BHARTIYA SKILL DEVELOPMENT UNIVERSITY
SCHOOL OF POLYMECHANIC SKILLS
1st SEMESTER, END SEMESTER EXAMINATION
SUMMER SEMESTER, B.VOC. PROGRAM
SESSION 2017-2018

Course Code: POL1001 **Course Name**: Handskills
Time (Minutes): 60 **Maximum Marks**: 20

Instructions:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Mark.
4. Section B contains 06 Questions. Each question carries 1 Mark.
5. Section C contains 03 Questions. Each question carries 3 Marks.

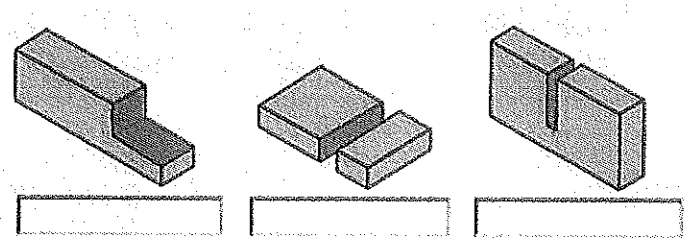
Section- A

1. When the tool wedge will penetrate deeper into the work piece?
   a) When the work piece material is harder than the tool material
   b) When a tool is used of large wedge angle
   c) When the work piece material is softer than the tool material
   d) When less force is applied on the tool

2. A wedge angle β should be always chosen that is –
   a) As large as possible
   b) As small as possible, but as large as necessary
   c) As large as possible, but as small as necessary
   d) As small as possible

3. In which process we can't define the cutting edge geometry?
   a) Chiseling
   b) Drilling
   c) Sawing
   d) Grinding

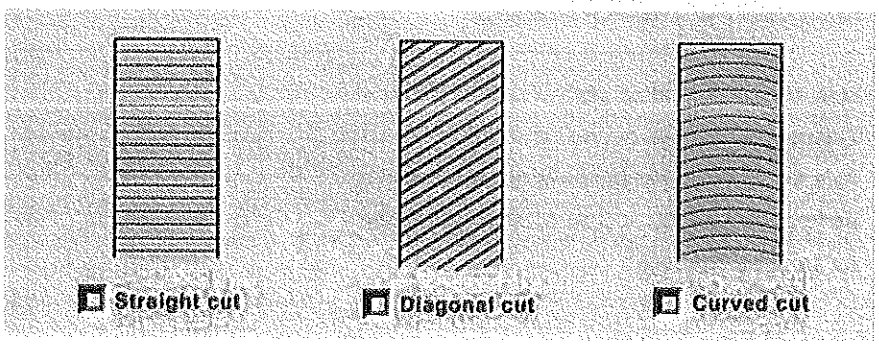
4. Please fill the saw cut types shown with the correct designation.



5. Which chisel is used in making cavities and slots?
   a) Flat chisel
   b) Cape chisel
   c) Web chisel
   d) Round nose chisel

6. After scribing, base plate is to be used as a base for hammering or layout punching.
   a) True
   b)
      False

7. Which of the file cut configurations has the bad chip evacuation?



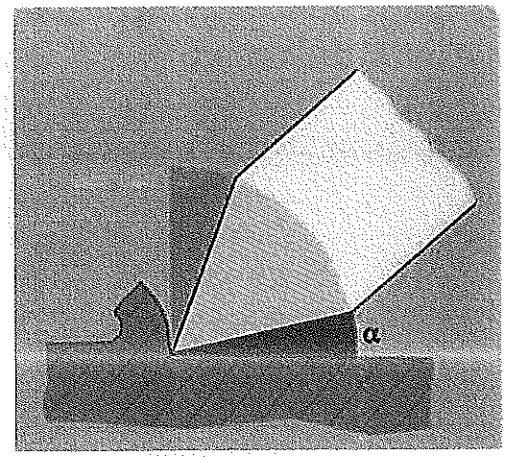
8. Which one is the correct order of reaming process ?
   a) Drill > CSK > Reamer
   b) Spot Drill > Drill > Core Drill > Reamer
   c) Spot Drill > Drill > CSK > Core Drill > Reamer
   d) Spot Drill > Drill > Reamer

9. What is the correct formulae for Blind Tap if thickness of work piece is H and dia of tap is D?
   a) H + 0.3D + 3
   b) H + 0.3D + 0.7D + 3
   c) H + 0.5D + 5
   d) H + 0.5D + 3

10. Why is blank work piece surface tinted with layout dye?
   a) To prevent rusting.
   b) To improve the appearance of the work piece.
   c) To make the scribed line easier to see.
   d) To protect the point of the scriber.

Section- B

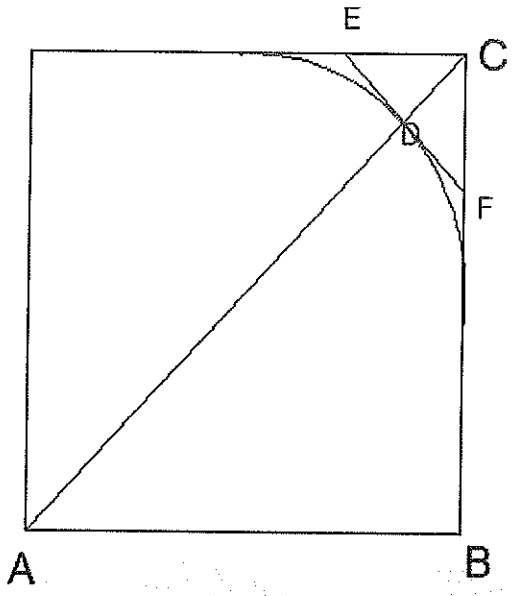
11. What happened if the size of clearance angle is very less?



12. Write a short note on occupational safety during sawing.
13. Why sheet metal is not scribed by hard material?
14. Define the following in one line –
    (1) Drilling (2) Reaming (3) Tapping (4) Debburing
15. Write the difference between counter sinking and counter bore with figure?
16. Write the applications of filing?

Section C

17. Explain the chip formation process.
18. Derive the formulae of chamfer CF = CE for radius 'R', where AB = BC = AD = R.



Q19. Describe 'free cutting' in 'sawing' with figures? Types of saw blade can be made to cut free.

