



BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Session: 2018-19 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1101

Course Name: Measuring & Assembly

Time: 3 Hours

Max. Marks: 100

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 20 Questions. Each question carries 1 Marks.
4. Section B contains 06 Questions. Each question carries 5 Mark.
5. Section C contains 05 Questions. Each question carries 10 Mark.

Section – A

20X01 = 20 Marks

1. The accuracy depends upon
 - (a) Precision of Instrument
 - (b) Precision of method
 - (c) Good planning
 - (d) All of the above
2. For which of the following cases is a tolerance expressed as $11_{-0.05}^{0.00}$
 - (a) Limiting tolerance
 - (b) Unilateral tolerance
 - (c) Bilateral tolerance
 - (d) None of these
3. The use of a plug gauge is
 - (a) To check screw threads
 - (b) To check angles
 - (c) To check cylindrical bores
 - (d) To measure spherical holes
4. For a properly lubricated chain in the range of
 - (a) 70-80%
 - (b) 90-92%
 - (c) 80-90%
 - (d) 96-98%
5. Non-metallic gaskets are made of
 - (a) Wood & Brass
 - (b) Aluminum & Rubber
 - (c) Rubber & Asbestos
 - (d) All of the above
6. Example of semisolid lubricant is:
 - (a) Mineral oil
 - (b) Grease
 - (c) Graphite
 - (d) Vegetable oil
7. 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
8. For Which applications plunger dial indicators are not used?
 - (a) Inspecting surface for flatness.
 - (b) Aligning Work piece
 - (c) Inspecting shaft roundness
 - (d) Measuring bore diameter

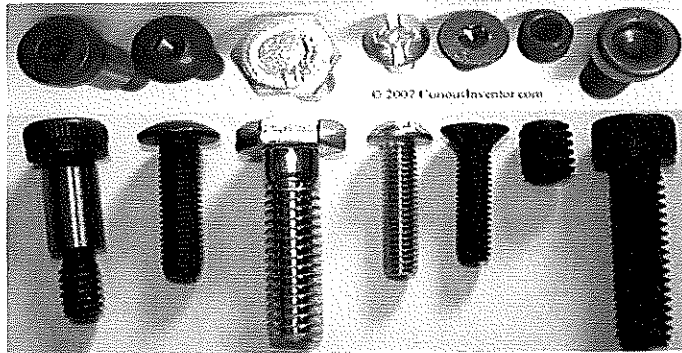


9. V-belts have a cross section.
 - (a) Circular
 - (b) Triangular
 - (c) Trapezoidal
 - (d) Rectangular
10. Outside Taper can be checked by
 - (a) Taper Plug Gauge
 - (b) Outside Micrometer
 - (c) Ring Gauge
 - (d) Taper Ring Gauge
11. "Stem and stylus must be at right angle to the measurement surface." This sentence suit for
 - (a) Puppet dial test indicator
 - (b) Plunger Type Test Indicator
 - (c) Sine Bar
 - (d) None of the above
12. Standard Temperature for measurement is
 - (a) 25° C
 - (b) 20° C
 - (c) 18° C
 - (d) None of the above
13. Least size available in Slip Gauge block set which you have used: -
 - (a) 1.0005 mm
 - (b) 1.05 cm
 - (c) 1.005 cm
 - (d) 1.005 mm
14. Which of the following is the correct measuring instrument to check the dimension (dia) of hole?
 - (a) Vernier caliper
 - (b) Ring gauge
 - (c) Plug gauge
 - (d) Snap gauge
15. Accuracy of a standards? to calibrate a measuring instrument should be.
 - (a) 1/10th of least count of measuring instrument
 - (b) Less than 1/10th of least count of measuring instrument
 - (c) More than 1/10th of least count of measuring instrument
 - (d) Maximum 1/10th of least count of measuring instrument
16. Sensory inspection is a type of?
 - (a) Subjective measurement
 - (b) Objective measurement
 - (c) A&B Both
 - (d) None of these
17. Use of Ratchet
 - (a) Fine movement
 - (b) To limit the measuring force
 - (c) A&B Both
 - (d) None of these
18. Teeth are parallel to axis of shaft in
 - (a) Helical gear
 - (b) Spur gear
 - (c) Bevel gear
 - (d) Herringbone gear
19. Objectives of lubrication
 - (a) To reduce friction
 - (b) To Increase friction
 - (c) A&B Both
 - (d) None of these
20. Wringing process is used in
 - a) Hole test micrometer
 - b) Plug Gauge
 - c) Slip gauge
 - d) None of these

Section – B
(Attempt any 6)

06X05 = 30 Marks

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



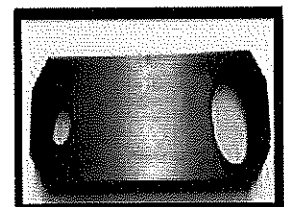
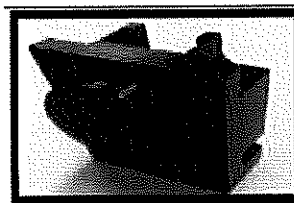
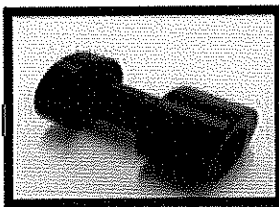
22. What is the function of a guideway? Give the name of two types of guide ways. (3+2)
23. Give the three difference between Gauges & measuring Instruments. Write the three uses of feeler gauge. (3+2)
24. What is the use of spring washer? Give the difference between direct and indirect measurement with examples. (2+3)
25. What is Dowel pin? Write any two advantages and disadvantages of deep groove ball bearing. (1+4)
26. What is the difference between accuracy and precision? Explain with an example.
27. Explain the CHAIN DRIVES. Write down the advantage of chain drive.
28. What is gears, Explain about any two types of gear.

Section – C

05X10 = 50 Marks

29. 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) Threaded Joints

30. Explain different types of errors in measurements.
31. (a) Describe any three types of keys with diagrams.
(b) Write the name following Assembly parts:



32. Define the lubrication and mention the function of lubricant also provide classification of lubricant.
33. Explain Vernier calipers with neat & clean sketch.



School of Manufacturing
Session: 2018-19 (Winter Semester)
B. Voc. Program, 1st Semester,
End-Sem. Examination

Course Code: SMS1101

Time: 60 Min.

