BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2018-19 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Set- 1

Course Code: SMS1102 **Time: 1.5 Hours**

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

Instructions:

1. Attempt all questions.
2. Use of Calculator is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 04 Questions. Each question carries 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section – A

10X01 = 10 Marks

1. An endless circulating saw blade is used in?
   a) Power hack saw
   b) Horizontal band saw
   c) Circular saw
   d) None of the above
2. Please put the process steps required for producing the slot shown into the correct order –
   1) Layout punch the center of the hole 2) Rough and finish file the side surfaces 3) Drill and deburr both holes D8 mm **4)** Scribe the side surfaces and center of the holes **5)** deburr the filed surfaces **6**) Choose the reference plane for dimensions 7**)** Remove the web with the web chisel
   a) 2-1-3-4-7-5-6
   b) 6-5-2-1-6-7-3
   c) 6-4-3-7-2-1-5
   d) none
3. On which of the following factors the cutting speed depends:
   1. Work piece material 2) size of the work piece 3) Cutting tool material 4) Shape of Work piece
   a) Only 1 & 2
   b) Only 1 & 3
   c) Only 2,3,4
   d) All 1,2,3,4

4. The cutting edge penetrates the material and how far it penetrates depends on?
    a) Rake angle
    b) Wedge angle
    c) Relief angle
    d) All
5. Which means of clamping is used to make bevels and chamfers easier to file?
    a) Over size soft jaws
    b) File vise
    c) V-groove jaws
    d) Equal width space
6. Which of the file cut configuration has the worst chip evacuation-
    a) Straight cut
    b) Curved cut
    c) Diagonal
    d) Both a & b
7. The Tapered portion of core drill by which it can be gripped is known as:
    a) Body
    b) Shank
    c) Cutting edge
    d) Flutes
8. Which one is the application of chamfer?
    a) To ease lead during fitting
    b) To reduce the risk of cut injuries on the work piece edges
    c) To make work piece edges esthetically pleasing
    d) All of the above
9. For manufacturing of certain amount of hole, maximum hole size was found to be 50.14 mm and minimum hole size was found to be 49.98. Tolerance in mm will be:
    a) 0.12
    b) 0.16
    c) 0.13
    d) 0.20
10. For negative rake angle, tool will be
    a) Smoother
    b) Harder
    c) Stronger
    d) Weaker

Section – B

04X05=20 Marks

11. Write the formulae with their nomenclature for the depth calculation of Blind drill, Blind Tap and Throughout Tap with sketches?

12. Write the formula for cutting speed. Also define its nomenclature with its units. If cutting speed is 35 m/min and tool diameter is 5 cm then calculate the RPM.
13. Define punching and scribing. Explain on which factors the accuracy of punching depend.

Section – C

02X10 = 20 Marks

14. Explain the following:
    a) The Rules and techniques should be considered during filing and sawing?
    b) The tool geometry of cutting tool with a neat sketch.
15. Describe the following with the help of sketch:
    a) Rt b) Rz C) Ra

Set- 2

Course Code: SMS1101 **Time: 1.5 Hours**

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

Instructions:

1. Attempt all questions.
2. Use of Calculator is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 04 Questions. Each question carries 05 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A **(10 x 01 = 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. What can be used instead of key to prevent relative motion between the hub and shaft in small power transmissions?
   (a) Roller Bearing
   (b) Set Screw
   (c) Taper Roller Bearing
   (d) Cir clip
5. For Which application plunger dial indicators are not used?
   (a) Inspecting surface for flatness.
   (b) Aligning Work piece
   (c) Inspecting shaft roundness
   (d) Measuring boring diameter
6. V-belts have a cross section:
   (a) Circular
   (b) Triangular
   (c) Trapezoidal
   (d) Rectangular
7. Outside Taper can be checked by:
   (a) Taper Plug Gauge
   (b) Outside Micrometer
   (c) Ring Gauge
   (d) Taper Ring Gauge
8. "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
9. Standard Temperature for measurement is:
   (a) 25^0 C
   (b) 20^0 C
   (c) 18^0 C
   (d) None of the above
10. Least size available in Slip Gauge block set which you have used:
   (a) 1.0005
   (b) 1.05
   (c) 1.050
   (d) 1.005