Answer Key

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1st SEMESTER, END SEMESTER EXAMINATION
SUMMER SEMESTER, B.VOC. PROGRAM
SESSION 2017-2018

Course Code: A-POL1001 **Course Name:** Handskills
Time (Minutes): 60 **Maximum Marks:** 20

Section- A **(0.5x10=5 Marks)**

1. When the tool wedge will penetrate deeper into the work piece? 0.5 Mark
   Ans. When the work piece material is softer than the tool material
2. A wedge angle β should be always chosen that is – 0.5 Mark
   Ans. As small as possible, but as large as necessary
3. In which process we can't define the cutting-edge geometry? 0.5 Mark
   Ans. Grinding
4. Please fill the saw cut types shown with the correct designation. (0.16x3=0.5 Mark)
   Ans.
   1. Sawing out
   2. Sawing off
   3. slitting
5. Which chisel is used in making cavities and slots? 0.5 Mark
   Ans. Web chisel
6. After scribing, base plate is to be used as a base for hammering or layout punching. 0.5 Mark
   Ans. False
7. Which of the file cut configurations has the bad chip evacuation? 0.5 Mark
   Ans. Straight cut
8. Which one is the correct order of reaming process? 0.5 Mark
   Ans. Spot Drill > Drill > CSK > Core Drill > Reamer
9. What is the correct formulae of tap depth for Blind Tap if thickness of work piece is H and dia. of tap is D?
   Ans. H + 0.5D + 3 0.5 Mark
10. Why are blank work piece surface tinted with layout dye 0.5 Mark
    Ans. To make the scribed line easier to see.

Section- B (1x6=6 Marks)

11. What happened if the size of clearance angle is very less? (1 Mark)

Ans. If the clearance angle is very less, then the tool face will rub with the work piece surface. Due to this, friction will generate and because of friction tool temperature will increase which can affect the tool life. Surface finish will also be affected

12. Write a short note on occupational safety during sawing. (0.2x5=1 Mark)

Ans.

1. Clamp the work piece firmly in the vise.
2. Prevent the saw from slipping off the work piece by filing a notch.
3. Shortly before separation of the work piece, reduce the cutting pressure.
4. Don't remove saw chips with your fingers.
5. Deburr the work piece after sawing.

13. Why bend edges on sheet metal is not scribed by hard material? (1 Mark)

Ans. When a sheet metal is scribed by a hard material then a v-notch of very small size is formed, and when it is bent then the scribed sheet metal would break along the scribed line.

14. Define the following in one line – (0.33x3=1 Mark)

Ans.

(1) Drilling – Drilling is the operation of producing circular hole in the work piece by using a rotating cutter called Drill.

(2) Reaming – Reaming is accurate way of sizing and finishing the pre-existing hole, Accuracy of 5 microns can be achieved.

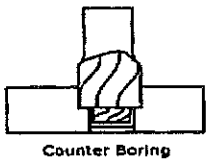
(3) Tapping – Tapping is the process by which internal threads are formed, it is performed by hand or machines.

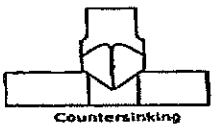
15. Write the difference between counter sink and counter bore with figure? (0.5x2=1 Mark)

Ans.

Counter Sink – Special angle cone shaped enlargement at the end of the hole to accommodate the screws. Cone angles of 60° , 90° , 120° etc.

Counter Bore – This operation uses a pilot to guide the cutting action to accommodate the heads of bolts.





16. Write five the applications of filing? (0.2x5=1 Mark)

Ans. Filing is specially well suited for the production of –

(1) Flat surfaces

(2) Square and parallel surfaces

(3) Radii

(4) Fits

(5) Complex contours

Section C (3x3=9 Marks)

17. Explain the chip formation process. (What and its phases) (1x3=3 Marks)

Ans. In a metal removal process, excess metal is removed in the form of 'chips'. Chip formation can be divided into three phases –

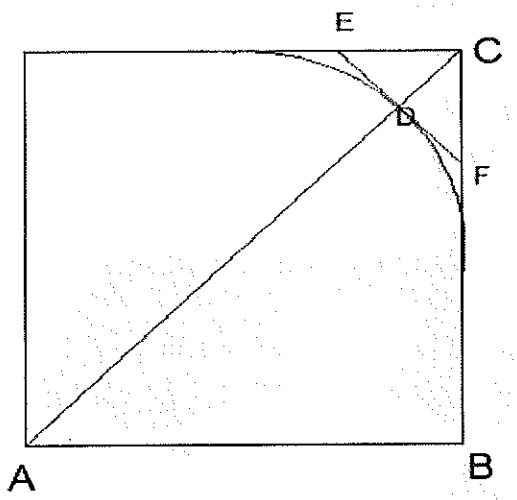
(1) Compression – When a tool comes in contact with the work piece, the work piece material compressed at a certain limit.

(2) Shearing –This compressed material wants to be free so a relative motion will come there between the compressed material and rest of work piece material. Due to this, two parallel forces in opposite direction get started working. These two forces are shear force and the process is shearing.

(3) Sliding – Moving out of the chips from the work piece after cut.

18. Derive the formulae of chamfer CF = CE for radius 'R', where AB = BC = AD = R. (3 Marks)

Ans. The chamfer value for the radius R is CF (=CE)



As given in question: AB = BC = AD = R

So, in triangle ABC, angle C and A is of 45°

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

$AC = R\sqrt{2} = R \times 1.414 = 1.414R$

AC = AD + CD → CD = AC – AD → CD = 1.414R – R = 0.414R

In triangle FDC –

Angle D is of 90°, C is of 45°, so angle F is also of 45°

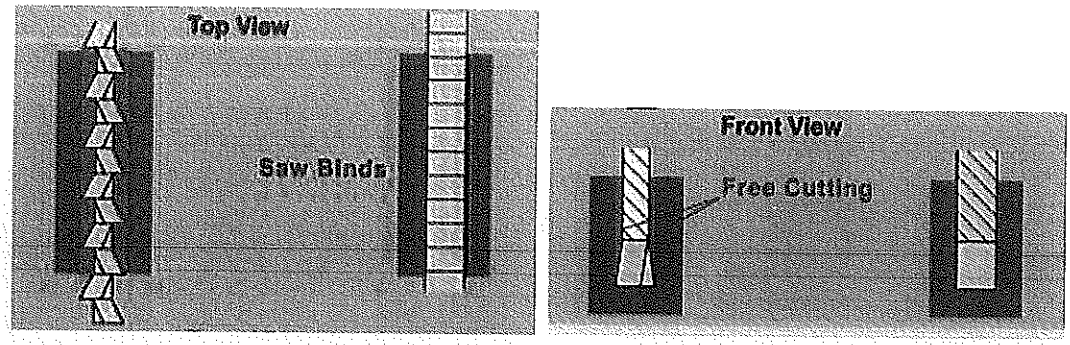
Then, $CF^2 = FD^2 + CD^2$ → $(0.414R)^2 + (0.414R)^2$

