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: SMS1101 **Time: 1 Hour**

Course Name: Assembly & Measuring **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. Material of a measuring tool should be-
   a) Softer than the work piece.
   b) Harder than the work piece.
   c) Same hardness as of work piece
   d) None of the above.
2. Sensory inspection is a type of-
   a) Subjective measurement
   b) Objective measurement
   c) A & B Both
   d) None of the above
3. Radius gauge is a type of-
   a) Form gauge
   b) Limit gauge
   c) Dimensional gauge
   d) Both form and limit gauge
4. Oil Seal is used to prevent-
   a) Leakage of Expensive Lubricating oils
   b) the Entry of Foreign Particles
   c) A & B both
   d) None of the above

5. Teeth are parallel to axis in-
   a) Helical gear
   b) Spur gear
   c) Bevel gear
   d) Herringbone gear

Section – B

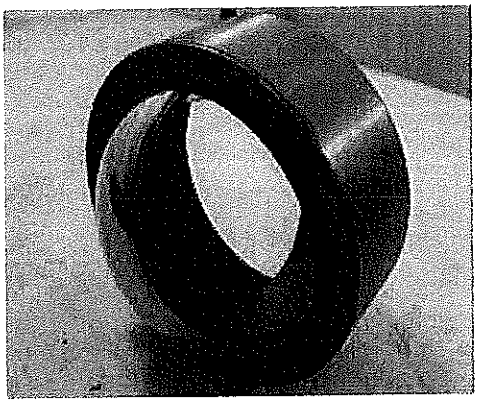
03X02 = 06 Marks

6. Write the difference between measuring instruments and gauges.
7. Explain the Bevel protractor with its parts.
8. What is the function of a Bearing? Write the name of any two types of bearing.

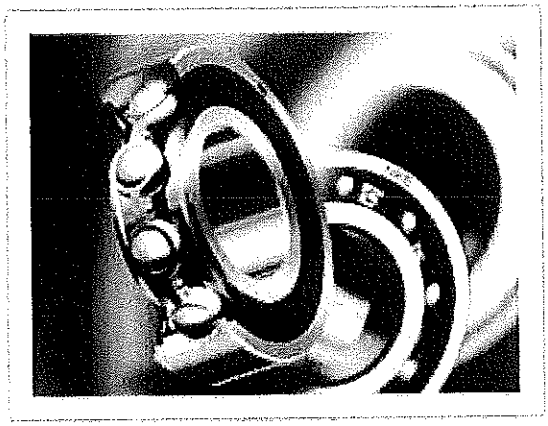
Section – C

03X03 = 09 Marks

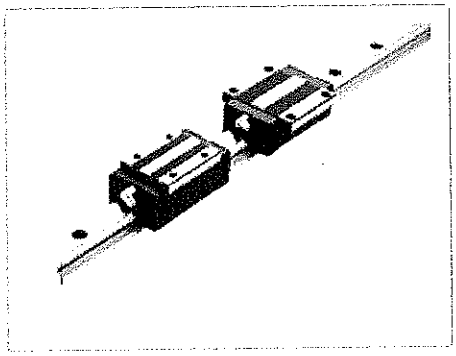
9. Explain different types of errors in measurement.
10. Write the name of the following parts.



A



B



C

11. Write down the Advantages and Disadvantages of V-belt over Flat belt drive.

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: SMS1101 **Time: 1 Hour**

Course Name: Assembly & Measuring **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.

Answer Key

Section – A

05X01 = 05 Marks

1. Material of a measuring tool should be-
   b) Harder than the work piece.
2. Sensory inspection is a type of-
   a) Subjective measurement
3. Radius gauge is a type of-
   a) Form gauge
4. Oil Seal is used to prevent-
   c) A & B both
5. Teeth are parallel to axis in-
   b) Spur gear

Section – B

03X02 = 06 Marks

6. Write the difference between measuring instruments and gauges.

S.No.	Gauges	Measuring instruments
1.	Gauge are used to check the work piece	Instruments are used to measure the work piece
2.	These are used mainly for mass production.	Instruments are used for bought out inspection
3.	Gauges have fix dimension or fix Value	Instruments have variable dimension or value