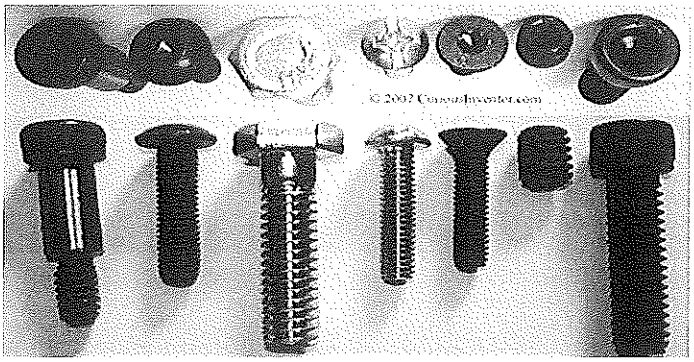
Section-B **(04 x 05 = 20 Marks)**

11. Write the importance of Least count and Calculate the least count of Bevel Protractor. (3+2)

12. What is the function of a guideway? Give the name of two types of guide ways. (3+2)

13. Give the three differences between Gauges & measuring Instruments. Write the three uses of feeler gauge. (3+2)

14. Write down the name of any five from the picture given below: (5)



Section-C **(02 x 10 = 09 Marks)**

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

(B). What is the use of spring washer? Give the difference between direct and indirect measurement with examples. (2+3)

16. Explain any Five: (2*5)

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

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Answer Key

School of Manufacturing Skills

Session: 2018-19 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1102 **Time: 90 Min.**

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

Set- A

Section – A

10X01 = 10 Marks

1. An endless circulating saw blade is used in?

   Ans.

   b) Horizontal band saw

2. Please put the process steps required for producing the slot shown into the correct order –

   → Layout punch the center of the hole 2) Rough and finish file the side surfaces **3)** Drill and deburr both holes D8 mm **4)** Scribe the side surfaces and center of the holes **5)** deburr the filed surfaces **6)** Choose the reference plane for dimensions **7)** Remove the web with the web chisel

   Ans.

   d) none

3. On which of the following factors the cutting speed depends;

   1. Work piece material 2) size of the work piece 3) Cutting tool material 4) Shape of Work piece

   Ans.

   b) Only 1 & 3

4. The cutting edge penetrates the material and how far it penetrates depends on?

   Ans.

   c) All

5. Which means of clamping is used to make bevels and chamfers easier to file?

   Ans.

   b) File vise

6. Which of the file cut configuration has the worst chip evacuation-

   Ans.

   a) Straight cut

7. The Tapered of portion of core drill by which it can be gripped is known as

Ans.

b) Shank

8. Which one is the application of chamfer?

Ans.

d) All of the above

9. For manufacturing of certain amount of hole, maximum hole size was found to be 50.14 mm and minimum hole size was found to be 49.98. Tolerance in mm will be

Ans.

b) 0.16

10. For large negative rake angle, tool will be

Ans.

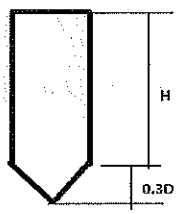
c) Stronger

Section – B

04X05=20 Marks

11. Write the formula with its nomenclature for the depth calculation of Blind drill, Blind Tap and Throughout Tap with sketch?

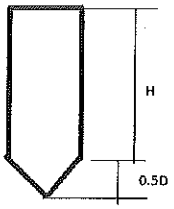
Ans. For blind drill:



Depth =H+0.3D where H= given drawing depth

D= drill diameter

For Blind tap:



Depth =H+0.5D+3 where H= given drawing depth

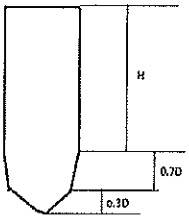
D= drill diameter

3 = it indicate the machine default value

Depth = H+0.7D+0.3D+3 where H= given drawing depth

D= drill diameter

3= It indicate machine value



12. Explain the cutting parameters in brief.

Ans.

- **Cutting speed and spindle speed-** Cutting speed is the relative speed at which the tool passes through the work material and removes metal. It is normally expressed in meters per minute. It has to do with the speed of rotation of the workpiece or the tool, as the case may be.

