BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I Semester,

End-Sem. Examination

Course Code: SMS1101 **Time: 2 Hour**

Course Name: Assembly & Measurement **Max. Marks: 50**

Instruction:

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 4 Marks.
5. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

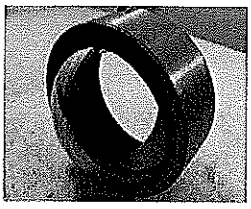
1. For a properly lubricated chain, efficiency is from-
   a) 70-80%
   b) 90-92%
   c) 80-90%
   d) 96-98%
2. Non-metallic gaskets are made up of-
   a) Wood & Brass
   b) Aluminum & Rubber
   c) Rubber & Asbestos
   d) All of the above
3. Example of semisolid lubricant is-
   a) Mineral oil
   b) Grease
   c) Graphite
   d) Vegetable oil
4. For Which applications plunger dial indicators are not used?
   a) Inspecting surface for flatness.
   b) Aligning Work piece
   c) Inspecting shaft roundness
   d) Measuring boring diameter

5. V-belts have a cross section-
   a) Circular
   b) Triangular
   c) Trapezoidal
   d) Rectangular
6. Outside Taper can be checked by-
   a) Taper Plug Gauge
   b) Outside Micrometer
   c) Ring Gauge
   d) Taper Ring Gauge
7. "Stem and stylus must be at right angle to the measurement surface." This sentence suits for-
   a) Puppet dial test indicator
   b) Plunger Type Test Indicator
   c) Sine Bar
   d) None of the above
8. Standard Temperature for measurement is-
   a) 250 C
   b) 200 C
   c) 180 C
   d) None of the above
9. Least size available in Slip Gauge block set which you have used?
   a) 1.0005
   b) 1.05
   c) 1.050
   d) 1.005
10. Radius gauge is type of-
   a) Form gauge.
   b) Limit gauge.
   c) Dimensional gauge
   d) Both form and limit gauge.

Section – B

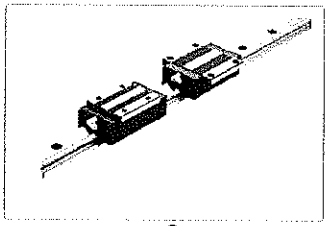
04X04 = 16 Marks

11. Write the name of the following parts.

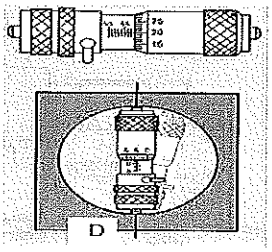


A

B



C



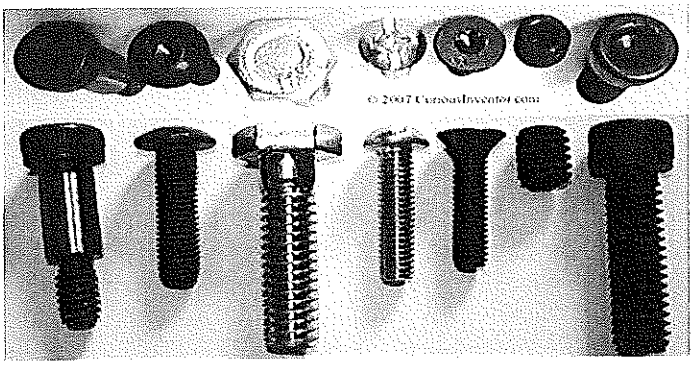
D

12. What is the difference between accuracy and precision?
13. Write down the Advantages and Disadvantages of v-belt over flat belt drive.
14. Which factors should we consider to select measuring tool?

Section – C

04X06 = 24 Marks

15. What is the importance of Least count? Also calculate the least count of Bevel Protractor.
16. Write down the names of any five from the picture given below.