Course Name: Assembly & Measuring

Max. Marks: 100 Marks

1. The accuracy depends upon

Ans-(d) All of the above

2. For which of the following cases is a dimension expressed as $11^{+0.00}_{-0.05}$

Ans-(b) Unilateral tolerance

3. The use of a plug gauge is

Ans- (c) To check cylindrical bores

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

(d) 96-98%

5. Non-metallic gaskets are made up of

(c) Rubber & Asbestos

6. Example of semisolid lubricant is:

(b) Grease

7. What can be used instead of key to prevent relative motion between the hub and shaft in small power transmissions.

(a) Set Screw

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

(d) Measuring boring diameter

9. V-belts have a cross section.

(c) Trapezoidal

10. Outside Taper can be checked by

(d) Taper Ring Gauge

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

(b)Plunger Type Test Indicator

12. Standard Temperature for measurement is

(b)20° C

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

(d) 1.005

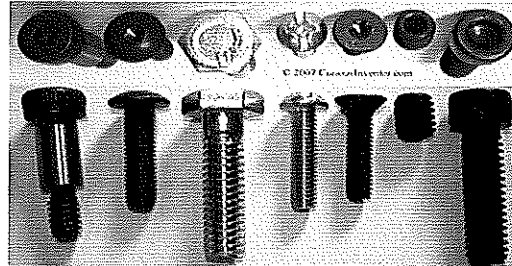


- 14. Which of the following is the correct measuring tool to check the dimension (dia.) of hole?
(c) Plug gauge
- 15. Accuracy of a standards to calibrate a measuring instrument should be...
(c) More than 1/10th of least count of measuring instrument.
- 16. Sensory inspection is a type of?
(a) Subjective measurement
- 17. What is the use of Ratchet...?
(a) Fine movement !
- 18. Teeth are parallel to axis of shaft in:
(a) (b) Spur gear
- 19. Objectives of lubricant
(b) (a)To reduce friction
- 20. Wringing process is used in
(c) (c) Slip gauge

Section – B

06X05 = 30 Marks

21. 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

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

Ans-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

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

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



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Three use of feeler gauge

- (1) In Spark plug
- (2) To check gap between two mating parts
- (3) To check allowance between two parts
- (4) To check space between valves.
- (5) To fit the bearing, we can use feeler gauge.

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

Ans-They are short, cylindrical rods made of various materials including wood, metal, plastic.

Dowell pins can be tapered, grooved, slotted.

S.No.	ADVANTAGES	DISADVANTAGES
	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> a. Not self-aligning, accurate aligning between shaft and housing bore is required. b. Poor rigidity compared to roller bearing.

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

Ans-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,

26. 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.



27. Chain: -A chain can be defined as a series of links connected by pin joint.

- Positive drive.
- For a properly lubricated chain, efficiency is from 96% to 98%.
- Does not require initial tension.
- Used in bicycle, motorcycle and in other automobile vehicles also and many more

28. Gears: - Gears are toothed wheels which transmit power and motion by successive engagement of teeth.

- They are generally used when the distance between the shafts is less.

gears types: -

(A) Spur Gear: - Teeth are parallel to axis of shaft.

- Impose radial load on shafts.
- Can be used only where shafts are parallel.

(B) Helical Gear: - Teeth are at an angle with axis of shaft.

- o Imposes both radial and thrust forces on shaft.
- o A type of gear, consisting of two helical gears with opposite hand of helix is herringbone gear (generally for parallel shafts).

Section – C

05X10 = 50 Marks

29. 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

Answer: -

a. 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.

b. 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.



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.

d. 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.

e. 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.

f. **THREADED JOINTS:** - Threaded joint is a separable joint of two or more machine parts that are held together by means of threaded fastening such as a bolt and a nut.

g.

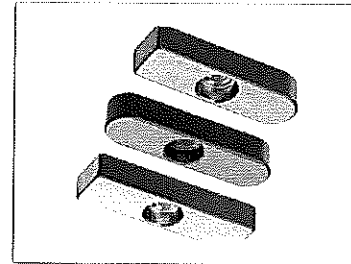
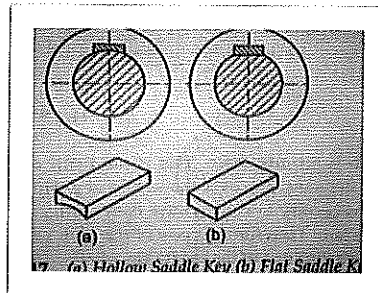
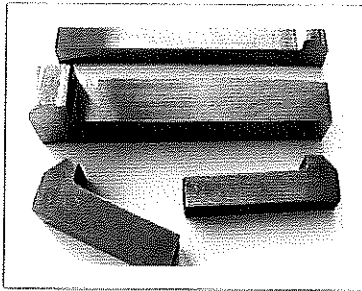
30. Explain different types of errors in measurement with diagram.

Ans:- Error - it is the difference between measured value and true value

Types of Error

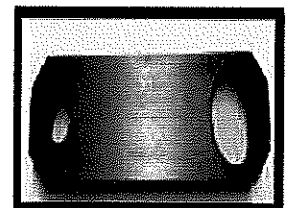
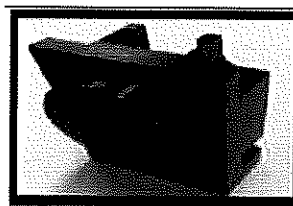
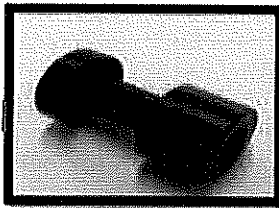
- A. **Parallax Error** –Parallax error is the shift in apparent position of an object due to different viewing position. When we have to take reading from an instrument or do some measurements then different viewing position will give different readings leading to an error. This could be removed by 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 it's 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 workpiece 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.

31. (a) Describe any three types of keys with diagrams.



Sunk Key	saddle key	Feather Key
<p>A sunk key is a key in which half the thickness of the key fits into the keyway on the shaft and the remaining half in the keyway on the hub.</p> <p>A <i>parallel key</i> is the sunk key which is uniform in width as well as height throughout the length of the key</p>	<p>A saddle key is a key which fits in the keyway of the hub only.</p> <p>The power is transmitted by means of friction.</p> <p>Therefore, these keys are suitable for low power transmission as compared to sunk key.</p>	<p>A parallel key which is either fixed to the shaft or to the hub and which permits relative axial movement between them</p>

(b) Write the name following Assembly parts:



Screw
It is used to set the vertical alignment of shaft in assembly

Shifting Casing
It is having a guide way for guide screw

Shackle
It is a link which connect the fork joint with guide bolt.

32. Define the lubrication, Classification of lubricants and also define the Objectives of lubricant.

Ans- Lubrication: -Lubrication is science of reducing friction by application of suitable substance called lubricant between the rubbing surfaces of bodies having relative motion.

The lubricants are classified in three groups:

- Liquid lubricants like mineral or vegetable oil.



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Semi-solid lubricants like grease.