  Spindle speed: Spindle speed is expressed in RPM (revolutions per minute)
- **Depth of cut-** It indicates how much the tool digs into the component (in mm) to remove material in the current pass.
- **Cutting feed-** The relative speed at which the tool is linearly traversed over the workpiece to remove the material. In case of rotating tools with multiple cutting teeth (like a milling cutter), the feed rate is first reckoned in terms of "feed per tooth," expressed in millimeters (mm/tooth). At the next stage, it is "feed per revolution" (mm/rev).

13. Write the formula for cutting speed. Also define its nomenclature with its units. If cutting speed is 35 m/min and tool diameter is 5 cm then calculate the RPM.

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, $35 = 3.14 \times 50 \times N / 1000$

$N = 233 rev/min$

14.

Ans.

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

Ans. **punching** is a process of making a small cone shaped depression into the workpiece by the help of hammer and layout punch

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

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

Section – C

02X10 = 20 Marks

15.

a) What rules and techniques should be considered during filing and sawing?

Ans.

→ for filing

1. Work piece should be clamped tightly and cover 70% of surface in clamping
2. Holding the file
3. Posture and gesture
4. Movement of file
5. Pressure distribution
6. Height of the vice
7. Feed

→ For sawing-

- Scribing should be accurate and visible
- Workpiece clamping
- Making notch before starting sawing

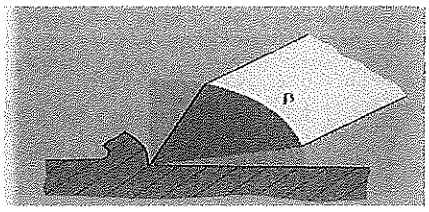
- Check saw blade tension .it must be tight and having better teeth.

- Direction of the teeth of saw blade
- Posture and gesture

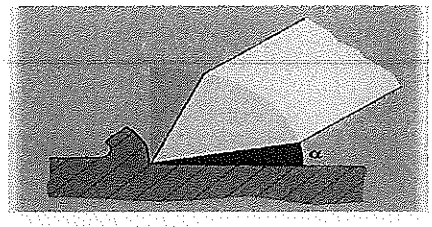
b) Explain tool geometry of cutting tool with neat sketch.

Ans.

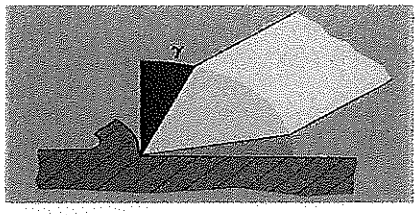
- **Wedge angle**-The size of the wedge angle influence the cutting force of the metal removal process.



- **Relief angle**-the size of the relief angle influence the friction between the workpiece surface and the tool. I reduce the surface quality of the workpiece and tool life



- Rake angle –this angle influence the cutting force as well chip formation in the metal removal process.



16. Describe the following (with sketch)

a) Rt b) Rz C) Ra

Ans.

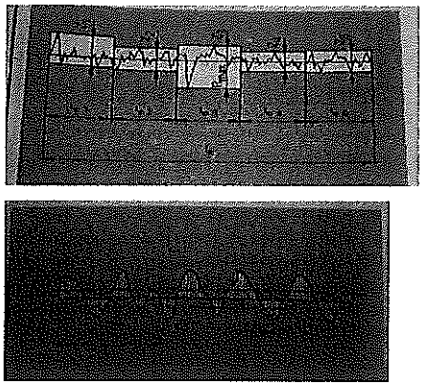
a) Rt- peak to valley height-

-the peak to valley height RT is the distance between the highest and lowest point on the surface being examined. As only the largest deviation re mentioned, the peak to valley height provides little useful information on the surface quality

b) Rz- average peak to valley height- the averaged peak to valley height is the mean figure obtained from five successive individual section.

$$Rz=1/5(z1+z2+z3+z4+z5)$$

c) Ra- average surface roughness value-Ra, is the arithmetic average of the absolute values of the profile heights over the evaluation length.



Set- 2

Course Code: SMS1001 **Course Name:** Measuring & Assembly

Time (Minutes): 90 **Maximum Marks:** 50 Marks

Section-A **(10 x 01 = 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. What can be used instead of key to prevent relative motion between the hub and shaft in small power transmissions.