$CF = 0.414R\sqrt{2} = 0.414R \times 1.414 = 0.5853R$

$CF \approx 0.6R$

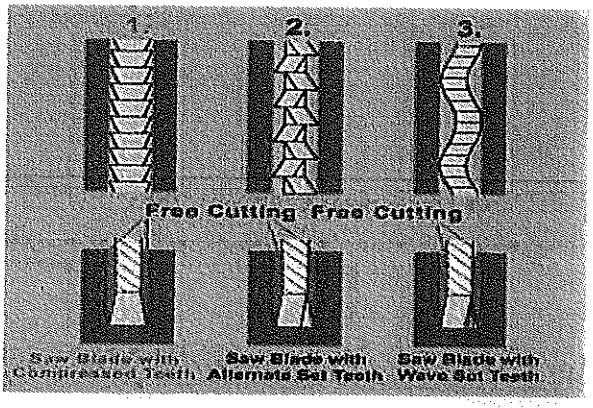
19. Describe 'free cutting' in 'sawing' with figures? Types of saw blade can be made to cut free. (3 Marks)

Ans. During sawing, if the saw blade cuts the work piece material without binding then the cutting is called free cutting. For free cutting the 'kerf' must be wider than the thickness of the blade, if this is not the case the saw blade will bind.



Three types of saw blade can be made to free cut –

(1) Compression of the teeth
(2) Alternation of the teeth
(3) Wave setting of the teeth



lade can be made to cut free.

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1st SEMESTER, END-SEMESTER EXAMINATION
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SESSION 2017-2018

Course Code: POL1002
Time (Minutes): 60

Course Name: Conv. Milling
Maximum Marks: 20

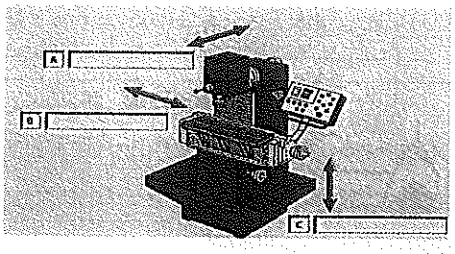
Instructions:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Mark.
4. Section B contains 06 Questions. Each question carries 1 Mark.
5. Section C contains 03 Questions. Each question carries 3 Marks.

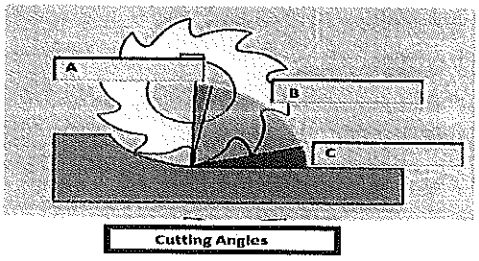
Section- A

1. Rake angle is the angle which is useful for...
    a) Cutting the work peace
    b) Coolant Flow
    c) Chip Removal
    d) Surface Finish
    e) Heat Transfer
2. What is the Clearance angle in N type milling Tool...?
    a) 8 -10°
    b) 6-8°
    c) 4-6°
    d) 11-12°
3. While processing thin-walled workpieces, axial and radial angle must be...
    a) Positive
    b) Negative
4. Which angle contributes in dampening vibration during cutting?
    a) Helix angle
    b) Clearance angle

5. What are the types of Milling Process used for position of the cutting edge in use...? **(More than one Option)**
   a) Down Milling
   b) External Milling
   c) Internal Milling
   d) Peripheral Milling
   e) End Milling
   f) Face Milling
   g) Up Milling
6. What is the R.P.M for Edge Finder...?
   a) 100-200
   b) 200-300
   c) 400-600
   d) 1000-1200
7. Please identify the Feed Axis
   -Transverse
   -Longitudinal
   -Vertical



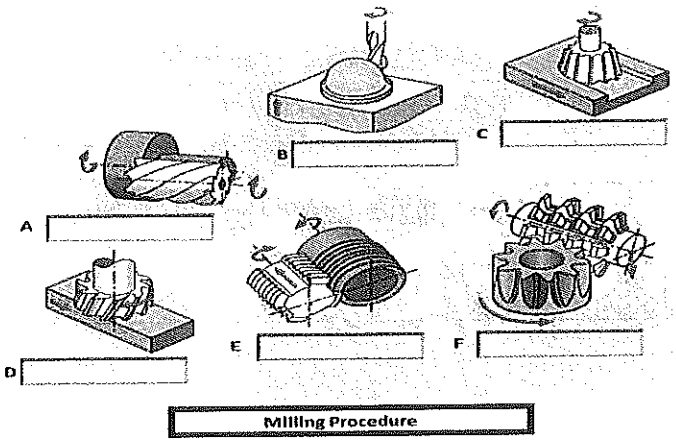
8. Identify various cutting angles in a tool Geometry.
   -Relief angle α
   -Wedge angle β
   -Rake angle Y



9. Name designation of milling cutters used for machining on given material.
   -Steel
   -Tool Steel
   -Aluminum

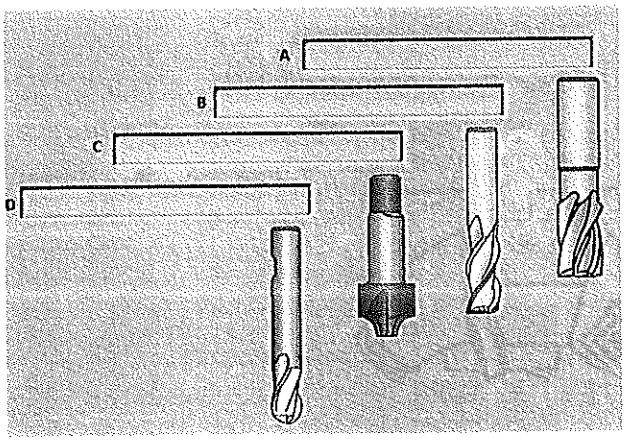
10. Please Match the Milling Procedure shown in the picture

-Face Milling
-Circular Milling
-Helical Milling
-Hobbing
-Profile Milling
-Contour Milling

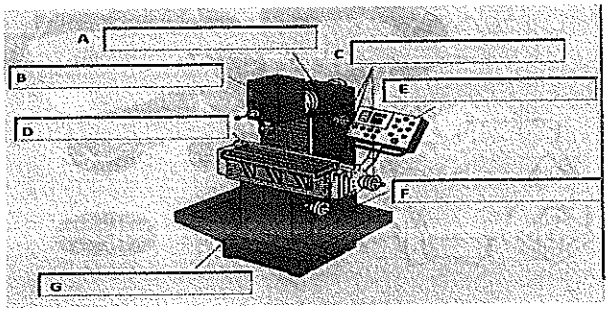


Section- B

11. Write any 2 differences between Up Milling and climb Milling.
12. Name the cutters



13. Name the following Parts



14. Wedge angle is the angle between _____ and _____.
15. Write any 2 types of Wear?
16. Why is it preferable to use cutters with a cutting-edge angle of 45°?