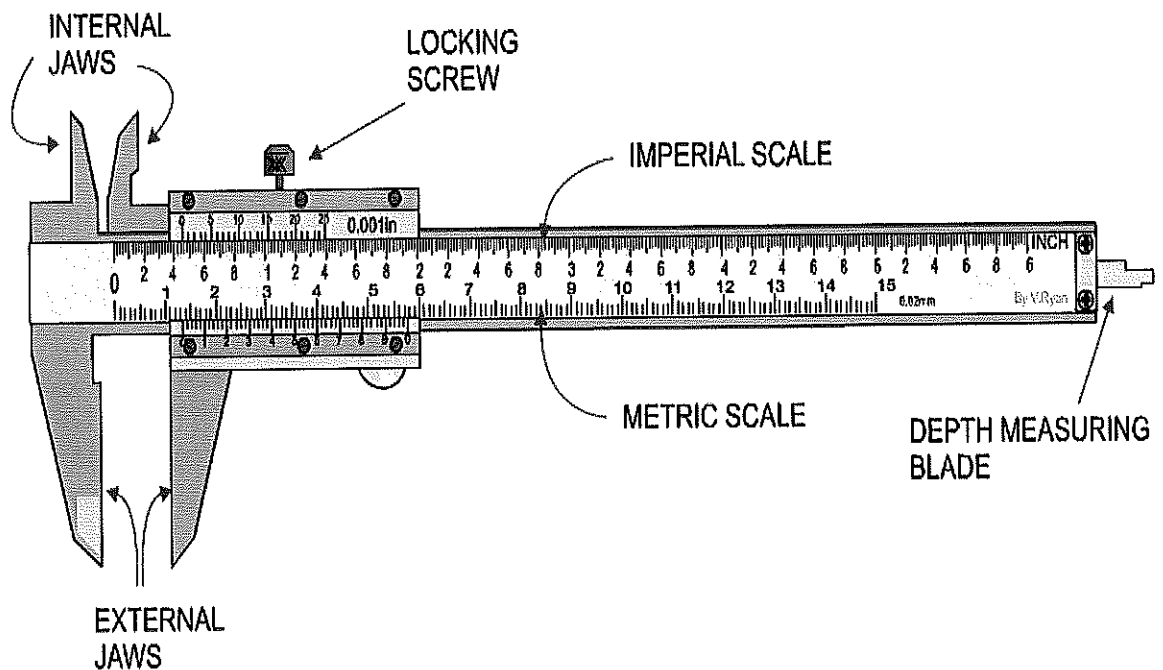
- ⊙ Solid lubricants like graphite or molybdenum disulphide.

Objectives of lubricant: -

- ⊙ To reduce friction.
- ⊙ To carry away heat generated due to friction.
- ⊙ To reduce/prevent wear.
- ⊙ Protection against corrosion.

33. Write the component parts name of Vernier caliper with figure.

1. Internal jaw- For internal measurements like internal diameter, groove dimension.
2. External jaw- for external measurements like length, outer diameter.
3. Vernier /secondary scale- for precise dimension
4. Main scale- for main readings
5. Depth bar- for depth measurement
6. Clamping screw- To lock the movement of scale







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Session: 2018-19 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1102

Time: 3 Hours

Course Name: Handskills

Max. Marks: 100

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 20 Questions. Each question carries 1 Marks.
4. Section B contains 06 Questions. Each question carries 5 Marks.
5. Section C contains 05 Questions. Each question carries 10 Marks.

Section – A

20X01 = 20 Marks

1. What would be the 'tap depth' formula for 'throughout Tapping' 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) $H+0.3d+3$
2. Which of the file cut configuration has the worst chip evacuation-
 - a) Straight cut
 - b) Curved cut
 - c) Diagonal
 - d) Both a & b
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. 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
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) Cap 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
11. Which one is not a part of file?
- a) Face/blade length
 - b) Tang
 - c) Bow
 - d) File tip
12. Soft jaws can be made of?
- a) Plastic
 - b) High speed steel
 - c) ceramics
 - d) None of the above
13. During clamping of saw blade, the cutting teeth should be in which direction?
- a) In forward direction
 - b) In backward direction
 - c) Neither in forward nor in backward direction
 - d) None of the above



14. To make a conical shape at the entrance of the hole is called

- a) Counter sinking
- b) Drill
- c) Tapping
- d) Reaming

15. Point angle of a twist drill is (degree)?

- a) 60
- b) 45
- c) 118
- d) 90

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

- e) Over size soft jaws
- f) File vice
- g) V-groove jaws
- h) Equal width space

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

- a) Rake angle
- b) Wedge angle
- c) Relief angle
- d) All

18. Operation of finishing previously drilled hole in order to bring it to accurate size and have good surface finish is known as

- a) Drilling
- b) Reaming
- c) Boring
- d) Counter boring

19. Operation used to form internal thread is known as

- a) Drilling
- b) Tapping
- c) Reaming
- d) Boring

20. In which holder the drill having taper shank should be clamp?

- a) Drill chuck
- b) Collet holder
- c) Sleeve
- d) All a & b & c



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(Attempt any 06 questions out of 08 questions)

21. What occupational safety should be considered during Machining (any five).
22. What do you understand by Bench vice? Write the names of its parts.
23. Explain the working technique for filing.
24. Write the formula with its nomenclature for the depth calculation of Blind drill, Blind Tap and Throughout Tap?
25. Define the scribing and punching.
26. Derive the formula to calculate the chamfer value for Radius R
27. Write the types of saw cut with figures.
28. 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.

Section – C

05X10 = 50 Marks

29.
 - a) Write the different types of chisel with its applications.
 - b) Explain the angles of the cutting wedge.
30. Describe free cutting in sawing. Explain various types of saw blades on the basis of free cutting with the help of diagrams.
31. Write short notes on following:
 - a) Tapping
 - b) Reaming
 - c) Counter sinking
 - d) counter boring
32. Explain the chip formation process with a sketch
33. Write the difference between cut file and milled file.



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Time: 60 Min.
Max. Marks: 100 Marks

Section – A

20X01 = 20 Marks

1. 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) $H+0.3d+3$

Ans. c

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. 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

Ans. D



The size of the rake angle mainly influences-

- a) Work piece surface
- b) Friction between tool and workpiece
- 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) Cap 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

11. Which one is not a part of file?

- a) Face/blade length
- b) Tang
- c) Bow
- d) File tip

Ans. C

12. Soft jaws can be made of?

- a) Plastic
- b) High speed steel
- c) ceramics



d) None of the above

Ans. a

13. During clamping of saw blade, the cutting teeth should be in which direction?

- a) In forward direction
- b) In backward direction
- c) Neither in forward nor in backward direction
- d) None of the above

Ans. a

To make a conical shape at the entrance of the hole is called

- a) Counter sinking
- b) Drill
- c) Tapping
- d) Reaming

Ans. A

14. Point angle of a twist drill is (degree)?

- a) 60
- b) 45
- c) 118
- d) 90

Ans. c

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

- a) Over size soft jaws
- b) File vice
- c) V-groove jaws
- d) Equal width space

Ans. B

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

- a) Rake angle
- b) Wedge angle
- c) Relief angle
- d) All

Ans. b

17. Operation of finishing previously drilled hole in order to bring it to accurate size and have good surface finish is known as

- a) Drilling
- b) Reaming
- c) Boring
- d) Counter boring

Ans. b

18. Operation used to form internal thread is known as



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- a) Drilling
- b) Tapping
- c) Reaming
- d) Boring

Ans. b

19. In which holder the drill having 'taper shank should be clamp?

- a) Drill chuck
- b) Collet holder
- c) Sleeve
- d) All a & b & c

Ans. c

Section -- B

06X05 = 30 Marks

20. What occupational safety should be considered during Machining (any five)?

Ans.

1. Clamp the workpiece tightly in the vice
2. Don't try to approach the spindle while running
3. Wear the safety glass
4. Wear and safety shoes
5. Remove all the unnecessary items such as watch, jewellery etc.

21. 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 workpiece.

The main parts of a vice

Handle

Spindle

Fix jaw

Movable jaw

Lead screw

Dovetail guide ways

Anvil plate

Height adjusting lever

22. Explain the working technique for filing.

Ans.