(a) Set Screw

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

(d) Measuring boring diameter

6. V-belts have a cross section.

(c) Trapezoidal

7. Outside Taper can be checked by

(d) Taper Ring Gauge

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

(b) Plunger Type Test Indicator

Standard Temperature for measurement is

(b)20^0 C

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

(d) 1.005

Section-B **(04 x 05 = 20 Marks)**

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

Answer: - Importance of least count: -

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'

12. What is the function of a guideway? Give the name of two types of guide ways. (3+2)

Answer:-

The main function of a guideway is to make sure that the cutting tool or machine tool operative element moves along predetermined path.

1. Guideways with sliding friction
2. Guideways with rolling friction

13. Give the three difference between Gauges & measuring Instruments. Write the three uses of feeler gauge.

Answer

Difference between gauges & measuring Instruments

S.No.	Gauges	Measuring instruments
1.	Gauge are used to check the work piece	Instruments are used to measure the work piece
2.	This is used for mass production mainly	Instruments are used for bought out inspection

3.	Gauges have fix dimension or fix Value	Instruments have variable dimension or value

Three use of feeler gauge

(1) In Spark plug

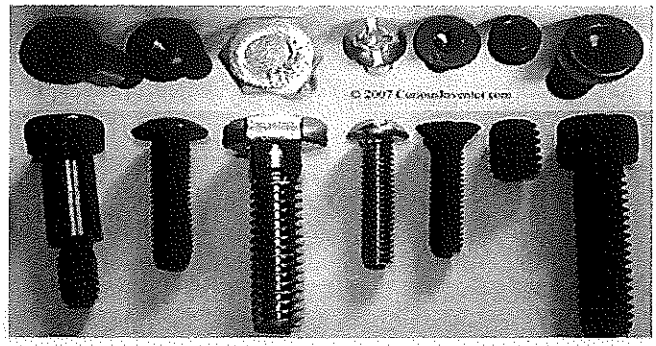
(2) To check gap between two meting parts

(3) To check allowance between two parts

(4) To check space between valves.

(5) To fit the bearing, we can use feeler gauge.

14. Write down the names of any five from the picture given below. (5)



(1) Set screw
(2) Button head cap screw
(3) CSK screw
(4) Button head cap screw
(5) Hexa head cap screw
(6) Round head slotted cap screw

Section-C **(02 x 10 = 09 Marks)**

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

(B) What is the use of spring washer? Give the difference between direct and indirect measurement with examples. (2+3)

Answer

(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.

(B)

During tightening, the spring washer is compressed and its teeth bite into the contacting surface of the nut on one side and the base on the other. Thus, nut gets fixed in the base. Locking is more effective when the contacting surfaces are soft.

S.No.	Direct Measurement	Indirect Measurement
1.	Direct measurement means measurement directly can taken by measuring instruments	Indirect measurement means measurement can taken by comparing with some other instruments.
2.	Direct Measurement accurate and precise	Indirect Measurement not that much accurate and precise comparatively direct measurement.
3.	Vernier calliper, Micrometre	Caliper, Scriber,

16. Explain any Five (2*5)

1. Calibration of Measuring Instruments
2. Surface plate in Measuring
3. Geometrical Dimensions & Tolerances
4. Grade 8.8 in Bolt
5. Dial caliper
6. Repeatability of Measuring Instruments

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.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Manufacturing Skills

Session: 2018-19 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Set- 1

Course Code: SMS1104 **Time: 1.5 Hours**

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

Instructions:

1. Attempt all questions.
2. Use of Calculator is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 04 Questions. Each question carries 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A

1. What is the formula of cutting velocity and specify the unit?
   a) Vc = $\frac{\pi dn}{1000}$ m/min
   b) Vc = $\frac{\pi dn}{1000}$ mm/sec
   c) Vc = $\frac{\pi dn}{1000}$ m/sec
   d) Vc = $\frac{\pi dn}{1000}$ mm/min
2. Which thread is capable to bear heavy load in both directions?
   a) Acme Thread
   b) Metric Thread
   c) V Shape Thread
   d) Withworth Thread
3. What is the normal clearance angle in tool?
   a) 17-15 Degree
   b) 6-8 Degree
   c) 0-4 Degree
   d) 30 Degree
4. Lathe cannot produce internal features like holes.
   a) True
   b) False
5. What is the formula for minimum depth of cut?
   a) 1/3rd of Nose radius
   b) 2/3rd of Nose radius
   c) 2/3rd of Cutting Edge Length
   d) 1/3rd of Cutting Edge Length