7. Explain the Bevel protractor with its parts.

   It is used to measure the angle of mechanical parts

   PART NAME

   1. Mane scale
   2. Solid beam
   3. Adjustable measurement beam
   4. Clamp screw
   5. Secondary scale

   Lest count

   Value of one division on mane scale /total number of division on secondary scale

   1/12=60'/12=5'

8. What is the function of a Bearing? Write the name of any two types of bearing.

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

➢ ***function:***

a. One in the definition.

b. Supports shaft or axle and holds it in correct position.

c. Takes the force on shaft and transmit to bas.

Types: -

1. Plain or sliding bearing
2. Rolling or anti-friction bearing

Section – C

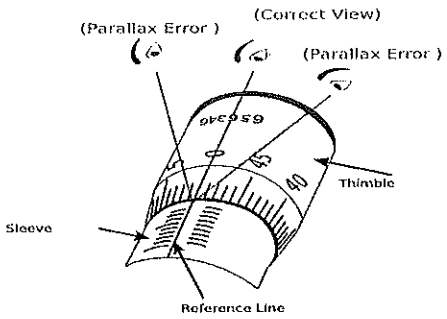
03X03 = 09 Marks

9. Explain different types of errors in measurement.

   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.

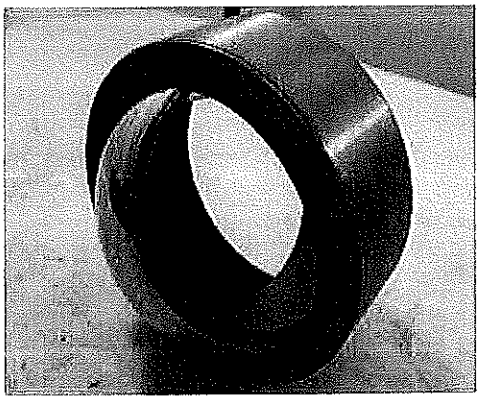


B. Tilt Error - This error occurs due to having play between slider and beam. When we applied excessive force on slider to clamp the work piece then slider may displace from its original position this lead to error in measuring instruments. To avoid this error, we should apply limited force on jaws.

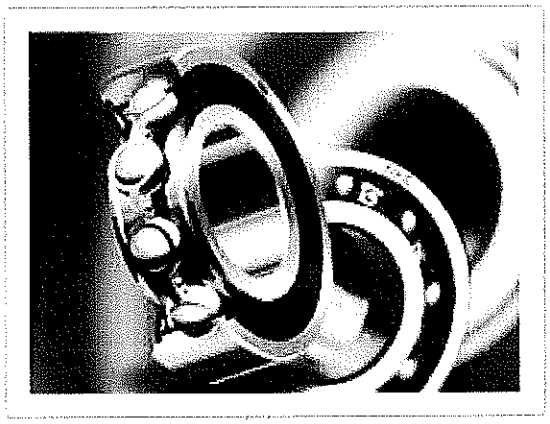
C. Cocking Error- when we measure the distance between reference face and measuring face of the work piece or measuring instruments then the reference faces and measuring faces of work piece and measuring instrument should be parallel if it is not then it will show wrong value.

D. Dirt or Burrs Error –it is caused by dirt and burr on the work piece and measuring instruments

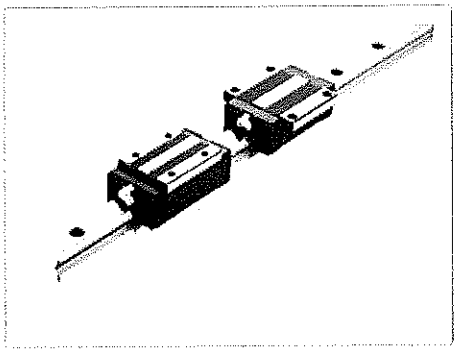
10. Write the name of the following parts.