- Work piece should be clamped tightly and cover 70% of surface in clamping
- Holding the file
- Posture and gesture



Movement of file

- Pressure distribution
- Height of the vice
- Feed

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

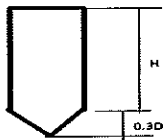
Ans.

For blind drill:

$$\text{Depth} = H + 0.3D$$

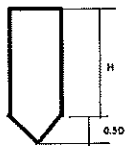
where H= given drawing depth

D= drill diameter



For blind tap:

For Blind tap:



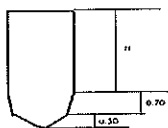
$$\text{Depth} = H + 0.5D + 3$$

where H= given drawing depth

D= drill diameter

3 = it indicates the machine default value

For thought tap:



$$\text{Depth} = H + 0.7D + 0.3D + 3$$

where H= given drawing depth

D= drill diameter

3 = it indicates the machine default value

24. 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 workpiece by the help of hammer and layout punch

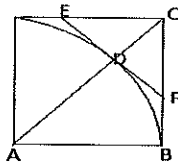
Scribing- scribing a process of transfer the drawing dimension and contours onto the workpiece.

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

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

Ans.



In triangle ABC –

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

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

$$\text{Since, } AC = AD + DC ; \quad DC = AC - AD = 1.414R - R = 0.414R$$

In triangle CDF –

Since DC and DF are equal,

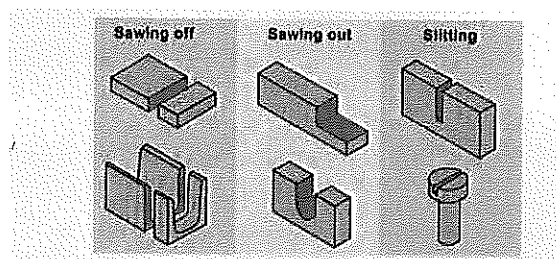
$$\text{Hence, } CF^2 = DC^2 + DF^2 = 0.414R^2 + 0.414R^2$$

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

$$CF = 0.58R$$

26. Write the types of saw cut with figures.

Ans. There are three types of saw cuts –



27. 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 –

$$V_c = \pi DN / 1000$$



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Where, V_c = cutting speed in m/min

D = diameter of tool/work piece in mm

N = RPM

With this formula,

$$V_c = (3.14 \times 50 \times 1000) / 1000$$

$$V_c = 157.5 \text{ m/min}$$

Section – C

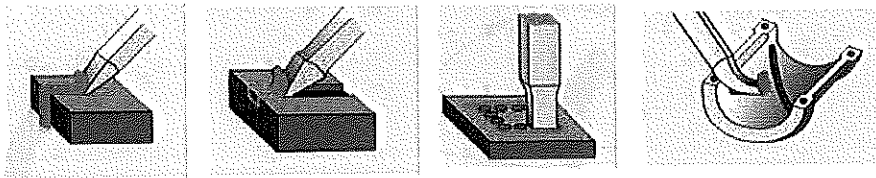
05X10 = 50 Marks

28.

Ans.

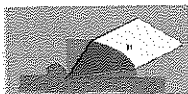
a) Write the different types of chisel with its applications.

- I. Flat chisel – the flat chisel is used to work on flat surfaces and to clean up weld seams.
- II. Cape chisel – the cape chisel is used mainly to chisel narrow, flat keyways.
- III. Web chisel – it is used in making cavities and slots.
- IV. Round nose chisel – it is used to make lubricating grooves.



b) Explain the angles of the cutting wedge.

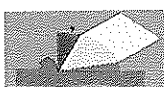
- **Wedge angle**-The size of the wedge angle influence the cutting force of the metal removal process.



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



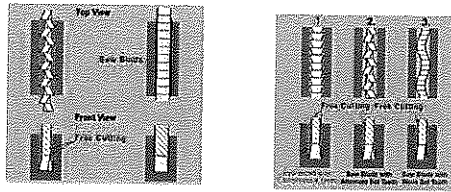
- **Rake angle** –this angle influences the cutting force as well chip formation in the metal removal process.



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

Ans.

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



Free cutting types:

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

30. Write short notes on following:

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

Ans.

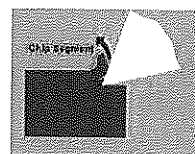
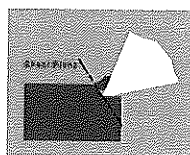
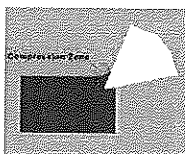
- a) Tapping – It is a process of making internal thread with a special tool named 'tap'.
- b) Reaming – It is a process of enlarging a hole with high surface quality and within tolerance of 10 – 20 microns.
- c) CSK – It is a process of making a conical shape at the entrance of the hole.
- d) Counter boring- It is a process to enlarge a drill with a certain depth.

31. Explain the chip formation process with a sketch

Ans.

Chips formation process can be divided into mainly three phases:

- a) Compression – when tool come in contact with the raw material then the material is started compressing and it compresses at a certain limit.
- b) Shearing – when chips want to shift from its position due to tool load then a friction force starts working and so that there are two forces and these forces are in opposite direction and parallel, this process is shearing.
- c) Sliding – in this process chip just slides through the rake angle of the tool.



32. Write the difference between cut file and milled file.

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.



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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





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Session: 2018-19 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1103

Time: 3 Hours

Course Name: Conv. Milling

Max. Marks: 100

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 20 Questions. Each question carries 1 Marks.
4. Section B contains 06 Questions. Each question carries 5 Marks.
5. Section C contains 05 Questions. Each question carries 10 Marks.

Section – A

20 X 01 = 20 Marks

1. Which type of wear tear is caused due to fluctuations in temperature?
 - a) Edge fractures
 - b) Thermal cracks
 - c) Edge build -up
 - d) Chips & splinters
2. Which tool holder is used for clamping Morse taper shank tool?
 - a) Collet type tool holder
 - b) Reducing bushes
 - c) Weldon type tool holder
 - d) Arbor type tool holder
3. What is coolant concentration range for milling?
 - a) 8-10%
 - b) 12-15%
 - c) 5-7%
 - d) 18-20%
4. Rake angle is the angle which is useful for _____
 - a) Cutting the work piece
 - b) Coolant flow
 - c) Chip removal
 - d) Surface finish
5. What is the Normal Clearance angle in Tool?
 - a) 8 -10°
 - b) 6-8°
 - c) 4-6°
 - d) 5-7°



6. What is another name for Climb Milling...?
 - a) Up milling
 - b) Down milling
 - c) Conventional milling
 - d) All of the above
7. What is the range for V_c (mm/min) on mild steel work piece with carbide indexable tool?
 - a) 25-30
 - b) 400-500
 - c) 80-100
 - d) None of above
8. Which Cutting geometry of indexible insert is mainly selected for machining thin-walled workpiece?
 - a) Axial rake angle negative and radial angle negative
 - b) Axial rake angle positive and radial angle positive
 - c) Axial rake angle positive and radial angle negative
 - d) None of above
9. What is the main reason behind built-up edge formation on the cutting edge?
 - a) indexible inserts with insufficient strengths
 - b) tool temperature is too high.
 - c) At lower cutting speeds and with tough materials
 - d) All of the above
10. Cutting Speed (v_c) depends on:
 - a) The workpiece material
 - b) The tool material
 - c) The required surface finish
 - d) All of the above
11. How much Feed per tooth (F_z) we prefer for carbide insert on Aluminum workpiece?
 - a) 0.05 -0.150 mm
 - b) 0.06 -0.120 mm
 - c) 0.02 -0.40 mm
 - d) All of the above
12. Unit of feed rate is..... (for milling)
 - a) mm/rev.
 - b) mm/min.
 - c) m/min.
 - d) all of the above
13. Which operation is used for manufacturing gears?
 - a) Profile milling
 - b) Form milling
 - c) Hobbing
 - d) None of the above