6. Which type of feed is needed in Facing Operation?
    a) Longitudinal
    b) Cross
    c) Both cross and longitudinal
    d) None of the above

7. Transversing of tools at any angle to the job produces curve surface?
    a) True
    b) False
8. The cutting edge geometry mainly depends on:
    a) Work piece material
    b) Work piece contour
    c) Machining process and required surface quality
    d) All of the above
9. Formula for calculating thread depth is:
    a) 0.302 X Pitch
    b) (Major diameter – Minor Diameter) x 2
    c) (Major Diameter – Minor Diameter)/2
    d) None of the above
10. What is the full form of DRO?
    a) Digital Right Out
    b) Digital Read Over
    c) Delete Read and Order
    d) None of the above

Section- B

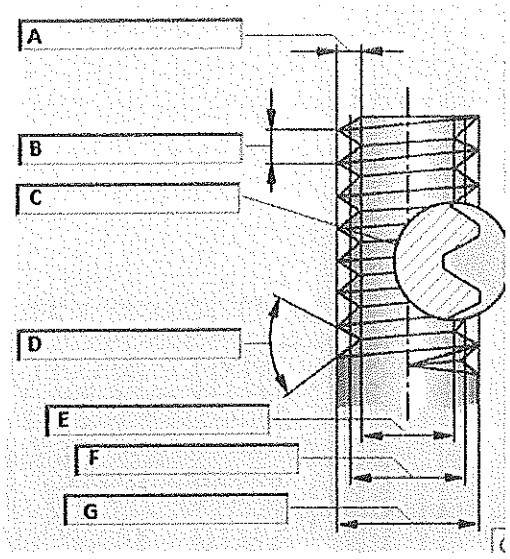
11. Write the formula of center drill with an example.
12. What type of operations can be performed with the help of tailstock? Explain any five.
13. A shaft of 80 mm diameter is to be plain turned. The lathe is turning at a speed of 190 min^{-1}.

    What is the cutting speed V_c in m/min.?
14. How tool life is influenced? How it can be improved? Write any 5 points for each condition.

Section- C

15. Write short notes on:
    a) Single and Multi-Start Thread
    b) Toollife
    c) Uses of Coolant Oil

16. Explain the following:
    a) Different types of chips
    b) Taper Turning procedure
    c) When a screw with a pitch P of 1.5 mm is rotated 8 times in a matching internal thread, what distance d does it travel?
    d) Write the missing thread designations in the figure shown below.



Set- 2

Course Code: SMS1103 **Time: 1.5 Hours**

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

Instructions:

1. Attempt all questions.
2. Use of Calculator is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 04 Questions. Each question carries 5 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section-A **(1x10=10 Marks)**

1. Which position represents the X axis motion?
    a) Lateral
    b) Horizontal
    c) Longitudinal
    d) Vertical

2. The infeed of the milling cutter into the work piece is defined by_____ and _____?
   a) Cutting plane & cutting tool
   b) Cutting depth & cutting width
   c) Both of the above
   d) None of these

3. Which geometry allows an almost universal range for good cutting parameters?
   a) Double positive geometry
   b) Double negative geometry
   c) Positive negative geometry
   d) All of the above

4. Which type of the wear occurs due to loss of carbon?
   a) Edge fractures
   b) Edge build –up
   c) Flank wear
   d) Crater wear

5. What is the range of feed per tooth for carbide cutters?
   a) 0.050 – 0.500 mm
   b) 0.060 - 0.120mm
   c) 0.050 – 0.150mm
   d) 0.100 – 0.250mm

6. What is another name for Up Milling…?
   a) Conventional Milling
   b) Climb Milling

7. Which one of the milling processes in which the shape of the milling tool determines the shape of the work piece?
   a) Form milling
   b) Profile milling
   c) Circular milling
   d) Surface milling