A



B



C

A) Plain Bearing

B) Deep groove ball bearing

C) Linear Guideways

11. Write down the Advantages and Disadvantages of V-belt over Flat belt drive.

Advantages

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

Disadvantages

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

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 would be the 'tap depth' formula for 'Throughout Tap' if thickness of work piece is H and tap diameter is d?
   a) H+0.5d+3
   b) H+0.7d+3
   c) H+0.7d+0.3d+3
   d) H+0.3d+3
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. Soft Jaws 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 differences between the 'cut file' and 'milled file' with figures. Also draw tool geometry diagram and mention all the angles with correct values.
7. What do you understand by cold chisel? Why its head is not hardened? Which is more hard, hot or cold chisel?
8. Describe factors affecting tool penetration with examples.

Section – C

03X03 = 09 Marks

9. Describe the free cutting in sawing. What are types of free cutting saw blade (with diagrams)?
10. Derive the formula to calculate the chamfer value for Radius R.
11. Write the short notes on following (with diagram):
    a) Reaming
    b) Types of chisel
    c) Horizontal band saw

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 would be the 'tap depth' formula for 'Throughout Tap' if thickness of work piece is H and tap diameter is d?
   a) H+0.5d+3
   b) H+0.7d+3
   c) H+0.7d+0.3d+3
   d) H+0.3d+3
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. Soft Jaws 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 differences between the 'cut file' and 'milled file' with figures. Also draw tool geometry diagram and mention all the angles with correct values.
7. What do you understand by cold chisel? Why its head is not hardened? Which is more hard, hot or cold chisel?
8. Describe factors affecting tool penetration with examples.

Section – C

03X03 = 09 Marks

9. Describe the free cutting in sawing. What are types of free cutting saw blade (with diagrams)?
10. Derive the formula to calculate the chamfer value for Radius R.
11. Write the short notes on following (with diagram):
    a) Reaming
    b) Types of chisel
    c) Horizontal band saw

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.

Answer Key

Section – A

05X01 = 05 Marks

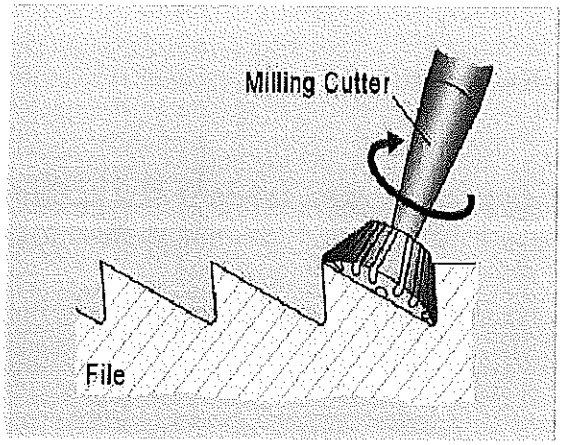
1. What happens if the size of clearance angle / relief angle becomes very less?
   a) The friction will be more and the surface quality will be bad
2. What would be the 'tap depth' formula for 'Throughout Tap' if thickness of work piece is H and tap diameter is d?
   c) H+0.7d+0.3d+3
3. Which one is not a part of file?
   b) Tang
4. Point angle of a twist drill is (degree)-
   c) 118
5. Soft Jaws can be made of-
   a) Plastic