14. Which type of Std. taper for tool holder is used for milling machine?
- a) SK-30
 - b) SK-40
 - c) HSK
 - d) All of the above
15. The cutter arbors are used for clamping.....
- a) Shank type cutter
 - b) Spur- toothed milling cutter
 - c) Shell type milling cutter
 - d) None of above
16. The angle between tool flank and face is known as _____
- a) Clearance angle
 - b) Wedge Angle
 - c) Rake Angle
 - d) Helix Angle
17. Which cutting tool angle is contributing to improving surface quality and dampening vibration during cutting?
- a) Rake angle
 - b) Helix angle
 - c) Clearance angle
 - d) Both b & c
18. Milling is the
- a) Materials removal processes
 - b) Process using tools with geometrically define cutting edges
 - c) Both a & b
 - d) Geometrically undefined cutting edge
19. The machine column and base of milling machine are made of:
- a) Mild steel
 - b) High carbon steel
 - c) Carbide
 - d) Gray cast iron
20. Which tool group is preferably for used to cut hard, tough but flexible or short- chipping materials?
- a) N types milling tools
 - b) W types milling tools
 - c) L types milling tools
 - d) none of above

Section – B
(Attempt any 6)

06X05 = 30 Marks

21. Explain the following terms:

- a) Cutting speed
- b) Feed rate



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22. How can we Mill a Slot of 20H8 with the help of $\varnothing 12$ slot Drill?
23. What is the difference between slot drill and end mill? (any two)
24. Write any 5 Milling operations.
25. Why we prefer taper shank tool holder?
26. Discuss on different types of Tool Holders with their applications.
27. Distinguish between shoulder and face milling.
28. Why is it preferred to use cutters with a cutting edge angle of 45° for face milling?

Section – C

05X10 = 50 Marks

29. Describe conventional and climb Milling:
30. Explain the following milling machine parts:
 - a) Machine column and base
 - b) Knee
 - c) Main drive
 - d) Feed device
 - e) Vertical milling head
31. Define to following cutting angles in a tool Geometry.
 - a) Relief angle α
 - b) Wedge angle β
 - c) Rake angle γ
32. Explain the different types of milling machines?
33. Explain mechanical clamping elements (any five)



School of Manufacturing
Session: 2018-19 (Winter Semester)
B. Voc. Program, 1st Semester,
End-Sem. Examination

Course Code: SMS1103

Time: 60 Min.

Course Name: Conv. Milling

Max. Marks: 100 Marks

Section – A

20 X 01 = 20 Marks

1. Which type of wear is caused due to fluctuations in temperature?
d) Chips & splinters
2. Which tool holder is used for clamping Morse taper tool shank?
b) Reducing bushes
3. What is coolant concentration range for milling?
c) 5-7%
4. Rake angle is the angle which is useful for _____
c) Chip removal
5. What is the Normal Clearance angle in Tool?
b) 6-8°
6. What is another name for Climb Milling?
b) Down milling
7. What is the range for V_c on mild steel work piece with carbide indexible tool?
c) 80-100
8. Which Cutting geometry of indexible insert is mainly selected for machining thin-walled workpiece?
b) Axial rake angle positive and radial angle positive
9. What is the main region behind built-up edges form on the cutting edge?
c) At lower cutting speeds and with tough materials
10. Cutting Speed (v_c) depends on:
d) All of the above
11. How much Feed per tooth (F_z) we prefer for carbide insert on Aluminum workpiece?
a) 0.05 -0.150 mm
12. Unit of feed rate is...(for milling)
b) mm/min.
13. Which operation is used to manufactured gear?
c) Hobbing
14. Which type of tool holder standard we used in machine spindle?
b) SK-40
15. The cutter arbors are used for clamping.....
c) Shell type milling cutter



16. Rake angle is the angle which is useful for _____
b) Chip removal
17. Which cutting tool angle is contributing to improving surface quality and dampening vibration during cutting?
c) Clearance angle
18. Milling is the
c) Both a & b
19. The machine column and base is made of:
d) Gray cast iron
20. Which tool group is preferring for used to cut hard, tough but flexible or short-chipping materials?
d) none of above

Section – B

06X05 = 30 Marks

21. Explain the following terms:
- a) **Cutting speed**-Cutting speed (also called surface speed or simply speed) is the speed difference (relative velocity) between the cutting tool and the surface of the workpiece it is operating on. It is expressed in units of meters per minute (m/min).^[1]
 - b) **Feed rate** - Feed rate is defined as tool's distance travelled during one spindle revolution
 - Its unit is mm/min
22. How can we Mill a Slot of 20H8 with the help of $\varnothing 12$ slot Drill?
23. What is the difference between slot drill and end mill? (any two)
- Ans.** End mills don't plunge because the cutting edge doesn't meet in the middle so there is an area that doesn't cut.
- Slot drill has cutting faces that meet in the middle so can plunge and cut sideways too
24. Write any 5 Milling processes.
- a) surface milling
 - b) circular milling
 - c) profile milling
 - d) copy milling
 - e) thread milling
 - f) Hobbing
25. Why we prefer taper shank tool holder?
- Ans.** we use because On tapered shanks, the force is transmitted by force closure. In addition to the favorable concentricity properties, milling tools with tapered shanks are often able to bear higher loads than milling cutters that are held in clamping chucks.



26. Discuss on different types of Tool Holders with their applications.

Ans.

SR.	Tool holder	Application
1	Arbor type	It used to hold without shank tool like face mill ,shoulder tool etc.
2	Reducing type	It is used for tool that having Morse taper shank ex.drill
3	Weldon type	It is used to hold parallel with Weldon shank tool. ex.rough slot drill
4	Collect type	It used to hold parallel shank tool.

27. Distinguish between shoulder and face milling.

Ans **Shoulder milling cutter**

The setting angle on shoulder milling cutters is 90° . Shoulder milling cutters are preferred for pre-milling workpiece. In this area of application, they have a high tendency to vibrate due to the high feed forces. The quality of the workpiece surfaces is therefore poor after this process.

Face mill

The setting angle on surface milling cutters is usually 45° or 75° ; they are primarily used to manufacture flat surfaces. The uneven tooth spacing that can be found on surface milling cutters reduces vibrations and therefore helps improve the quality of the surface finish.

28. Why is it preferable to use cutters with a cutting edge angle of 45° for face milling?

- Face mill with a cutting edge angle of 45° have a relatively large rake angle and are therefore well suited for milling on machine with low drive power.

Section – C

02X10 = 20 Marks

29. Describe conventional and climb Milling.

Ans. **Conventional milling**

When conventional milling, the workpiece's feed motion acts against the milling cutter's cutting motion. The cutting edges slide over the workpiece surface and cut into the material at the cutting edge under high pressure. machines.