17. Explain any Five:

    (a) Calibration of Measuring Instruments
    (b) Surface table
    (c) Geometrical Dimensions & Tolerances
    (d) Grade 8.8 in Bolt
    (e) Dial caliper
    (f) Repeatability of Measuring Instruments

18. What is Dowell pin? Write any two advantages and disadvantages of deep groove ball bearing.

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Answer Key

Section – A

10X01 = 10 Marks

1. For a properly lubricated chain, efficiency is from-

(d) 96-98%

2. Non-metallic gaskets are made up of

(c) Rubber & Asbestos

3. Example of semisolid lubricant is:

(b) Grease

4. For Which applications plunger dial indicators are not used?

(d) Measuring boring diameter

5. V-belts have a cross section.

(c) Trapezoidal

6. Outside Taper can be checked by

(d) Taper Ring Gauge

7. "Stem and stylus must be at right angle to the measurement surface." This sentence suit for

(a) Plunger Type Test Indicator

8. Standard Temperature for measurement is

(b) 20 C

9. Least size available in Slip Gauge block set which you have used: -

(d) 1.005

10. Radius gauge is type of.

(a) Form gauge.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

04X04 = 16 Marks

11. Write the name of the following parts.
    A. Plain Bearing
    B. Deep groove ball bearing
    C. Linear guideways
    D. Two point contact micrometer

12. 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.

13. 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.

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

    Ans:- (1) Tolerances of given size
    (2) Range of given dimension
    (3) Availability of measuring instruments
    (4) Time consumption in measurements

Section – C

04X06 = 24 Marks

15. Importance of Least count and Calculate the least count of Bevel Protractor. (3+2)

    Answer: - <u>Importance of least count: -</u>

    1. Without least count we cannot take Measurement.
    2. To define any kind of reading in measuring instruments we should know the least count.
    3. With the help of least count of measuring instruments we can define the precision.

Least count of Bevel Protractor = value of one division on main scale/ Total No of division on sub scale

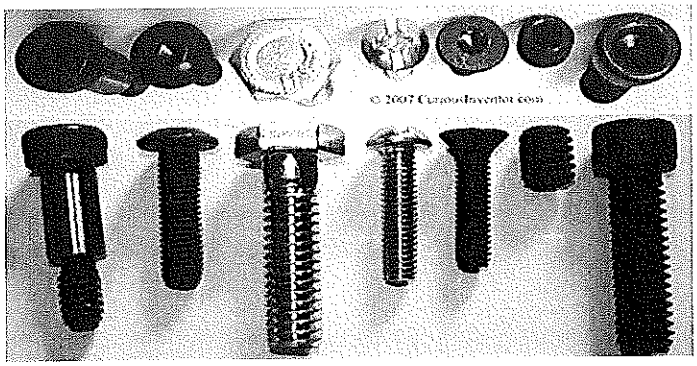
= 1/12

$=1*60/12$ (Because 1^0= 60 minute)

= 5'

16. Write down the names of any five from the picture given below.

a. **Set screw**
b. **Button head cap screw**
c. **CSK screw**
d. **Button head cap screw**
e. **Hexa head cap screw**
f. **Round head slotted cap screw**



17. Explain any Five

Answer: -

(1) Calibration of measuring Instruments: -

Calibration means to check the correctness of measuring instruments with a standard.
It is very important otherwise we cannot sure the about perfect measurement.
With the help of Slip gauge grade 00 we can check or calibrate the measuring instruments.

(2) Surface plate in measuring

Surface plate is a standard base plate used for measuring. This is very precise and accurate & provide the flat datum to measure any kind of dimension.
It can be made of Cast Iron and Granite.
Granite Surface table is very precise and costly.
It is having a very good compressive strength.

(3) Geometrical Dimensions & Tolerances

Geometrical Dimension & Tolerance is used in drawing to control the geometrical feature in a part.
With the help of GD&T we can achieve better geometry & best fits.
There are so many geometrical symbols are used: -
Like Concentricity, Parallelism, flatness, run out, total run out, Cylindrical, Eccentricity, surface of line, surface of profile etc.

(4) Grade 8.8 in Bolt

This grade 8.8 refers the fastener grade
First letter 8 denotes the ultimate tensile strength which is 800 N/mm^2
And second letter 8 denotes the yield strength which is 80% of UTS.

(5) Dial caliper

Dial caliper is measuring instruments to check the various dimension like length, width, thickness, depth etc.
It is having a least count of 0.01 mm.
Dial caliper is an advance Vernier with having dial.
With the help of dial caliper we can identify the measurement variation also.

18. (A) What is Dowell pin? Write any two advantages and disadvantages of deep groove ball bearing. (1+4)

(A) They are short, cylindrical rods made of various materials including wood, metal, plastic. Dowell pins can be tapered, grooved, slotted.