Section- C

17. An 80mm wide surface is to be face milled. What should the minimum diameter of the face will be and also why we prefer out of center position in relation to the workpiece when face milling?
18. Why should the highest-possible cutting speed be selected and also what effects result from interrupted cutting during milling?
19. A workpiece made of 16MnCr5 is to be milled flat. To do this a face mill with diameter 80mm which is fitted with six carbide indexable inserts is selected.

    Machining parameters:

    V_c = 120 m/min

    F_z = 0.2 mm

    What are the values of n, v_f ?

Answer - Key

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Course Code: A-POL1002
Time (Minutes): 60

Course Name: Conv. Milling
Maximum Marks: 20

Section- A **(0.5x10=5 Marks)**

1. Rake angle is the angle which is useful for... 0.5 Mark
   Ans. Chip Removal
2. What is the Clearance angle in N type milling Tool...? 0.5 Mark
   Ans. 11-12°
3. While processing thin-walled workpieces, axial and radial angle must be..... 0.5 Mark
   Ans. Positive
4. Which angle contributes in dampening vibration during cutting? 0.5 Mark
   Ans. Helix angle
5. What are the types of Milling Process used for position of the cutting edge in use...? 0.16x3=0.5 Mark
   Ans. Peripheral milling, end milling and face milling
6. What is the R.P.M for Edge Finder...? 0.5 Mark
   Ans. 400-600
7. Please identify the Feed Axis 0.16x3=0.5 Mark
   Ans. A) Transverse
   B) Longitudinal
   C) Vertical
8. Identify various cutting angles in a tool Geometry. 0.16x3=0.5 Mark
   Ans. a) Rake Angle
   b) Wedge Angle
   c) Relief angle
9. Name designation of milling cutters used for machining on given material 0.16x3=0.5 Mark
   Ans. a) Classification N
   b) Classification H
   c) Classification S

Answer Key

10. Please Match the Milling Procedure shown in the picture — 0.5 Mark

Ans. a) Circular Milling
b) Profile Milling
c) Contour Milling
d) Face Milling
e) Helical Milling
f) Hobbing

Section- B — (1x6=6 Marks)

11. Write any 2 differences between Up Milling and Down Milling. — 0.5x2=1 Marks

Ans. Up Milling- Cutter Rotates against direction of feed
It has the tendency to lift the work piece
Climb Milling- The cutter rotates with the direction of feed
It has the tendency to dig into the work piece

12. Name the cutters — 0.25x4=1 Marks

Ans. a) Standard Shank Type Milling Cutter
b) Key Way Milling Cutter
c) Corner Rounding End mill
d) Ball End Mill

13. Name the following Parts — 0.14x7=1 Marks

Ans. a) Milling Head
b) Main Drive
c) Hand wheel
d) Machine Table
e) Digital Read Out (D.R.O)
f) Machine Column and Base
g) Knee

14. Wedge angle is the angle between _____ and _____. — 0.5x2=1 Marks

Ans. Face and Tool Flank

15. Write any 2 types of Wear? — 0.5x2=1 Marks

Ans. Flank Wear and Crater Wear

16. Why is it preferable to use cutters with a cutting-edge angle of 45° — 1 Marks

Ans. Face mills 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 (3x3=9 Marks)

17. An 80mm wide surface is to be face milled. What should the minimum diameter of the face will be and also why we prefer out of centre position in relation to the workpiece when face milling? 1.5x2=3 Marks

Ans. 53 to 67
When the cutter is positioned centrally a change in the direction of the cutting force can trigger vibrations. This causes insufficient rigidity of the workpiece or machine.

18. Why should the highest possible cutting speed be selected and also what effects result from interrupted cutting during milling? 1.5x2=3 Marks

Ans. The cutting speed V_c should be selected as high as possible so that the milled parts are manufactured economically

Fluctuation of cutting force and temperature at the cutting edge result from interrupted cutting during milling.

19. A workpiece made of 16MnCr5 is to be milled flat. To do this a face mill with diameter 80mm which is fitted with six carbide indexable inserts is selected. 3 Marks

Machining parameters:

V_c = 120 m/min

F_z = 0.2 mm

What are the values of n, v_f ?

Ans. $n = V_c/\pi \times D$

$= 120/\pi \times 0.08$

$= 477$ rpm

$V_f = f_z \times z \times / n = 0.2 \times 6 \times 477$

$= 572$mm/min

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1st SEMESTER, END SEMESTER EXAMINATION
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SESSION 2017-2018

Course Code: POL1003
Time (Minutes): 60

Course Name: Assembly
Maximum Marks: 20

Instructions:

1. Attempt all questions.
2. Use of Calculators is Prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Marks.
4. Section B contains 06 Questions. Each question carries 1 Marks.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section- A

1. Thin annular shaped metal disk is called-
   a) Nut
   b) Washer
   c) Stud
   d) Bolt
2. When there is heavy thrust load, we use-
   a) Ball Bearing
   b) Roller Bearing
   c) Self-Aligning Bearing
   d) Roller Thrust Bearing
3. When there is no place to accommodate nuts, we use-
   a) Bolt
   b) Stud
   c) Cap screws
   d) Washer
4. Fastener with a head and straight threaded shank, used with a nut is called-
   a) Screw
   b) Bolt
   c) Stud
   d) Set screw

5. Lock nut is also known as-
    a) Locknut
    b) Jam nut
    c) Castle Nut
    d) Slotted nut
6. For a properly lubricated chain, efficiency is from-
    a) 70-80%
    b) 90-92%
    c) 80-90%
    d) 96-98%
7. Example of semisolid lubricant is-
    a) Mineral oil
    b) Grease
    c) Graphite
    d) Vegetable oil
8. When correctly tensioned, these belts have no slippage-
    a) Round belt
    b) Flat belt
    c) Timing belt
    d) V-belt
9. Teeth are parallel to axis in-
    a) Helical gear
    b) Spur gear
    c) Bevel gear
    d) Herringbone gear
10. When there is some misalignment between axis of shaft and housing, we use-
    a) Ball bearing
    b) Roller bearing
    c) Self-aligning bearing
    d) Deep groove ball bearing

Section- B

11. Examples of animal oil are _____ and _____.
12. Define Oil Seal.
13. Non-metallic gaskets are made up of _____, _____, _____ or _____.