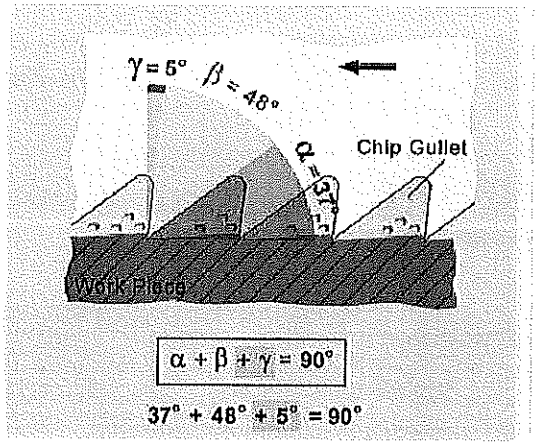
Section – B

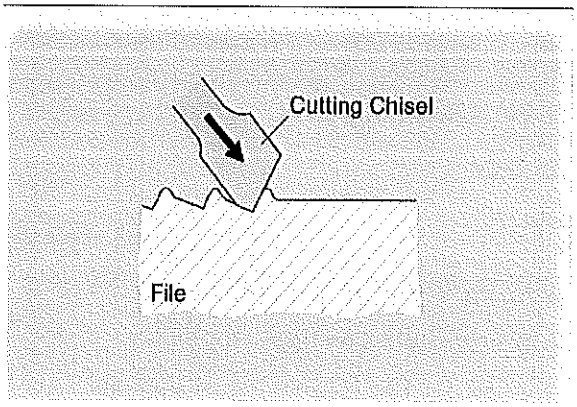
03X02 = 06 Marks

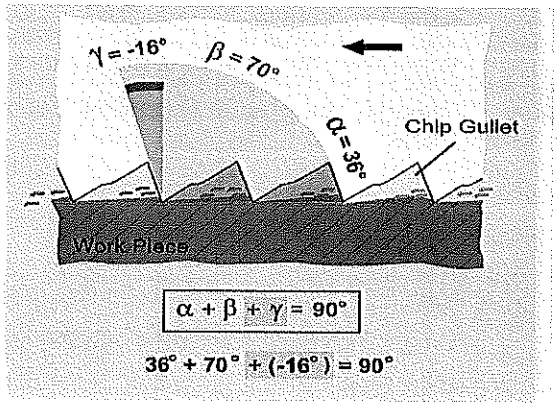
6. Write the differences between the 'cut file' and 'milled file' with figures. Also make tool geometry diagram and mention all the angles with correct values.
   Ans. **Cut file** – cut files are made by chiseling notches into the file face. This results in a file with a negative rake angle and a scraping effect. Therefore, cut files are preferred for hard materials.

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



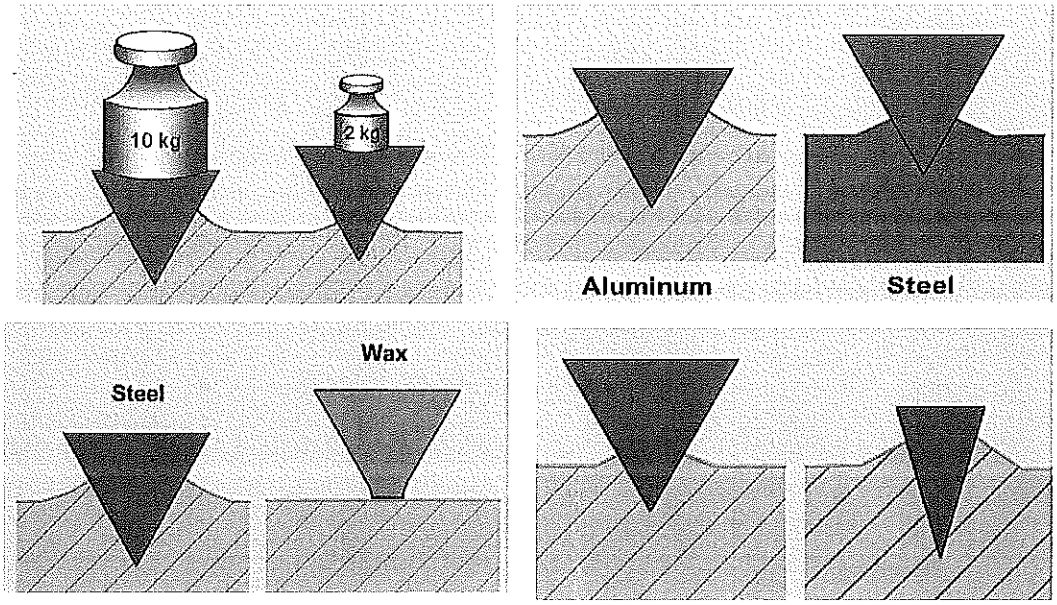






7. What do you understand by cold chisel? Why its head is not hardened. Which is more hard, hot or cold chisel?
   Ans. Cold chisel is a chisel in which there is no need to heat up the work piece (it can also work on cold work piece). Its head is not hardened because with hardness brittleness of material will also increases because of which tool's resistance to shock will also decreases so on hitting it by hammer its head will break down. The cold chisel is more hard than hot chisel.