S.No.	ADVANTAGES	DISADVANTAGES
	a. Relatively large size of balls, these bearings have high load carrying capacity. b. Due to point contact between the balls and races, frictional loss and temperature rise is less.	a. Not self-aligning, accurate aligning between shaft and housing bore is required. b. Poor rigidity compared to roller bearing.

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School of Manufacturing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I Semester,

End-Sem. Examination

Course Code: SMS1102 **Time: 2 Hour**

Course Name: Handskills **Max. Marks: 50**

Instruction:

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 4 Marks.
5. Section C contains 04 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Which is not a type of tool holder?
    a) Sleeve
    b) Drill chuck
    c) Tap wrench
    d) Tap
2. Which of the file cut configuration has the worst chip evacuation?
    a) Straight cut
    b) Curved cut
    c) Diagonal
    d) Both a &
3. Reaming process can be done without pre drill-
    a. True
    b. False
4. To remove the weld seams which types of chisel is used?
    a) Web chisel
    b) Flat chisel
    c) Cap chisel
    d) None
5. Punching is a process of
    a) Making conical depression on to the surface of work piece
    b) Transferring the dimension and contour onto the work piece surface
    c) Both a & b
    d) None of them

6. The size of the rake angle mainly influences-
    a) Work piece surface
    b) Friction between tool and work piece
    c) Chip formation
    d) None of the above
7. What would be the procedure for tapping process?
    a) Drill – tap
    b) Drill – core drill – tap
    c) Drill – csk – tap
    d) Spot drill – drill – csk – tap
8. 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
9. Which chisel is used in making lubricating grooves?
    a) flat chisel
    b) Web chisel
    c) Cape chisel
    d) Round nose chisel
10. 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

Section – B

04X04 = 16 Marks

11. What do you understand by Bench vice? Write the names of its parts.
12. Define scribing and punching. Explain on which factors the accuracy of punching depends?
13. Write the formula for cutting speed. Also define its nomenclature with its units. If rpm is given 1000 and tool diameter is 5 cm, then calculate cutting speed.
14. Write short notes on following:

    a) Tapping **b)** Reaming **c)** Counter sinking **d)** counter boring

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – C

04X06 = 24 Marks

15. What occupational safety should be considered during the work in the workshop (any ten)?
16. Explain the following terms with a neat and clean diagram:
    a) Core diameter
    b) Pitch
    c) Lead
    d) Pitch diameter
17. a) Write the application of filing.
    b) Describe the difference between cut files and milled files.
18. Explain the accessories for the work piece clamping.

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School of Manufacturing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I Semester,

End-Sem. Examination

Course Code: SMS1102 **Time: 2 Hour**

Course Name: Handskills **Max. Marks: 50**

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3. Section A contains 10 Questions. Each question carries 1 Marks.
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5. Section C contains 04 Questions. Each question carries 6 Marks.

Answer Key

Section – A

10X01 = 10 Marks

1. Which is not a type of tool holder
   a) Sleeve
   b) Drill chuck
   c) Tap wrench
   d) Tap

Ans. d

2. Which of the file cut configuration has the worst chip evacuation-
   a) Straight cut
   b) Curved cut
   c) Diagonal
   d) Both a &

Ans. a

3. Reaming process can be done without pre drill
   a. True
   b. False

Ans. a

4. To remove the weld seams which types of chisel is used
   a) Web chisel
   b) Flat chisel
   c) Cap chisel
   d) None

Ans. b

5. Punching is a process of
    a) Making conical depression on to the surface of work piece
    b) Transferring the dimension and contour onto the work piece surface
    c) Both a & b
    d) None of them

Ans. a

6. The size of the rake angle mainly influences-
    a) Work piece surface
    b) Friction between tool and work piece
    c) Chip formation
    d) None of the above

Ans. c

7. What would be the procedure for tapping process?
    a) Drill – tap
    b) Drill – core drill – tap
    c) Drill – csk – tap
    d) Spot drill – drill – csk – tap

Ans. d

8. 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

Ans. a

9. Which chisel is used in making lubricating grooves?
    a) flat chisel
    b) Web chisel
    c) Cape chisel
    d) Round nose chisel

Ans. d

10. 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

Ans. a

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

04X04 = 16 Marks

11. What do you understand by Bench vice? Write the names of its parts.

Ans.