14. Define Clutch.
15. _____ can be used instead of key to prevent relative motion between the hub and shaft in small power transmissions.
16. _____ is added in mineral oil to increase viscosity.

Section- C

17. Explain any three advantages of deep groove ball bearing.
18. Discuss any three types of keys.
19. Explain three functions of bearing.

Answer- Key

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SESSION 2017-2018

Course Code: A-POL1003
Time (Minutes): 60

Course Name: Assembly
Maximum Marks: 20

Section- A **(0.5x10=5 Marks)**

1. Thin annular shaped metal disk is called- 0.5 Mark
   Ans. Washer
2. When there is heavy thrust load, we use- 0.5 Mark
   Ans. Roller Thrust Bearing
3. When there is no place to accommodate nuts, we use- 0.5 Mark
   Ans. Cap Screws
4. Fastener with a head and straight threaded shank, used with a nut is called- 0.5 Mark
   Ans. Bolt
5. Lock nut is also known as- 0.5 Mark
   Ans. Jam Nut
6. For a properly lubricated chain, efficiency is from- 0.5 Mark
   Ans. 96-98%
7. Example of semisolid lubricant is- 0.5 Mark
   Ans. Grease
8. When correctly tensioned, these belts have no slippage- 0.5 Mark
   Ans. Timing Belt
9. Teeth are parallel to axis in- 0.5 Mark
   Ans. Spur Gear
10. When there is some misalignment between axis of shaft and housing, we use- 0.5 Mark
    Ans. Self- Aligning Bearing

Section- B (1x6=6 Marks)

11. Examples of animal oil are _____ and _____. 0.5x2= 1 Mark

Ans. Tallow oil and Lard oil.

12. Define Oil Seal. 1 Mark

Ans. Oil Seal is a mechanical device which is used to prevent leakage of fluid between two machine components.

13. Non-metallic gaskets are made up of _____, _____, _____ or _____. 0.25x4= 1 Mark

Ans. Non-metallic gaskets are made up of asbestos, cork, rubber or plastic.

14. Define Clutch. 1 Mark

Ans. A clutch is a mechanical device used to connect and disconnect the driving and driven members at the will of the operator.

15. _____ can be used instead of key to prevent relative motion between the hub and shaft in small power transmissions. 1 Mark

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

16. _____ is added in mineral oil to increase viscosity. 1 Mark

Ans. Rapeseed oil

Section- C (3x3=9 Marks)

17. Explain any three advantages of deep groove ball bearing. 1x3=3 Marks

Ans. Advantages

a) These bearings have high load carrying capacity because of relatively large size of balls.
b) Due to point contact between the balls and races, frictional loss and temperature rise is less.
c) This bearing gives excellent performance in high speed applications and generate less noise due to point contact.
d) Design is simple and inexpensive.
e) These can be used for longer distances, up to 15m

18. Discuss any three types of keys. 1x3=3 Marks

Ans. Types of keys.

a) A *parallel key* is the sunk key which is uniform in width as well as height throughout the length of the key.
b) *A taper key* is uniform in width but tapered in height. Taper keys are often provided with Gib-head to facilitate removal.

c) A saddle key is a key which fits in the keyway of the hub only. The power is transmitted by means of friction. Therefore, these keys are suitable for low power transmission as compared to sunk key.

d) Feather Key - A parallel key which is either fixed to the shaft or to the hub and which permits relative axial movement between them Elevators.

19. Explain three functions of bearing. 1x3=3 Marks

Ans. Functions of bearing.

a) It allows relative motion between two parts such as shaft and housing with minimum friction.

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

c) Support the load.

1) Radial Load

2) Axial Load

3) Angular Load

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SCHOOL OF POLYMECHANIC SKILLS
1st SEMESTER, END SEMESTER EXAMINATION
SUMMER SEMESTER, B.VOC. PROGRAM
SESSION 2017-2018

Course Code: POL1004
Time (Minutes): 60

Course Name: Measuring
Maximum Marks: 20

Instructions:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Mark.
4. Section B contains 06 Questions. Each question carries 1 Mark.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section- A

1. Visual and tactile inspection is a type of_____.
   a) Subjective measurement.
   b) Sensory measurement.
   c) Both subjective and sensory.
   d) None of the above

2. Slip gauge is use to____.
   a) Calibration
   b) Internal measurement
   c) External measurement
   d) Both a &b

3. Inspection done by using our senses is called
   a) Objective inspection
   b) Subjective inspection
   c) Gauging
   d) None of the above

4. Which one is the correct measuring tool to measure the diameter of a shaft?
   a) Vernier Callipers.
   b) Micrometer.
   c) Snap Gauge.
   d) Plug Gauge.

5. Accuracy of Standards to calibrate a measuring instrument should be____.
   a) $1/10^{th}$ of least count of measuring instrument.
   b) Less than $1/10^{th}$ of least count of measuring instrument.
   c) More than $1/10^{th}$ of least count of measuring instrument.
   d) Maximum $1/10^{th}$ of least count of measuring instrument.

6. Thread pitch gauge is type of_____..
   a) Form gauge.
   b) Limit gauge.
   c) Dimensional gauge.
   d) Both form and limit gauge

7. Sensory inspection is a type of____.
   a) Subjective measurement.
   b) Objective measurement.

8. Material of a measuring tool should be___.
   a) Softer than the work piece material.
   b) Harder than the work piece material.
   c) Same hardness as of work piece material.
   d) None of the above.

9. Convert
   a) 20 cm^2 = ___mm^2
   b) 19µm = ___mm

10. Which of the following is the correct measuring tool to check the dimension (diameter) of hole?
    a) Vernier caliper
    b) Ring gauge
    c) Plug gauge
    d) Snap gauge

Section- B

11. Define Reproducibility?
12. Define Least Count.
13. Write down the application of Bevel protractor.
14. Slip gauge or Gauge block comes under the category of_____.
15. What do you mean by Calliper?
16. When measured values are close to each other we call it_____.