8. Which kind of tool holder is used for shell type milling cutters?
   a) Reducing bushes
   b) Weldon type tool holder
   c) Collet type tool holder
   d) Arbor type tool holder

9. Which of the tool is used for making internal radius?
   a) T- slot cutter
   b) Ball nose cutter
   c) Dove tail cutter
   d) Shell end mill cutter

10. Type 'H' milling cutters are used to cut materials:
   a) Soft & stringy
   b) Hard & tough
   c) Both of the above
   d) None of these

Section- B **(4x5=20 Marks)**

11. Explain the following?
   a) Type W, N & H milling cutters.
   b) Why we maintain a slot or a pocket in the middle of the tolerance?

12. What is Milling? Explain different types of Milling. (According to the position of cutting edge in use)

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. Explain the different types of tool wear?

Section- C **(10x2=20 Marks)**

15. Explain the following milling machine parts.
    a) Machine column and base
    b) Knee
    c) Main drive
    d) Feed device
    e) Vertical milling head

16. Explain any four types of milling machines.
    a) Plano milling machine
    b) Vertical milling machine
    c) Horizontal milling machine
    d) CNC milling machine
    e) Universal milling machine

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Answer Key

School of Manufacturing Skills

Session: 2018-19 (Summer Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1104 **Time: 90 Min.**

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

Section-A **(10x1=10 Marks)**

1. Which one is correct answer?

   Ans. (a) Vc = $\frac{\pi dn}{1000}$ m/min

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

   Ans. (a) Acme thread.

3. What is the normal clearance angle in tool?

   Ans. (b) 6° *to* 8°

4. Lathe cannot produce internal features like holes?

   Ans. (b) False

5. What is the formula for minimum depth of cut?

   Ans. (b) 2/3rd of Nose radius.

6. Which type of feed is needed in Facing Operation?

   Ans. (b) cross

7. Why do we use coolant?

Ans. (D) All of the above

8. The cutting edge geometry mainly depends on

Ans. (d) all of the above

9. Formula for calculating thread depth is

   Ans. (d) None of the above

10. What is the full form of DRO?

    Ans. (d) None of the above.

Section- B **(04x05= 20 Marks)**

11. Write the formula of center drill with example.

(1) **Ans.** According to drawing select the center drill

(2) Mount it in drill chuck. (.25 marks)

(3) Calculate the RPM. (.25 marks)

(4) Insert it in workpiece when taper will start. Measure the Actual diameter.

(5) Use formula

1 Mark

$$\sqrt{3}\left[\frac{\text{Required diameter- Actual diameter}}{2}\right]$$

(6) Calculate the distance, and put center drill inside the workpiece calculated distance with the help of tail stock

12. Explain any 5 applications of tailstock.

Ans. Drilling

Reaming

Centering

Countersinking

Support

13. A shaft of 80 mm diameter is to be plain turned. The lathe is turning at a speed of 190 min^{-1}.

What is the cutting speed V_c in m/min.?

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

D= 80 mm

N= 190 /min

Vc= 0.08 * 3.14 * 190 = 47.72 m/min.

14. How tool life is influenced and how it can be improved. Write any 5 points for each condition.

Ans. **Influenced**

Cutting condition

Tool Itself

Workpiece

Cooling lubricant

Improved

Low cutting speed

Taking smaller cutting profiles

Larger wedge angle

Using right cutting lubricant

Section- C **(02x10=20 Marks)**

15. Write short note on:

a) Single and Multi-Start Thread- With single start thread lead is same as pitch and with multi start thread lead is equal to twice of pitch for two started thread thrice for three started thread and so on.

b) Tool life- It refers to the length of time the tool can be used before it reaches the point of maximum allowable wear

16. Calculate the following parameter for External Thread M20.

a) Different types of Chips.

Continuous Chips- It is long single piece chips which are formed mainly when the rake angle is large

Segmented Chips- It is made up of a small number of connected chips segment formed by an intermediate size rake angle

Dis continuous Chips- It is formed when rake angle is small

C When a screw with a pitch P of 1.5 mm is rotated 8 times in a matching internal thread, what distance d does it travel?