Bench vice is a clamping device which is mounted on the bench and it used to clamp the work piece.

- The main parts of a vice
- Handle
- Spindle
- Fix jaw
- Movable jaw
- Lead screw
- Dovetail guide ways
- Anvil plate
- Height adjusting lever

12. Define the scribing and punching. Explain on which factors the accuracy of punching depend?

Ans.

punching is a process of making a small cone shaped depression into the work piece by the help of hammer and layout punch

Scribing- scribing a process of transfer the drawing dimension and contours onto the work piece.

The accuracy of punching depends:

a) Accurate scribing
b) How sharp the tip of the punch.
c) How the punch is used.
d) The position of the punch
e) When the hammer is hit correctly

13. Write the formula for cutting speed. Also define its nomenclature with its units. If rpm is given 1000 and tool diameter is 5 cm, then calculate cutting speed.

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

With this formula,

Vc = (3.14 x 50 x 1000) / 1000

Vc=157.5 m/min

14. Write short notes on following:

a) Tapping **b)** Reaming **c)** Counter sinking **d)** counter boring

Ans.

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

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

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

d) Counter boring- It is a process to enlarge a drill with a certain depth.

Section – C

04X06 = 24 Marks

15. What occupational safety should be considered during the work in the workshop (any ten)?

1. Eating and drinking in the mechanical workshop areas are strictly prohibited.
2. When working with machine tools or other equipment with rotating spindles, jewelry, loose clothing etc. are prohibited and long hair must be completely covered.
3. Personal Protective Equipment (PPE) is supplied and must be used where necessary. Barrier cream, lab coats/overalls, eye and hearing protection, dust masks and safety shoes must be used as the work/risk assessment dictates.
4. The gangway through the workshop must be kept clear. Any oil spillage, grease etc. must be cleaned up immediately.
5. Inform Trainer for Unsafe Conditions
6. Student affected by drugs or alcohol **should not be permitted** in the workshop
7. Make sure your work piece is fixed securely before work commences
8. Immediately notify the workshop trainer of any faulty or broken equipment
9. Wash hands after using equipment and materials
10. If an accident does happen, no matter how small, it must be reported to the trainer.

16. Explain the following terms with a neat and clean diagram:

a) Core diameter

b) Pitch

c) Lead

d) Pitch diameter

Ans.

a) Core diameter- minor diameter is called core diameter

b) Pitch- the linear distance between the peek point of two adjacent thread.

c) Lead- Linear distance traveled by one revolution of thread

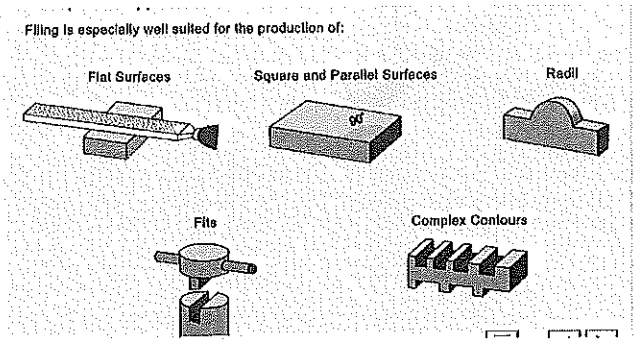
d) Pitch diameter- the diameter of pitch circle is called pitch diameter

17. a) write the application of filing

b) Describe the difference between cut files and milled files

Ans.

a) Application of filing



b) Difference between the cut files and milled files

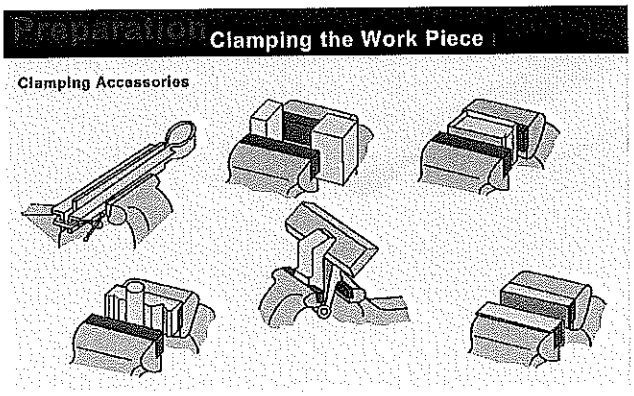
c) **Cut file** – cut files are made by chiseling notches into the file face. This results in a file with a negative rake angle and a scraping effect. Therefore, cut files are preferred for hard materials.

d) **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

18. Explain the accessories for the work piece clamping.

Ans.