Climb milling

When climb milling, the workpiece's feed motion acts in the same direction as the milling cutter's cutting motion. The cutting edges cut into the workpiece surface suddenly and make the largest cuts at the beginning of the material removal process.

30. Explain the following milling machine parts:

Ans.

Machine frame

The machine frame is commonly made of cast iron. The material reduces vibrations. The machine frame carries important elements such as the knee, the main drive and working spindle, the feed device and the vertical milling head.

Knee



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The knee consists of the angle table and the machine table. The angle table is mounted on the machine stand and can be adjusted vertically. The machine table is connected to the angle table. It can be adjusted longitudinally and transversely. It is used to clamp workpieces using suitable clamping elements.

E Main drive

The main drive consists of the electric motor, the main gear unit and the horizontal milling spindle. The horizontal milling spindle is driven by the electric motor via the main gear unit. The horizontal milling spindle is used to hold clamping tools and milling cutters.

Machine table

Angle table

Feed device

As a rule, the modern milling machines are driven by infinitely adjustable feed motors via an electronic control system. Older models may be driven by a stepped gear unit. The mechanical feed can be carried out in all three directions (X-, Y-, Z-axis).

E Vertical milling head

The vertical milling head is driven by the main motor with gear unit directly via the horizontal milling spindle or via a separate drive shaft that is housed in the counter support. When milling slopes or profiles, the vertical milling head can be pivoted into the required position using a rotary base with a graduated collar. On some vertical milling heads, it is possible to manually feed vertically (Z-axis). Depending on the design, the tool can remain in the horizontal spindle on universal milling machines when milling vertical.

31. Define the following cutting angles in a tool Geometry

Ans.

Wedge angle (β)- This is the angle between the rake face and the flank face. A larger wedge angle is required when the material being cut is a high-strength material. When cutting softer materials, the wedge angle can be correspondingly smaller.

Clearance angle (α)- This is the angle between the workpiece surface and the rake face of the cutting wedge. Clearance angles of 6° to 8° are effective for metalworking purposes.

Rake angle (γ)-The rake angle has a major impact on chip formation. It lies between the horizontal line to the cutting surface and the flank face.

32. Explain the different types of milling machines?

Ans.

Universal milling machine

Universal milling machines can be used as horizontal or vertical milling machines thanks to their horizontal and vertical working spindles. Their design – with pivoting or sliding milling head, a tilting, rotating or pivoting milling table and special equipment – means they can be used for many manufacturing tasks.

Bed-type milling machine

Bed-type milling machines do not have a height-adjustable table. The milling table only moves along the longitudinal axis. The milling head sets the cross-feed and height adjustments. Therefore, they are suitable for machining large, long, high and heavy workpieces.

Drilling and milling machine



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Drilling and milling machines are used for very large and very heavy workpieces. Overall heights of 8 m and travel distances of 15 m are not unusual. These machines can be used for long feed strokes.

Horizontal milling machine

On horizontal milling machines, the milling spindle is positioned horizontally. A counter support with an adjustable mount means the milling cutter can be adjusted axially. It is possible to use various milling cutters at the same time. Horizontal milling machines are used for milling long workpieces with uniform surface profiles.

Vertical milling machine

In contrast to horizontal milling machines, the milling spindle is positioned vertically on vertical milling machines. The milling head can be pivoted and it is possible to adjust the height of the milling cutter in the milling head.

CNC milling machines

CNC milling machines (CNC = computerised numerical control) usually have a "three-axis continuous-path control system". Each axis is driven by its own feed drive with a direct-measuring distance measuring system. The axes have play-free ball-type linear drives. The automated tool exchange requires a quick-release clamping fixture for steep-angle or hollow taper tools with an electro-hydraulic control system. Depending on the design of the CNC milling machine, the tools can be saved in turret, cluster, drum or chain magazines and positioned based on the process sequence.

33. Explain Mechanical clamping elements. (any five)

Ans

Machine vice

The machine vice is used to clamp small- to medium-sized workpieces with parallel faces at the highest cutting and feed forces without vibration. By turning the hand crank, the clamping force is increased mechanically or hydraulically using high-pressure spindles. Machine vices have interchangeable, hardened and ground jaws.

Clamping bolts

Clamping bolts (T-slot bolts) are machined so that they can be held in the T-slots of the machine table. They are used to secure the clamping elements to the machine table, and to clamp workpieces using clamps and clamping supports. Due to the high loads they encounter, clamping nuts must be at least 1.5 times higher than the diameter of the thread. A hardened washer must always be placed between the clamp and the clamping nut. Rounded washers and conical sockets can be used to level out inclines between the clamp and workpiece.

Simple clamp

A simple clamp can be used for the clamping task shown. The slot width matches the size of the clamping bolt. Clamps are available for T-slot bolts sizes M6 to M42.

Offset clamp

Compared with simple clamps, offset clamps have a wider range of applications. They are manufactured for T-slot bolts sizes M6 to M24.

Chamfered fork clamp



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The fork clamp shown is chamfered on the clamping side. The fork shape increases the application range of this clamping element. Fork clamp with clamping extension

Fork clamps with round clamping extensions are suitable for clamping workpieces with recesses or bores. They are manufactured for T-slot bolts sizes M8 to M24.

Clamping supports

An important requirement for safely clamping workpieces is ensuring that the height between the workpiece and the clamping element abutment is equal. As a result of individual workpiece shapes and sizes, clamping supports must be particularly variable in relation to size (height). Only the most common types of clamping support are listed below as there is a comprehensive range of clamping supports available.

Stepped blocks

Depending on their size, conventional stepped blocks allow height to be adjusted between 12.5 mm and 365 mm. The height difference between individual clamping intervals is 7.5 mm.

Universal clamping supports

Universal clamping supports allow the height to be adjusted even more precisely. The inclined supports are mostly used in pairs or together with inclined clamps.

Screw jacks

Screw jacks are used to precisely adjust the height of the clamping elements to match the workpiece size. A spindle that is usually equipped with a trapezoidal thread can be used to adjust the height of the screw jack shown here to between 50 mm and 70 mm. Depending on their design

Flat clamps

Flat clamps are used to clamp flat workpieces directly to the machine table on the side. To do this, they are inserted in the slot in the table and securely positioned to the workpiece edge using an Allen screw. Clamping is actually achieved by the wedge effect of the clamping jaws. A further clamping bolt produces the clamping pressure.

Clamping claws

Clamping claws are used to clamp workpieces of different heights. Using a combination of clamps, clamping bolts and rounded washers with conical sockets, the clamping claws can be infinitely adjusted and can be used without any additional clamping supports.



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Session: 2018-19 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1104

Time: 3 Hours

Course Name: Conv. Turning

Max. Marks: 100

Instruction:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 20 Questions. Each question carries 1 Marks.
4. Section B contains 06 Questions. Each question carries 5 Marks.
5. Section C contains 05 Questions. Each question carries 10 Marks.

Section – A

20X01 = 20 Marks

Q1 ASB-45° Tool is Used for

- (A) Internal Grooving
- (B) Finish Boring Finish
- (C) Rough Boring
- (D) Internal Threading

Q2. 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

Q3. 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

Q4. Why undercut is required for threading operations?