8. Describe factors affecting tool penetration with examples.
   Ans. 1. The Force
   2. The work piece material
   3. The tool material
   4. The wedge angle

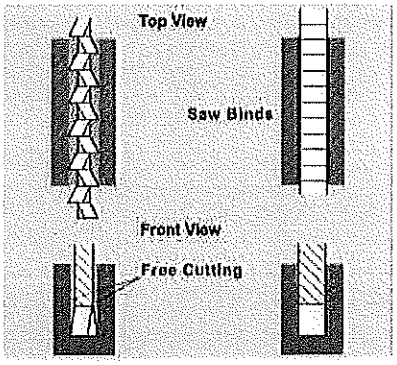


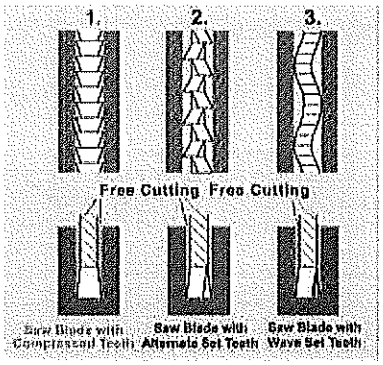
Section – C

03X03 = 09 Marks

9. Describe the free cutting in sawing. What are types of free cutting saw blade(with diagram)?

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.



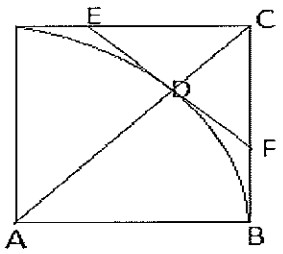


Free cutting types:

a) Compression of the teeth
b) Alternation of the teeth
c) Wave setting of the teeth

10. Derive the formula to calculate the chamfer value for Radius R.

Ans.



In triangle ABC –

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

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

Since, $AC = AD + DC$; $DC = AC - AD = 1.414R - R = 0.414R$

In triangle CDF –

Since DC and DF are equal,

Hence, $CF^2 = DC^2 + DF^2 = 0.414R^2 + O.414R^2$

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

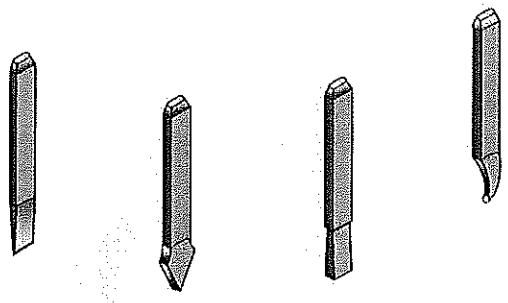
CF = 0.58R

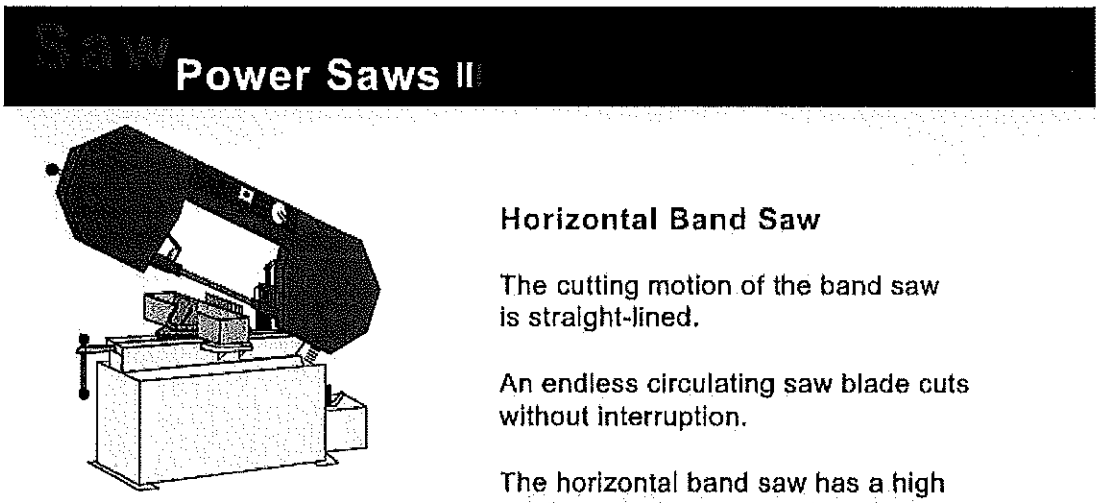
11. Write the short notes on following (with diagram).
    a) Reaming
    b) types of chisel
    c) horizontal band saw