- oversize jaw
- Equal width spacer
- Spacer
- File vice
- V-groove Jaw
- Soft jaws



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School of Manufacturing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I Semester,

End-Sem. Examination

Course Code: SMS1103 **Time: 2 Hour**

Course Name: Conventional Milling **Max. Marks: 50**

Instructions:

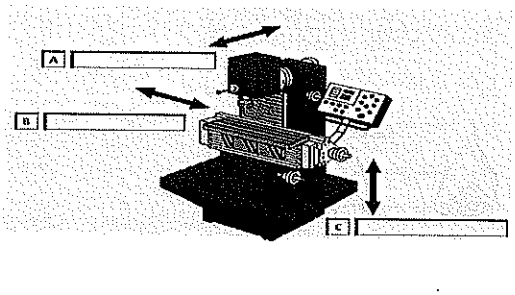
1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 4 Questions. Each question carries 4 Marks.
5. Section C contains 6 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. What is another name for Up Milling?
   a) Conventional Milling
   b) Climb Milling
   c) Face Milling
   d) End Milling
2. During Rough Milling, high Cutting forces arise. Here axial and radial angle must be:
   a) Positive
   b) Negative
   c) Both positive and negative
   d) None of the above
3. Type 'H' milling cutters are used to cut materials:
   a) Soft & stringy
   b) Hard & tough
   c) Both
   d) None of the above
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) All of the above
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) Peripheral 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 Transverse Axis in the given figure:
   a) X axis
   b) Y axis
   c) Z axis
   d) None of the above



10. Wedge angle is the angle between _____ and _____.
    a) Tool flank & face
    b) Face & finish surface

Section – B

04X04 = 16 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		
Chip Space		
Helix Angle		

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

04X06 = 24 Marks

15. Explain the following milling machine parts:
    a) Machine column and base
    b) Knee
    c) Main drive
    d) Feed device
16. Explain any four types of tool wears?
17. Difference between face mill & shoulder mill?
18. Difference between slot drill & end mill?

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Course Code: SMS1103 **Time: 2 Hour**

Course Name: Conventional Milling **Max. Marks: 50**

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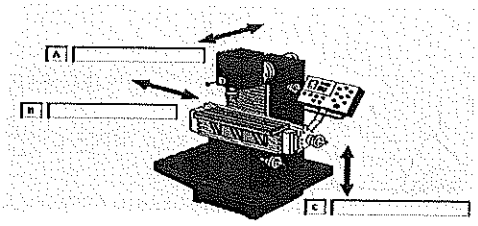
Answer Key

Section – A

10X01 = 10 Marks

1. What is another name for Up Milling?
   a) Conventional Milling
2. During Rough Milling, high Cutting forces arise. Here axial and radial angle must be:
   a) Positive
3. Type 'H' milling cutters are used to cut materials:
   b) Hard & tough
4. Which tool holder is used for tools having no shank?
   d) Arbor type tool holder
5. Which type of wear is caused due to fluctuations in temperature?
   b) Thermal cracks
6. What are the types of Milling Process used for position of the cutting edge in use?
   d) Peripheral Milling
7. What is coolant concentration range for milling?
   a) 8-10%
8. Rake angle is the angle which is useful for_____
   c) Chip removal

9. Identify the Feed Axis in the given figure:



a) X axis

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

b) Tool flank & face

Section – B

04X04 = 16 Marks

11. Define the following formula Parameter?

$V_f = f_z \times z \times n$

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:

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

13. Match the following

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.

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

04X06 = 24 Marks

15. Explain the following milling machine parts:

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?

Ans. 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 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.

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.

17. Difference between face mill & shoulder mill?

    SHOULDER MILL- shoulder mill is used for generating a shoulder on workpiece. Shoulder mill inserts are inserted at an angle of 90.

    FACE MILL- Face mill is used for generating an angular surface. Face mill inserts are inserted at an angle of 45.