- (A) Thread tool relaxation & Self-looking.
- (B) To clean the face
- (C) To reduce the diameter
- (D) None of the above

Q5. In lathe machine, tailstock is used for:

- (A) Supporting long shaft
- (B) Drilling
- (C) Reaming
- (D) All of the above



Q6. ECS-90° Tool is Used for :

- (A) Internal Grooving
- (B) Boring Finish
- (C) Boring Rough
- (D) Internal Threading

Q7. 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

Q8. Which one is the correct expression for Cutting Speed?

- (A) $V_c = \frac{\pi dn}{1000} \text{ cm/min}$
- (B) $V_c = \frac{\pi dn}{1000} \text{ mm/min}$
- (C) $V_c = \frac{\pi dn}{1000} \text{ m/min}$
- (D) $V_c = \frac{\pi dn}{1000} \text{ m/sec.}$

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

- (A) V – shaped Threads
- (B) Acme Threads
- (C) Knuckle Threads
- (D) Buttress Threads

Q10. 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

Q11. What is the normal clearance angle in tool?

- (A) 55° to 80°
- (B) 11° to 15°
- (C) 6° to 8°
- (D) 8° to 12°

Q12. What is the formula for minimum depth of cut?

- (A) 3/2 of Nose radius
- (B) 4/3 of Nose radius
- (C) 1/3 of Nose radius
- (D) 2/3 of Nose radius



Q13. 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

Q14. Which type of thread is used in agricultural equipment?

- (A) V – shaped Threads
- (B) Acme Threads
- (C) Knuckle Threads
- (D) Buttress Threads

Q15. What is the full form of DRO?

- (A) Digital read out
- (B) Data read out
- (C) Data read only
- (D) Digital read only

Q16. Pip occur due to

- (A) Tool is on center axis
- (B) Tool is not on center axis
- (C) Material is of bad quality
- (D) None of the above

Q17. In tool geometry, $\alpha + \beta + \gamma = \dots\dots\dots$, where $\alpha =$, $\beta =$, $\gamma =$

- (A) 60 degree
- (B) 30 degree
- (C) 90 degree
- (D) 180 degree

Q18. Which type of chuck is used for clamping rectangular work piece

- (A) Collet chuck
- (B) Three jaw chuck
- (C) Four jaw chuck
- (D) None of the above

Q19. Short designation for a 30 mm trapezoidal thread is

- (A) Tr 30 × 6
- (B) Ta 30 × 6
- (C) Tp 30 × 6
- (D) Tz 30 × 6

Q20. Short designation for a 30 mm round thread is

- (A) Rd 30 × ½
- (B) Ro 30 × ½
- (C) Rr 30 × ½
- (D) Ru 30 × ½



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Section – B

06X05 = 30 Marks

- Q21. Which are the different factor that influence the cutting tool life?
- Q22. Write difference between right hand tool and left hand tool? (with neat sketch)
- Q23. Define:
- A. Tool wedge angle
 - B. Clearance angle
 - C. Rake angle
- Q24. A shaft of 60 mm diameter is to be plain turned. The lathe is turning at a speed of 120min^{-1} . Calculate the cutting speed V_c in m/min?
- Q25. A bar to be plain turned to a diameter of 36 mm. What is the speed of rotation n , if the cutting speed is $V_c=61\text{ m/min}$?
- Q26. A shaft is to be plain turned on a lathe. The cutting speed is $v_c=39.6\text{ m/min}$, the rotation speed is 'n' 280 min^{-1} . What is the diameter of the shaft in mm?
- Q27. Write the minimum 9 tools used for conventional lathe operations?
- Q28. Explain insert designation "SNMG"?

Section – C

05X10 = 50 Marks

- Q29. For thread M16X2, calculate: -
- (a) Thread depth
 - (b) Required chamfer
 - (c) Minor diameter
- Q30. Define Average roughness value (R_a) and Average maximum height of the profile (R_z). Which value is greater for the same surface roughness?
- Q31. Explain at least 6 components of conventional lathe machine.
- Q32. Why centering of turning tools is required before machining? Explain with a neat sketch.
- Q33. Name different types of chips formation and explain it? (with a neat sketch)



School of Manufacturing

Session: 2018-19 (Winter Semester)

B. Voc. Program, 1st Semester,

End-Sem. Examination

Course Code: SMS1104

Course Name: Conv. Turning

Time: 60 Min.

Max. Marks: 100 Marks

Section-A

20 X 1 = 20 Marks

1. Programs are fed into the punch cards in -
 - c) NC machines
2. G92 is named as:
 - a) Spindle Speed Limit
3. G03 is named as:
 - c) Circular Interpolation Anti clockwise
4. Which element of CNC systems decodes the coded instructions?
 - d) Machine control unit
5. Which of these is not an input device for CNC system?
 - a) Tachogenerator
6. M01 is named as:
 - d) Optional Stop
7. G code used for X-Z plane selection is:
 - b) G18
8. What character do we use to skip any block in program?
 - c) /
9. Touch probe is used:
 - d) To take zero reference in Z direction
10. ATC stand for:
 - b) Automatic tool changer
11. In conventional production, Information flow takes place by
 - b) Oral or written information flow
12. Which process is used for tool life monitoring in automated manufacturing?
 - c) Optical breakage monitoring



13. Which of the following feature is not relevant to automated manufacturing?
- d) Automated material flow.
14. Flexible manufacturing system is also known as:
- a) Production island
15. In flexible manufacturing system skilled workers perform:
- d) All of these
16. 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
17. What is the unit of Cutting Velocity?
- c) m/min
18. M03 is named as:
- c) Spindle Rotation Clockwise
19. Edge finder is used to:
- b) Take the reference point X and Y direction
20. Which operations can be performed on Vertical Milling Machine?
- d) All of the above

Section-B

21. Describe G83 cycle in Milling with all its parameters.

Ans. G83 is peck drilling cycle.

Syntax:

- G83 X Z P Q R F;
 - X = hole position in X (always zero).
 - Z = absolute drilling depth.
 - P (m sec) = dwell at the hole bottom (P1000 = 1 sec)
 - Q (mm) = depth of cut in Z.
 - R (mm) = incremental retract.
 - F = feed (mm/rev)



22. What do you mean by point to point tool path system? Give four examples.

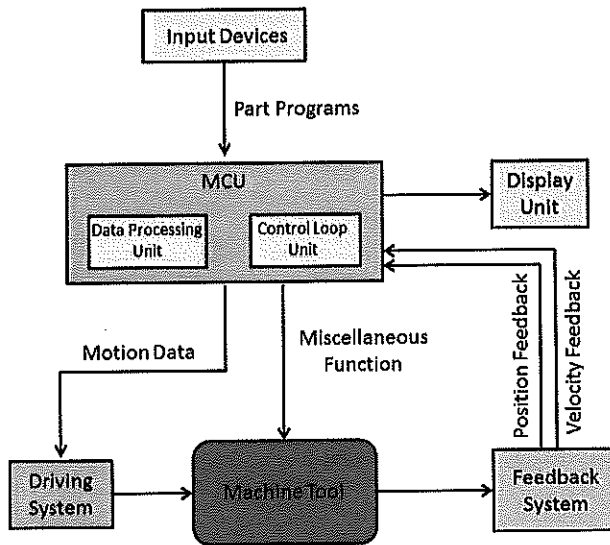
Ans. Point-to-point control systems cause the tool to move to a point on the part and execute an operation at that point only.