Ans.

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

(b) 1. Flat chisel
2. Cape chisel
3. Web chisel
4. Round nose chisel





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: SMS1103 **Time: 1 Hour**

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

Instructions:

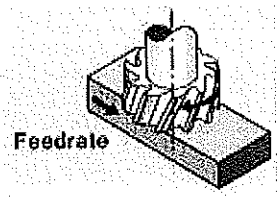
1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section – A

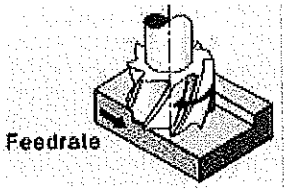
05X01 = 05 Marks

1. What is another name for Up Milling?
   a) Conventional Milling
   b) Climb Milling
2. Which one is Peripheral Milling procedure?

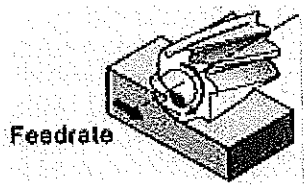
a)



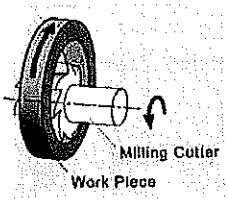
b)



c)



d)



3. 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

4. Type 'H' milling cutters are used to cut which of the following materials?
   a) Soft & stringy
   b) Hard & tough
5. What is coolant concentration range for milling?
   a) 7-8%
   b) 12-15%
   c) 4-6%
   d) 18-20%

Section – B

03X02 = 06 Marks

6. Which coolant is used in our workshop as a cutting oil? Write any 3 uses of cutting oil.
7. What is the difference between end mill and slot drills?
8. Define the following formula Parameter?
   a) Vc
   b) F (feed rate)

Section – C

03X03 = 09 Marks

9. Classify the milling cutter based on the hardness of the work piece material being machined.
10. Write down the different milling procedure based on the location of cutting edge.
11. What is Milling? Explain three type of milling machines design.

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: SMS1103 **Time: 1 Hour**

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

Instructions:

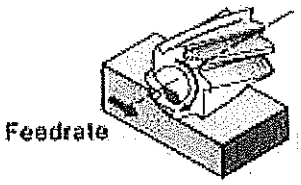
1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 05 Questions. Each question carries 1 Mark.
4. Section B contains 03 Questions. Each question carries 2 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Answer key

Section – A

05X01 = 05 Marks

1. What is another name for Up Milling?
   a) Conventional Milling
2. Which one is Peripheral Milling procedure?
   c



3. Which tool holder is used for tools having no shank?
   d) Arbor type tool holder
4. Type 'H' milling cutters are used to cut which of the following materials.
   b) Hard & tough
5. What is coolant concentration range for milling?
   a) 7-8%

Section – B

03X02 = 06 Marks

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

Ans. We are using strub company coolant. Its water soluble coolant. Use of the cutting oil as given below:

Better surface finish.

Longer tool life.

Lower energy consumption.

Cleaner cutting zone.

Better corrosion protection.

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

Ans. 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.