18. Difference between slot drill & end mill?

    Slot drill we can plunge directly in our workpiece .it has center cutting edges

    End mill-we cannot plunge directly in our workpiece .it doesn't have center cutting edges.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I Semester,

End-Sem. Examination

Course Code: SMS1104 **Time: 2 Hour**

Course Name: Conventional Turning **Max. Marks: 50**

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 4 Questions. Each question carries 4 Marks.
5. Section C contains 6 Questions. Each question carries 6 Marks.

Section – A

10X01 = 10 Marks

1. Which of the following is not the mode of action of the screw?
   (A) Measuring
   (B) Tensioning
   (C) Setting and moving
   (D) Undercut
2. 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
3. In lathe machine, the correct sequence for external thread-
   (A) Undercut, chamfer, turning & threading
   (B) Chamfer, undercut, turning & threading
   (C) Turning, undercut, chamfer & Threading
   (D) Turning, chamfer, threading & Undercut
4. Why we make undercut in thread?
   (A) Thread tool relaxation & Self-looking.
   (B) To clean the face
   (C) To reduce the diameter
   (D) None of the above

5. In lathe machine, tailstock is used for:
   (A) Supporting long shaft
   (B) Drilling
   (C) Reaming
   (D) All of the above
6. Which of the following operation produce chip less thread?
   (A) Swirl machining
   (B) Thread- milling
   (C) Grinding
   (D) Rolling
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. Which one is the correct answer?
   (A) Vc = $\frac{\pi dn}{1000}$ cm/min
   (B) Vc = $\frac{\pi dn}{1000}$ mm/min
   (C) Vc = $\frac{\pi dn}{1000}$ m/min
   (D) Vc = $\frac{\pi dn}{1000}$ $m/sec.$
9. Which thread is capable to bear heavy load in both direction?
   (A) V – shaped Threads
   (B) Trapezoidal Threads
   (C) Withworth Threads
   (D) Buttress Threads
10. 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

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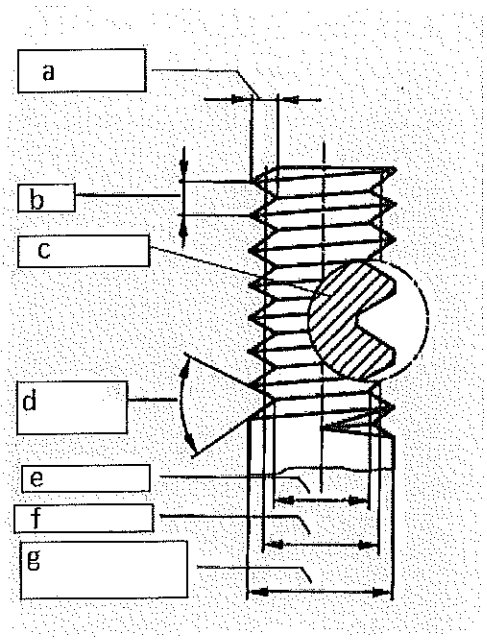
Section – B

04X04 = 16 Marks

11. Identify and write down the designation of the respectively and explain any five of them?



12. Write difference between right hand tool and left hand tool? (with neat sketch)
13. Define:
    - Tool wedge angle
    - Clearance angle
    - Rake angle
14. A shaft of 60 mm diameter is to be plain turned. The lathe is turning at a speed of 120min-1. What is the cutting speed 1vc in m/min?

Section – C

04X06 = 24 Marks

15. For thread M16X2, calculate: -
    (a)Thread depth
    (b)Required chamfer
    (c)Minor diameter
16. Define Average roughness value (Ra) and Average maximum height of the profile (Rz). Which value is greater for the same surface roughness?
17. Write down the classification of thread?
18. Why do we do centering of turning tools before machining? (with a neat sketch)

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Answer Key

Section – A

10X01 = 10 Marks

Q1. Which of the following is not the mode of action of the screw?

(A) Undercut

Q2 Pitch is defined as

(A) The distance between two consecutive threads

Q3 In lathe machine, the correct sequence for external thread

(C)Turning, undercut, chamfer & Threading

Q4 Why we make undercut in thread?

(A) Thread tool relaxation & Self-looking.

Q5 In lathe machine, tailstock is used for

(D)All of the above

Q6 Which of the following operation produce chipless thread?

(D) Rolling

Q7 Why do we use coolant?

(D)All of the above

Q8 Which one is the correct answer?

(C)Vc = $\frac{\pi dn}{1000}$ m/min

Q9 Which thread is capable to bear heavy load in both direction?