Section- C

17. Write at least five advantages of the Measuring tools having digital display.
18. Explain different type of Errors while measurement.
19. Write down the different parts of micrometer with their application.

Answer - Key

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SUMMER SEMESTER, B.VOC. PROGRAM
SESSION 2017-2018

Course Code: A-POL1004
Time (Minutes): 60

Course Name: Measuring
Maximum Marks: 20

Section- A

(0.5x10=5 Marks)

1. Visual and tactile inspection is a type of___. 0.5 Mark

   Answer. Both subjective and sensory.

2. Slip gauge is use to _____. 0.5 Mark

   Answer. Both a & b

3. Inspection done by using our senses is called 0.5 Mark

   Answer. Subjective inspection

4. Which one is the correct measuring tool to Measure the diameter of a shaft? 0.5 Mark

   Answer. Micrometer

5. Accuracy of Standards to calibrate a measuring instrument should be___. 0.5 Mark

   Answer. more than 1/10th of least count of measuring instrument.

6. Thread pitch gauge is type of____. 0.5 Mark

   Answer. Form gauge.

7. Sensory inspection is a type of____. 0.5 Mark

   Answer. Subjective measurement.

8. Material of a measuring tool should be____. 0.5 Mark

   Answer. Harder than the work piece material.

9. Convert 0.25x2=0.5 Mark

   Answer. a) 2000 mm^2

   b) 0.019 mm

Answer Key

10. Which of the following is the correct measuring tool to check the dimension (diameter) of hole?

Answer. Plug gauge 0.5 Mark

Section- B **(1x6=6 Marks)**

11. Define Reproducibility.

Answer. It is the closeness of agreement between measurement of the same thing carried out in different circumstance E.g. by a different person or a different method or at a different time.

12. Define Least count.

Answer. The minimum value that can be measured with measuring instrument is called least count.

13. Write down the application of Bevel protractor.

Answer. Angle measurement.

14. Slip gauge or Gauge block comes under the category of_____.
Answer. Dimensional Gauge

15. What do you mean by Calliper?

Answer. A Calliper is a device used to measure the distance between two opposite sides of an object.

16. When measured values are close to each other we call it_____.
Ans. Precision

Section- C **(3x3=9 Marks)**

17. Write at least five advantages of the Measuring tools having digital display.

Answer.

- Easy to read.
- No skill required.
- No parallax error.
- Can be used as a gauge.
- Reduce the measurement time.

18. Explain different type of error while measurement.

Answer.

- **Zero Errors** – Zero value of both scales(Main and Vernier scale) do not match with each other when both jaws are clamped together.

- **Cocking Errors** – Reference face and measuring face are not parallel and work piece is not properly hold between jaws.
- **Dirt and Burr errors** - Reference face and measuring face are not clean and not de-burr.
- **Tilt Errors** – When an extra force is exerted on measuring Face or slider then it causes the tilt in movable jaw.
- **Parallax error** – When the reading is not taken from the correct position.

19. Write down the different parts of micrometer with their application.

Answer.

- **Ratchet**- used to apply constant and limited measuring force and also used for fine movement.
- **Thermal insulation pad-** do not allow to transfer the body heat to micrometer.
- **Anvil and spindle-** Anvil used to support the workpiece and create reference face and spindle create measuring face, it consist linear and rotational motion.
- **Measuring scale**- works on the pitch principle or can be defined as one rotation of circular scale gives one division linear movement on main scale.
- **Frame** – it is required for providing support to all components of micrometer.

1.

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Course Code: POL1005
Time (Minutes): 60

Course Name: Conv. Turning
Maximum Marks: 20

Instructions:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Mark.
4. Section B contains 06 Questions. Each question carries 1 Mark.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section- A

1. Shear chips are formed when
   a) Cutting ductile material at medium cutting speed& small to medium rake angle.
   b) Cutting brittle material at medium cutting speed& small to medium rake angle.
   c) Cutting hard material at medium cutting speed& small to medium rake angle.
   d) Cutting ductile material at small cutting speed& small to medium rake angle.
2. Cooling lubricant are used to
   a) Increase tool life
   b) Centre the tool
   c) To increase friction for proper cutting
   d) None of above
3. Large wedge angle is used when machining.
   a) Hard material
   b) Ductile material
   c) Brittle material
   d) None of these
4. Tool life is influenced by... **(More than one Option)**
   a) Cutting Condition
   b) Tool itself
   c) Work piece
   d) Coolant lubricant used

5. Continuous chips are formed when applied
    a) High cutting speed with large rake angle.
    b) Low cutting speed with large rake angle.
    c) High cutting speed with low rake angle.
    d) Low cutting speed with high rake angle.
6. Does cooling lubricant have chemically inert properties.
    a) True.
    b) False.
7. On what parameters surface of turned components depends. **(More than one Option)**
    a) Rounding of all corners
    b) Cutting speed
    c) Feed of lathe tool
    d) All of above
8. What should we induce in composition of material to avoid continuous chips?
    a) Chromium
    b) Sulphur
    c) Manganese
    d) Nickel
9. We make spigot on work piece to prevent
    a) Friction
    b) Slipping in
    c) Wear
    d) Bending
10. Which type of chips gives best surface finish?
    a) Shear chips
    b) Tear chips
    c) Continuous chips
    d) None of these

Section- B

11. When do we use large wedge angle?
12. Write the formula for minimum depth of cut.
13. Write one application of knuckle thread?
14. Write the formula for maximum feed rate.
15. In an acme thread, the thread angle is _____.
16. The average surface roughness value is known as _____.

Answer - Key

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SESSION 2017-2018

Course Code: A-POL1005 **Course Name**: Conv. Turning
Time (Minutes): 60 **Maximum Marks**: 20

Section- A (0.5x10=5 Marks)

1. Shear chips are formed when 0.5 Mark
   Ans. Cutting ductile material at medium cutting speed& small to medium rake angle
2. Cooling lubricant are used to 0.5 Mark
   Ans. Increase tool life.
3. Large wedge angle is used when machining 0.5 Mark
   Ans. Hard material.
4. Tool life is influenced by... 0.5 Mark
   Ans. All are correct.
5. Continuous chips are formed when applied 0.5 Mark
   Ans. High cutting speed with large rake angle.
6. Does cooling lubricant have chemically inert properties? 0.5 Mark
   Ans. True.
7. On what parameters surface of turned components depends. 0.5 Mark
   Ans. All of above.
8. What should we induce in composition of material to avoid continuous chips? 0.5 Mark
   Ans. Sulphur.
9. We make spigot on work piece to prevent 0.5 Mark
   Ans. Slipping in.
10. Which type of chips gives best surface finish? 0.5 Mark
    Ans. Continuous Chips.