8. Define the following formula Parameter.

a) Vc

b) F (feed rate)

Ans

A) $Vc = \pi DN/1000$

Where Vc= cutting speed

D= dia of tool

N= R.P.M

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

Ans. Where V_f = feed rate

F_z = feed per tooth

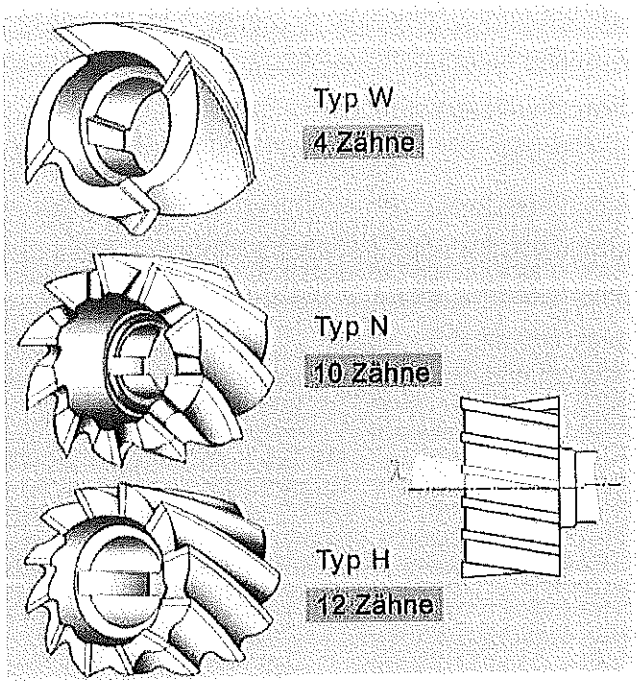
Z = no of teeth in cutter

N = R.P.M.

Section – C

03X03 = 09 Marks

9. Classify the milling cutter based on the hardness of the work piece material being machined.



Milling Cutter Classifications

Depending on the hardness of the work piece material being machined, milling cutters are divided into three classifications:

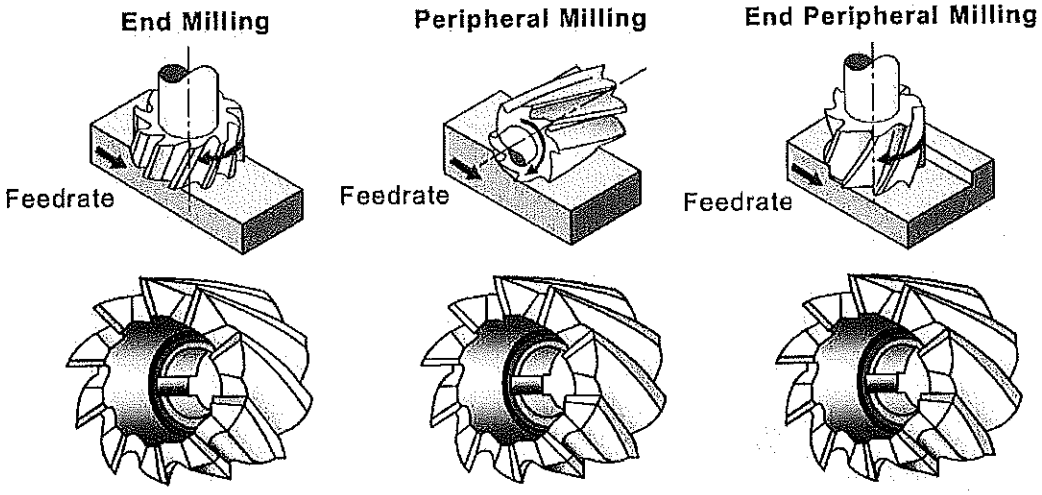
- **Classification S**, for soft work piece materials, such as aluminium
- **Classification N**, for work piece materials with normal hardness, such as structural steel
- **Classification H**, for hard work piece materials, such as tool steel

These differ from each other in the number of teeth, the size of the chip spaces and the configuration of the cutting edge angles. When choosing a milling cutter classification, the following rule applies:

- more teeth
- smaller chip spaces
- smaller helix angle

10. Write down the different milling procedure based on the location of cutting edge.

Location of the Cutting Edge Used to Produce the Surface



11. What is Milling? Explain three type of milling machines design.

Ans.