S=12mm

D A Thread Depth

B Pitch

C Thread Crossection

D Thread Angle

E Minor Diameter

F Pitch Diameter

G Major Diameter

Set- 2

Course Code: SMS1103 **Time: 1.5 Hours**

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

Section-A **(1x10=10 Marks)**

1. Which position represent the X axis motion?

Ans. (c) longitudinal

2. The infeed of the milling cutter into the work piece is defined by_____ and _____?

Ans. (b) Cutting depth & cutting width

3. Which geometry allows an almost universal range for good cutting parameters?
Ans. (c) Positive negative geometry

4. Which type of the wear occurs due to loss of carbon?
Ans. (d) Crater wear

5. What is the range of feed per tooth for carbide cutters?
Ans. (c) 0.050 – 0.150mm

6. What is another name for Up Milling...?
Ans. (a) Conventional Milling

7. Which of the milling process in which the shape of the milling tool determines the shape of the work piece?
Ans. (b) Profile milling

8. Which kind of tool holder is used for shell type milling cutters?
Ans. (d) Arbor type tool holder

9. Which of the tool is used for making internal radius?
Ans. (b) Ball nose cutter

10. Type 'H' milling cutters are used to cut materials:
Ans. (b) Hard & tough

Section- B **(4x5=20 Marks)**

11. Explain the following?

a) Type W, N & H milling cutters.

Type W: -type W have a large rake angle and are used for soft, stringy or long chipping materials such as copper, aluminum or PVC. In this we tool have small no of teeth. Type W milling tools always have large tooth spacing. Depending on the diameter of the milling cutter, they have four to eight teeth.

Type N: -type N milling tools are suited for normal to strong materials such as non-refined steel or cast iron.in this tool has eight to twelve teeth & small rake angle approx. 12°.

Type H: -type H milling cutters are used to cut hard, tough but flexible or short chipping materials such as non-refined steel or copper- zinc alloys. Compared to type N milling cutters, the cutting edges have a small rake angle approx. 8°.

b) Why we maintain a slot or a pocket in the middle of the tolerance?
Ans. Due to thermal expansion material expends during the machine but after the machining metal again comes back to its original size that's why it is advisable to cut material in to the middle of the tolerance so that it would still remain with in tolerance when it shrinks after the machining.

12. What is Milling? Explain different types of Milling. (According to the position of cutting edge in use)

Ans. Milling is a material removal process in which tool is rotate & work piece remain stationary. In this we used multipoint cutting edges tool & they have geometrically define cutting edges.

Milling processes categorized according to the cutting edges in use:

Peripheral milling: -in this process, only the cutting edges on the periphery of the milling cutter (cylindrical milling cutter) are engaged. the milling cutter axis is parallel to the processing surface.

Face milling: -in this process, the minor cutting edges on the face of the milling cutter generate the work piece surface. The milling cutter axis is perpendicular to the processing surface.

Peripheral face milling: -in this process, the major cutting edges on the periphery and the minor cutting edges on the face of the milling cutter generate the work piece surface.

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. Explain the different types of tool 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 work piece.

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.

Section- C **(10x2=20 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 three types of milling machines.

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.

Plano milling machine: -Plano milling machine do not have a vertical adjustable table. The milling table only moves along the longitudinal axis. The milling head is used for cross feed and height adjustment. thus, Plano-milling machine are highly suited for large, long, high and heavy work pieces.

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.

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Registration No.: .....

School of Manufacturing Skills

Session: 2018-19 (Summer Semester)

B. Voc. Program, 3rd Semester,

End-Sem. Examination

Set- 1

Course Code: SMS1301 **Time: 1.5 Hours**

Course Name: CNC Milling & Programming **Max. Marks: 50**

Instructions:

1. Attempt all questions.
2. Use of Calculator is Prohibited.
3. Section A contains 10 Questions. Each question carries 1 Mark.
4. Section B contains 05 Questions (Attempt any 04 questions out of 05 questions). Each question carries 05 Marks.
5. Section C contains 02 Questions. Each question carries 10 Marks.