(B) Acme Threads

Q10 What is the use of rake angle in a tool?

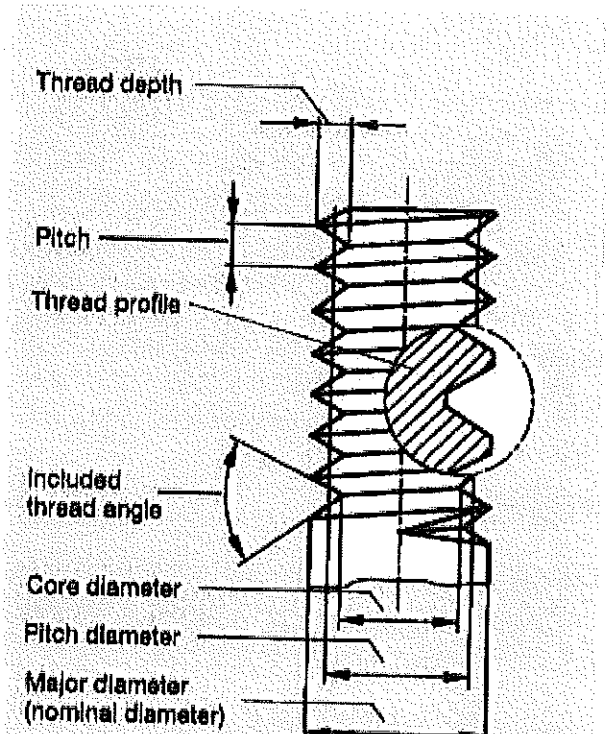
(A) Chips removal

Section – B

04X04 = 16 Marks

Q11 Identify and write down the designation of the respectively and explain any five of them?

Ans.



- Nominal diameter: the external thread diameter
- Core diameter: on an external thread, this is the diameter of the remaining cross-section. On internal threads, it is approximately the same as the diameter of the bore hole.
- Pitch diameter: this is approximately halfway between the nominal diameter and the core diameter.
- Included thread angle: the included thread angle is the angle between the thread flanks.
- Pitch: the pitch is the axial distance from thread turn to thread turn.
- Thread depth: this indicates how far into the material the thread profile goes.
- Thread profile: this indicates the shape of the thread.

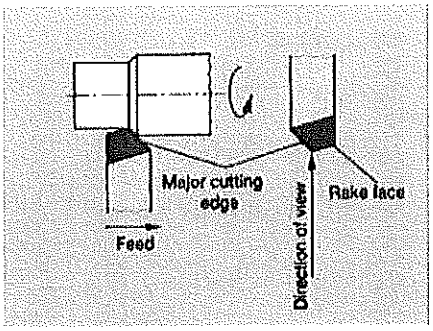
Q12 Write difference between right hand tool and left hand tool?

Ans

cutting tool are also characterized by the arrangement of their main cutting edge

Left hand tool

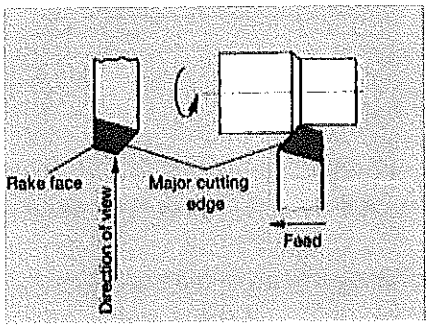
When the direction of tool feed is from left to right then a left hand cutting tool must be in used. When viewed from the workpiece the major cutting edge lies on the left side of the cutting tool.



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.



Q13 Define:

- Tool wedge angle (beta)
  This is the angle between the rack angle 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 (alpha)
  This is the angle between the surface of the workpiece and the flank of the cutting wedge. Clearance angle of 6 degrees to 8 degrees are effective for metal working purposes.

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

Q14 A shaft of 60 mm diameter is to be plain turned. The lathe is turning at a speed of 120min^{-1}.

What is the cutting speed v_c in m/min?