Section- B (1x6=6 Marks)

1. When do we use large wedge angle? 1 Mark
   Ans. To machine hard material.
2. Write the formula for minimum depth of cut. 1 Mark
   Ans. 2/3rd of nose radius of tool.
3. Write one application of knuckle thread? 1 Mark
   Ans. Used in agricultural equipment where high contamination is there.
4. Write the formula for maximum feed rate. 1 Mark
   Ans. ½ of nose radius of tool.

Answer Key

5. In an acme thread, the thread angle is _____. 1 Mark

   Ans. 30°

6. The average surface roughness value is known as _____. 1 Mark

   Ans. Ra.

Section- C (3x3=9 Marks)

7. Find the length of a taper if,
   Major diameter is 50mm
   Minor diameter is 20 mm
   Taper angle is 45°. 3 Marks

   Ans. Tan (α/2) = (D-d)/2L = 36.23mm.

8. Explain Toughness, Hardness, Brittleness, Ductility & density of material. 0.6x5=3 Marks

   Ans. **Toughness**: - Ability of material to absorb energy and plastically deform without fracturing or amount of energy per unit volume that material can absorb before rupturing.
   Hardness: - Resistance of material to deformation, indentation or penetration.
   Ductility: - Solid materials ability to deform under tensile stress often characterized by materials ability to stretch into wire.
   Brittleness: - Material when subjected to stress, it breaks without significant deformation.
   Density of material: - It is mass per unit volume of material.

9. For M12x1.5 thread, calculate the following: - 0.6x5=3 Marks
   a) Thread depth.
   b) V depth.
   c) Major diameter.
   d) Minor diameter.
   e) Chamfer.

   Ans. a): - Thread depth: - 0.614xpitch= 0.614x1.75= 1.0745mm

   1.0745x2=2.15mm. (Diametrically)

   b): - V depth: - 0.866xpitch= 0.866x1.75=1.515mmm

   c): - Major diameter: -Nominal dia.- 10%of pitch= 12 - 0.17= 11.83mm

   d): - Minor diameter: -Major dia. – thread depth = 11.83 – 2.15= 9.68mm

   e): - Chamfer: - {(Major dia. – Minor dia.)/2} + 0.5 = 1.5745mm.

Section- C

17. Find the length of a taper if,
    a) Major diameter is 50mm
    b) Minor diameter is 20 mm
    c) Taper angle is 45°.
18. Explain Toughness, Hardness, Brittleness, Ductility & density of material.
19. For M12x1.5 thread, calculate the following: -
    a) Thread depth.
    b) V depth.
    c) Major diameter.
    d) Minor diameter.
    e) Chamfer

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Course Code: POL1006 **Course Name**: Pneumatics
Time (Minutes): 60 **Maximum Marks**: 20

Instructions:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Mark.
4. Section B contains 06 Questions. Each question carries 1 Mark.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section- A

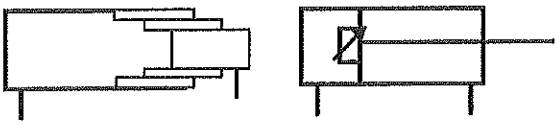
1. Standard atmospheric pressure is-
   a) 1.013 MPa
   b) 1.013 Pa
   c) 1.013 bar
   d) 1.013 N/m^2
2. A hydraulic system operates at a pressure up to-
   a) 10-12 bar
   b) 7-8 bar
   c) 400 bar
   d) 700 bar
3. Fluid power system is based on-
   a) Bernoulli's principle
   b) Gas law
   c) Avogadro's law
   d) Pascal law
4. The Function of Tank is to-
   a) maintain a pressure range
   b) drain water content
   c) prevents from pressure fluctuation
   d) remove dust particles from air

5. When PV=Constant, if we increase the volume then pressure will-
    a) Remains constant
    b) Decrease
    c) Increase
    d) none of these
6. In Isochoric process, at constant volume-
    a) Pressure is directly proportional to temperature
    b) Pressure is inversely proportional to temperature
    c) Temperature is proportional to volume
    d) Volume is directly proportional to pressure
7. Air dryer is used to-
    a) Supply mechanical power to compressor
    b) Transform the electrical energy to mechanical energy
    c) Remove dust particles from air
    d) Remove moisture content from air
8. What type of Refrigerant we are using in our Dryer?
    a) R22
    b) R34a
    c) R134a
    d) R34
9. What is L in FRL unit-
    a) Lubricant
    b) Liquid
    c) Lubricator
    d) Lubrication
10. Bistable valve is also known as-
    a) Dual pressure valve
    b) Shuttle valve
    c) Flow control valve
    d) Memory valve

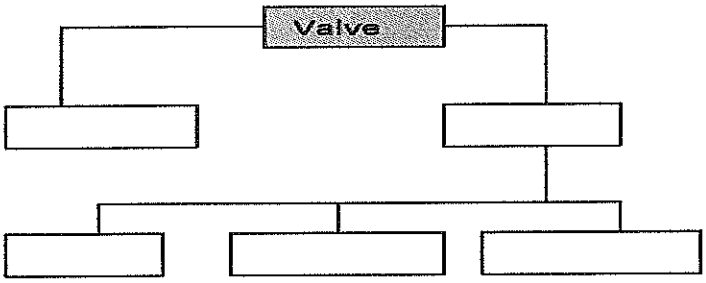
Section- B

11. Name the device used to quickly exhaust the air from actuator.
12. Covert the following units:
    - 1 bar = _____ N/m^2
    - 1 MPa = _____ bar
    - 1 atm = _____ bar
    - 1 bar = _____ PSI

13. Draw flow diagram for the types of compressor.
14. Define Pneumatics.
15. Write down the name of the pictures given below.



16. Fill in the blanks:



Section- C

17. Explain Bernoulli's principle. Also write the equation.
18. Differentiate between Pneumatics & Hydraulics (any six).
19. Write down any six advantages of using compressed air in Pneumatics.