The tool is not in continuous contact with the part while it is moving.

Examples: drilling, reaming, punching, boring and tapping.

23. Draw the block diagram of the elements of CNC machine.

Ans.



24. Define CNC. Write any four advantages of CNC machines.

Ans.

CNC means Computer Numerical Control. This means a computer converts the design produced by Computer Aided Design software (CAD), into numbers. The numbers can be considered to be the coordinates of a graph and they control the movement of the cutter.

Computer numerical control (CNC) is a method for automating control of machine tools through the use of software embedded in a microcomputer attached to the tool. It is commonly used in manufacturing for machining metal and plastic parts.

Advantages of CNC machines:

1. Easier to program
2. Easy storage of existing programs
3. Easy to change a program
4. Avoids human errors
5. Safer to operate
6. Enables the manufacturing of complex work pieces
7. Usually generates closer tolerances than manual machines



25. Write difference between automated manufacturing system and conventional production.

Ans. With **conventional production** employees are directly involved in the execution of the work, for example they make, monitor, check and transport raw parts, tools and finished parts.

With **flexible automated production** these tasks are performed by machinery and auxiliary equipment. A central production computer ensures the flow of information. Skilled workers perform setting, monitoring and maintenance tasks.

26. Explain service life monitoring.

Ans. With service life monitoring all tools operating times are recorded by the machine control and compared with the target service life. The remaining tool service life is displayed on the screen and must be longer than the duration of the next tool operation

27. Explain grooving cycle with all its parameters.

Ans. Grooving cycle is G77.

Syntax:

- G77 R;

G77 X Z P Q R F;

- BLOCK 1:

— R (mm) = Retraction height in X direction for chip breaking.

- BLOCK 2:

— X = Final point coordinates of grooving diameter in X.

— Z = Final point coordinates of grooving diameter in Z.

— P (μm) = Depth of cut in X direction without sign.

— Q (μm) = Incremental infeed in Z direction.

— R (mm) = Retract in Z direction (always positive) to finish the surface.

— F = feed (mm/rev).

28. Write down the difference between Machine coordinates and Absolute coordinates with the help of a diagram.

Ans. Machine coordinates – Machine coordinates shows the distance between the machine zero point and turret zero point.

Absolute coordinates – Absolute coordinates shows the distance between the work piece zero point and turret zero point.

Section-C

29. Explain open loop and closed loop system in detail.

Ans.

Open Loop System:

Programmed instructions are fed into the controller through an input device.

These instructions are then converted to electrical pulses (signals) by the controller and sent to the servo amplifier to energize the servo motors.



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The cumulative number of electrical pulses determines the distance each servo drive will move, and the pulse frequency determines the velocity.

The primary drawback of the open-loop system is that there is no feedback system to check whether the program position and velocity has been achieved. If the system performance is affected by load, temperature, humidity, or lubrication then the actual output could deviate from the desired output. For these reasons, the open-loop system is generally used in point-to-point systems where the accuracy requirements are not critical. Very few, if any, continuous-path systems utilize open-loop control.

Closed Loop System:

The closed-loop system has a feedback subsystem to monitor the actual output and correct any discrepancy from the programmed input.

The feedback system could be either analog or digital. The analog systems measure the variation of physical variables such as position and velocity in terms of voltage levels. Digital systems monitor output variations by means of electrical pulses.

Closed-loop systems are very powerful and accurate because they are capable of monitoring operating conditions through feedback subsystems and automatically compensating for any variations in real-time.

Most modern closed-loop CNC systems are able to provide very close resolution of 0.0001 of an inch. Closed-looped systems would, naturally, require more control devices and circuitry in order for them to implement both position and velocity control. This, obviously, makes them more complex and more expensive than the open-loop system.

30. Describe Threading Cycle (G78) with all the parameters. Also calculate all the parameters for M10 threads.

Ans. Threading cycle (G78)

Syntax:

- G78 Pxxxxx Q R;
G78 X Z P Q R F;
- BLOCK 1:
 - PXXxxx = number of finishing cuts.
 - PxxXXxx = chamfer value (C_F) = $C_F \times 10 / \text{Pitch}$
 - PxxxxXX = thread angle
 - Q (μm) = first depth of cut
 - R (mm) = finishing allowance
- BLOCK 2:
 - X (mm) = minor diameter
 - Z = absolute thread length.
 - P (μm) = thread depth (always positive)
 - Q (μm) = remaining depth of cut
 - R (mm) = incremental taper value (R0 for cylindrical threads)
 - F = thread pitch = feed (mm/rev)



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

Ans.

S.No.	NC Machines	CNC Machines
1	It is defined as the machine which is controlled by the set of instructions in the form of numbers, letters and symbols. The set of instructions is called as Program.	It is defined as the machine which is used to control the motions of the work piece and tool with the help of prepared program in computer. The program is written in alphanumeric data.
2	In NC machines, the programs are fed into the punch cards.	In CNC machines, the programs are fed directly into the computer by a small keyboard similar to our traditional keyboard.
3	Modification in the program is difficult.	Modification in the program is very easy.
4	High skilled operator is required.	Less skilled operator is required.
5	Cost of the machine is less.	Cost of the machine is high.
6	Maintenance cost is less.	Maintenance cost is high.
7	The programs in the NC machine cannot be stored.	In CNC machines, the programs can be stored in the computer and can be used again and again.
8	It offers less flexibility and computational capability.	It offers additional flexibility and computational capability.
9	Less accuracy.	High accuracy.
10	It requires more time for the execution of the job.	It takes very less time in the execution of the job.
11	It is not possible to run it continuously.	It can be run continuously for 24 hours in a day.

32. Explain FMC and FMS.

Ans.

Flexible manufacturing cell FMC

A flexible manufacturing cell is created if, for example, a machining center with work piece magazine and an overhead loading robot are connected to form a unit.

The magazine system supplies the machine tool with blanks and receives the finished work pieces over, for example, an 8-hour shift.

Besides individual machines, two identical machines are often used as a flexible manufacturing cell for medium batch sizes.



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Flexible manufacturing system FMS

A flexible manufacturing system is created when multiple production cells are linked by a common transport system with storage and magazine system via a control and information system.

Tool provision and unfinished parts / finished parts management ensure that tools, clamping devices, blanks and finished parts are available in sufficient numbers for, as an example one shift, held in storage systems or magazine, automatically retrieved, machined and placed back in storage. Moreover, automatic deburring, washing and assembly stations can be connected downstream.

33. Describe transport system in automated manufacturing system.

Ans.

A further element of the automated flexible manufacturing system is a largely automated transport system. It must be tailored to the manufacturing system.

Figure shows the layout of a transport system for an automated production system consisting of two flexible manufacturing cells and a curing machine. Tools are loaded into the manufacturing cells from one side. from the other side the blanks are brought to the production cell on pallets and the finished work pieces are taken to the finished goods store for storage and delivery after processing.