Ans given: d=60mm

n=120 min^{-1}

required: v_c

Answer: v_c=d. π. n

v_c=60mm×3.14×120 min^{-1}

v_c=0.60m×3.14×120 min^{-1}

v_c=22.6m/min

Section – C

04X06 = 24 Marks

Q15. For thread M16X2, calculate: -

(a) Thread depth

(b) Required chamfer

(c) Minor diameter

Ans. (a). Thread depth = 0.614 × pitch

= 0.614 × 2

= 1.228 mm (radially)

Thread depth (diametrically) = 2 × 1.228

= 2.456 mm

(b). Required Chamfer = $\frac{major\ dia.-minor\ dia.}{2}$ + 0.5

= $\frac{15.8-13.3}{2}$ +0.5

= 2 mm (approx.)

(c). Minor diameter = major dia. – thread depth

= 15.8 – 2.5

= 13.3 mm

Q16. Define Average roughness value (Ra) and Average maximum height of the profile (Rz).

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_e) 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.

Q17. write down the classification of thread?

Ans.

Thread are classified according to four factors:

1 **Purpose**

We distinguish between fastening threads and motion –transmitting threads.

Fastening threads

Generally single- threaded V-shaped thread with an included angle of 60 degree and maximum lead angle of 5 degree

Motion transmitting threads

Used to covert rotational motion into linear motion or vice versa. The profile changes according to load application

2 Direction of rotation

If you hold a screw vertically, the thread turns rise towards the right with a right-hand thread and towards the left with a left-hand thread.

Right-hand thread

Left-hand thread

Threads are normally right-handed.

A left-hand thread is only used if a right-hand thread would come unscrewed (e.g. grinding wheel fastening, turnbuckle, bicycle pedals) or if there is a risk of confusion (gas bottles).

LH (left hand) is added to the thread designation, e.g. M 16-LH.

3 number of threads

You can tell the number of thread turns from the thread starts.

Single-Threaded

Single-threaded is the most common type.

Multi- Threaded

For the double-threaded type, the pitch is twice the pitch of the single-threaded type, which means that a large axial motion is achieved with a small rotation (screw presses, worms).

4 profile

V-shaped thread

V-shaped thread

All V-shaped threads have small lead angles and are used as fastening threads. Their thread profile has a triangular shape.

Trapezoidal thread

Trapezoidal threads
can be axially loaded in two directions. The included thread angle is 30°. 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.

Buttress thread

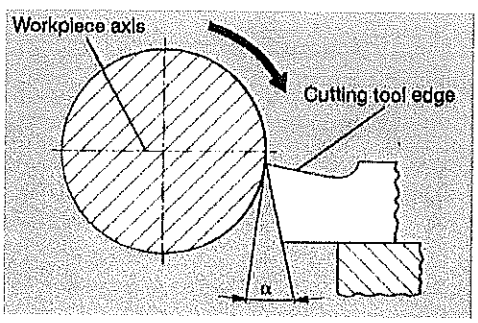
Buttress threads
are particularly suited to high, one-sided, axial loads. The load-bearing flank side is approximately perpendicular to the screw axis. The thread is centred on the major diameter. The high level of filleting on the thread turns on the bolt core reduces the notch effect, thereby increasing the load capacity.

Round thread

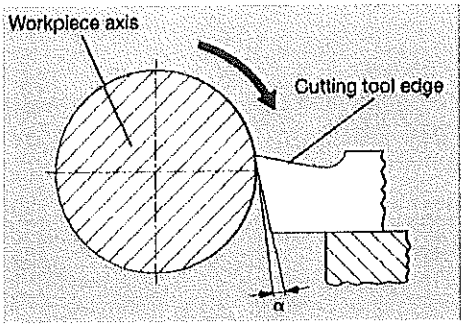
Round threads
are less sensitive to damage and dirt. They are therefore primarily used for fittings, hose connections, railway couplers, bulb holders, etc.

Q18. Why do we do centering of turning tools before machining? (with a neat sketch)

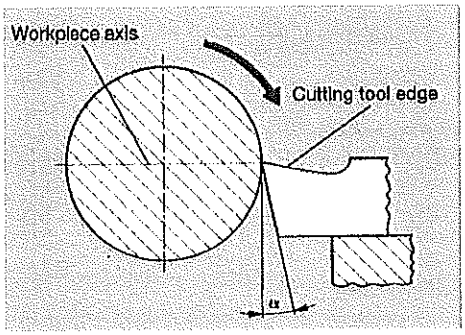
Ans.



Positioning the tool below the midpoint of the workpiece increases the clearance angle and reducesthe 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.