Section – A

10X01 = 10 Marks

1. Which operations can be performed on Vertical Milling Machine?
   a) Facing
   b) Drilling
   c) Tapping
   d) All of the above

2. A Coordinate system in which the point is specified in a plane by a pair of coordinates which are signed distance to the point from two perpendicular lines, measured in same unit length is known as
   a) Polar Coordinate system
   b) Cartesian coordinate system
   c) Point coordinate system
   d) All of the above

3. M01 is named as:
   a) Coolant ON
   b) Coolant OFF
   c) Program End
   d) Optional Stop

4. G03 is named as:
   a) Linear interpolation
   b) Circular interpolation Clockwise
   c) Circular Interpolation Anti clockwise
   d) None of the above

5. Touch probe is used:
   a) To Calibrate the X axis
   b) To Calibrate the Y axis
   c) To calibrate the Z axis
   d) To take zero reference in Z direction

6. Edge finder is used to:
   a) Cut the material
   b) Take the reference point X and Y direction
   c) Take the reference point in Z direction
   d) Take the reference point in X, Y and Z direction

7. G90 is named as:
   a) Absolute Coordinate
   b) Incremental Coordinate
   c) Feed in mm/rev
   d) Feed in mm/min

8. M03 is named as:
   a) Tool rotation Clockwise
   b) Tool Rotation Anti Clockwise
   c) Spindle Rotation Clockwise
   d) Spindle Rotation Anti Clockwise

9. G code used for X-Y plane selection is:
   a) G17
   b) G18
   c) G19
   d) G20

10. ATC stand for:
    a) Automatic Tool Control
    b) Automatic tool changer
    c) Automatic turret control
    d) None of the above

Section – B

04X05 = 20 Marks

1. What is the difference and similarity between Face Mill and Shoulder Mill?
2. Describe G83 cycle in Milling with all its parameters.
3. Calculate the Spindle RPM and Feed in mm/min for the given data:

   Tool- Facemill ϕ50 with 5 insert

   Vc= 200 m/min

   Feed per tooth= 0.2 mm/rev.
4. What do you mean by point to point tool path system? Give four examples.
5. Explain open loop and closed loop system.

Section – C

02X10 = 20 Marks

6. Write down any ten differences between NC and CNC machines.

Draw the schematic diagram of the working principles of CNC machines.

Set- 2

Course Code: SMS1302 **Time: 1.5 Hours**

Course Name: CNC Turning & Programming **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 05 Questions (Attempt any 04 questions out of 05 questions).
5. Each question carries 05 Marks.
6. Section C contains 02 Questions. Each question carries 10 Marks.

Section – A

10X01 = 10 Marks

1. Process of removing metal from the end of a work piece to produce the flat surface in which tool moves perpendicular to the axis of the work piece.
   a) Facing
   b) Turning
   c) Grooving
   d) Drilling

2. Which is a block code?
   a) G90
   b) G91
   c) G28
   d) G03

3. M01 is named as:
   e) Coolant ON
   f) Coolant OFF
   g) Program End
   h) Optional Stop

4. What is the code for Dwell time?
   a) G15
   b) G17
   c) G04
   d) G03

5. What is the unit of Cutting Velocity?
   a) mm/min
   b) mm/rev
   c) m/min
   d) None of the above

6. NC Stand for:
   e) Numerically control
   f) Numerical Control
   g) Number control
   h) All of the above

7. G92 is named as:
   a) Spindle Speed Limit
   b) Cutting speed
   c) Spindle rotation
   d) Retract up to Start plane

8. M03 is named as:
   e) Tool rotation Clockwise
   f) Tool Rotation Anti Clockwise
   g) Spindle Rotation Clockwise
   h) Spindle Rotation Anti Clockwise

9. G code used for X-Z plane selection is:
   a) G17
   b) G18
   c) G19
   d) G20

10. What character do we use to skip any block in program?
    a) @
    b) %
    c) /
    d) #

Section – B

04X05 = 20 Marks

11. What is the use of Dry Run mode and MDI mode?
12. Describe G74 cycle with all its parameters.
13. Write down the difference between Machine coordinates and Absolute coordinates with the help of a diagram.
14. Explain grooving cycle with all its parameters.
15. Explain the difference between G83 and G84 cycle.

Section – C

02X10 = 20 Marks

16. Describe Threading Cycle (G78) with all the parameters. Also calculate all the parameters for M10 threads.
17. Write down any five advantages and five disadvantages of CNC machines.