, the tool will catch and cause an uneven surface to be produced.



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.




7. Write down the procedure of making center drill.

Ans. Procedure of making center drill is as follows:

(1) According to drawing select the center drill
(2) Mount it in drill chuck.
(3) Calculate the RPM.
(4) Insert it in work piece when taper will start. Measure the Actual diameter.
(5) Use formula = $(Required\ Diameter - Achieved\ Diameter \div 2) \times \sqrt{3}$
(6) Calculate the distance, and put center drill inside the work piece calculated distance with the help of tail stock

8. Write down any three operations of lathe machine. Explain any one of the operation?

Ans. Turning

Facing

Grooving

Turning in turning operation circular cutting motion is use to remove the material where the tool is feed against the rotating work piece thus the diameter of the work piece is reduce using geometrically defined tool.

# BHARTIYA SKILL DEVELOPMENT UNIVERSITY

## Section – C

03X03 = 09 Marks

9. Explain Knurl threads with short designation.

Ans. knurl thread or round thread are sensitive to damage and dirt.

They are therefore primarily used for fitting, house connection, railway couplers, bulb holder, etc.

The short designation for round thread with a nominal diameter of 30 mm is:

Rd 30 x 1/8

Rd =round thread

30 = 30 mm nominal diameter

1/8 = 1/8-inch pitch

10. Calculate the following parameter for External Thread M20.

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 = $\frac{major\ dia.-minor\ dia.}{2}$ + 0.5

= $\frac{19.8-16.7}{2}$ +0.5

= 2mm (approx.)

11. Write the steps to perform threading operation on lathe.

Ans.

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.