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

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

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

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

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: 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. 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
2. 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
3. What is the unit of cutting velocity?
   a) m/rev
   b) m/sec
   c) m/min
   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. Thread angle of metric thread is-
   a) 30 degrees
   b) 60 degrees
   c) 120 degrees
   d) None of the above

Section – B

03X02 = 06 Marks

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

Section – C

03X03 = 09 Marks

9. Explain at least 5 components of lathe machine.
10. Explain trapezoidal threads with short designation.
11. Write the steps to perform threading operation on lathe.

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: 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.

Answer Key

Section – A

05X01 = 05 Marks

1. Why do we use coolant?

d) All of the above

2. Under which condition tear chips can be formed-

a) Using a large depth of cut, low cutting speed.

3. What is the unit of cutting velocity?

c) m/min

4. Which type of chips will occurred while performing operation on ductile materials?

b) Continuous

5. Thread angle of metric thread is-

b) 60 degrees

Section – B

03X02 = 06 Marks

6. 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

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

Turning

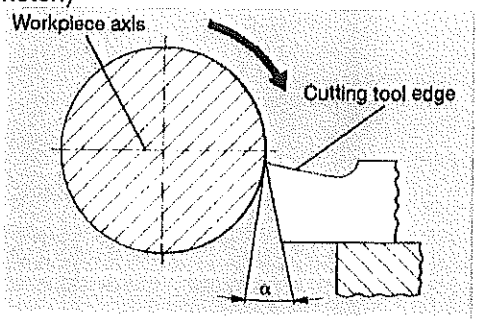
Facing

Grooving

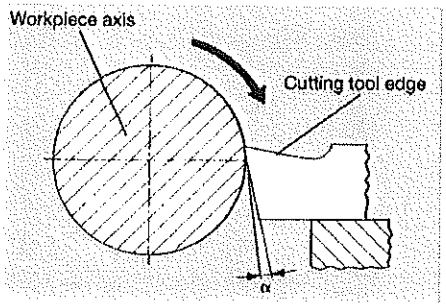
Turning in turning operation circular cutting motion is use to remove the material where the tool is feed against the rotating work piece thus the diameter of the work piece is reduce using geometrically defined tool.

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

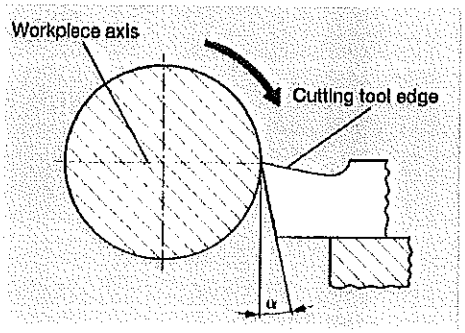
Ans. Positioning the tool below the midpoint of the work piece increases the clearance angle and reduces the rake angle, the tool will catch and cause an uneven surface to be produced.



Positioning the tool above the midpoint of the work piece reduces the clearnace 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.



Section – C

03X03 = 09 Marks

9. Explain at least 5 components of lathe machine.

Ans.) Lathe bed – The lathe bed is fixed to the lathe frame and made of grey cast iron which is extremely rigid and vibration free.

2.) Head stock – The headstock is used to transmit working energy to the work piece.

3.) Tailstock – The tailstock serves as a steady for long work piece and is also used for holding tools.

4.) Saddle- The longitudinal slide runs on the guide ways of the lathe bed. It can move by hand or through lead screw or feed shaft.

5.) Cross Slide- The cross slide is driven by threaded spindle. For transverse movement cross slide is required.

10. Explain trapezoidal threads with short designation.

Ans.) Trapezoidal threads can be axially loaded in two directions. The included angle is 30 degrees. The thread has "crest clearance", i.e. the thread turns must have "clearance"

On the core diameter and on the major diameter of the bolt.

When used as a motion transmitting thread, it is often multi –threaded and can withstand high loads.

The short designation for 30 mm trapezoidal thread is:

Tr 30x6

Tr =trapezoidal thread

30 = 30 mm nominal diameter

6 = 6 mm pitch

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.