Answer- Key

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Course Code: A-POL1006
Time (Minutes): 60

Course Name: Pneumatics
Maximum Marks: 20

Section- A (0.5x10=5 Marks)

1. Standard atmospheric pressure is- 0.5 Mark
   Ans. (c) 1.013 bar
2. A hydraulic system operates at a pressure up to- 0.5 Mark
   Ans. (d) 700 bar
3. Fluid power system is based on- 0.5 Mark
   Ans. (d) Pascal law
4. The Function of Tank is to- 0.5 Mark
   Ans. (c) prevents from pressure fluctuation
5. When PV=Constant, if we increase the volume then pressure will- 0.5 Mark
   Ans. (b) Decrease
6. In Isochoric process, at constant volume- 0.5 Mark
   Ans. (a) Pressure is directly proportional to temperature
7. Air dryer is used to- 0.5 Mark
   Ans. (d) remove moisture content from air
8. What type of Refrigerant we are using in our Dryer? 0.5 Mark
   Ans. (c) R134a
9. What is L in FRL unit- 0.5 Mark
   Ans. (c) Lubricator
10. Bistable valve is also known as- 0.5 Mark
    Ans. (d) Memory valve

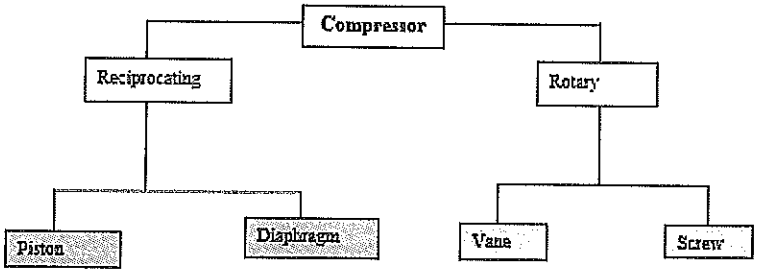
Section- B (1x6=6 Marks)

11. Name the device used to quickly exhaust the air from actuator.
    Ans. Quick exhaust valve. 1 Mark
12. Covert the following units: 0.25 x 4 = 1 Mark
    - 1 bar = 10^5 N/m^2
    - 1 MPa = 10 bar
    - 1 atm = 1 bar
    - 1 bar = 14.5 PSI

Answer Key

13. Draw flow diagram for the types of compressor. 0.16 x 6 = 1 Mark

Ans.



14. Define Pressure and Pneumatics. 1 Mark

Ans. Pneumatic is the branch of fluid power system in which power is transmitted by using dry compressed air.

15. Write down the names of the picture given below. 0.5x2=1 Mark

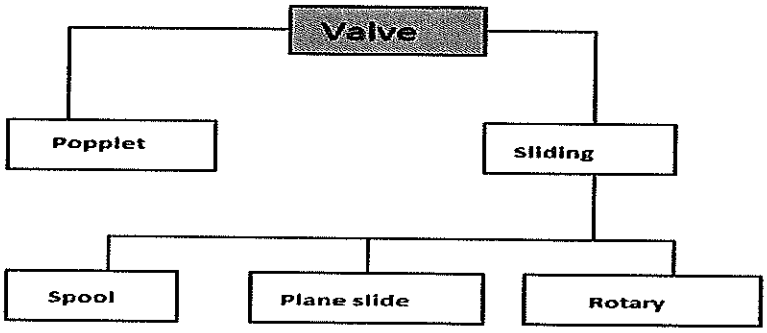
Ans.

Double acting cylinder - Variable cushion on one side

Telescopic cylinder - Double acting

16. Fill in the blanks: 1 Mark

Ans.



Section- C (3x3=9 Marks)

17. Explain Bernoulli's principle. Also write the equation. 1.5x2=3 Marks

Ans. Bernoulli's principle states that an increase in the speed of a fluid occurs simultaneously with a decrease in pressure or a decrease in the fluid's Potential Energy.

$$P_1 + \frac{1}{2}\rho V_1^2 + \rho g h_1 = P_2 + \frac{1}{2}\rho V_2^2 + \rho g h_2$$

18. Differentiate between Pneumatics & Hydraulics. 0.5x6=3 Marks

Ans. (Any six)

S. No.	Hydraulic System	Pneumatic System
1.	It uses a pressurized liquid as a fluid	It uses compressed gas, usually air, as a fluid
2.	An oil hydraulic system operates at pressure up to 700 bar	A pneumatic system usually operates at 10–12 bar
3.	Generally designed as closed system	Usually designed as open system
4	Valve operations are difficult	Valve operations are easy
5	Heavier in weight	Lighter in weight
6	Pumps are used to provide pressurized liquids	Compressors are used to provide compressed gases
7	The system has fire hazards	The system is free from fire hazards
8	Automatic lubrication is provided	Special arrangements for lubrication

19. Write down any six advantages of using compressed air in Pneumatics. 0.5x6=3 Marks

Ans. (any five)

- Availability: Air is available everywhere and can be compressed with a portable compressor so most factories and industries use this for many activities.
- Storage: It is easily stored in tanks in large volume.
- Simplicity of Design: Most pneumatic components are of simple design and structure.
- Easy to Work: Pneumatic components have simple control and are easily fitted to provide automation.
- Choice of Movement: It provides both linear movement and angular rotation with continuously variable operational speeds.
- Economy: Low installation cost and low maintenance cost as no service is required.
- Reliability: High system reliability because pneumatic components have a long working life.
- Resistance to Environment: High temperature, dust and corrosive atmosphere does not affect it while many other systems may get affected.
- Environmentally Clean: It is clean and does not cause any pollution.
- Safety: No fire hazards and pneumatic components do not produce heat.

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1st SEMESTER, END SEMESTER EXAMINATION
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SESSION 2017-2018

Course Code: POL1007
Time (Minutes): 60

Course Name: Welding
Maximum Marks: 20

Instructions:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 0.5 Mark.
4. Section B contains 06 Questions. Each question carries 1 Mark.
5. Section C contains 03 Questions. Each question carries 3 Marks.

Section- A

1. Ampere is the unit of .....?
   a) Current
   b) Pressure
   c) Heat
   d) Electrode
2. What is the code for MAG Welding?
   a) 111
   b) 141
   c) 135
   d) 131
3. Tensile strength of electrode E7018 is.....
   a) 430 Mpa.
   b) 470 Mpa.
   c) 520 Mpa.
   d) 490 Mpa.
4. What type of coating is found on electrode E6013?
   a) High Titania sodium
   b) High Titania potassium
   c) Low hydrogen sodium
   d) Low hydrogen potassium

5. The gap between the electrode and the workpiece should be about?
    a) Electrode Diameter
    b) Core wire Diameter
    c) Electrode Diameter X 2
    d) Core wire Diameter X 1.5
6. What type of current does a welding Inverter supplies?
    a) DC
    b) AC
    c) Both
7. MIG welding is always performed on .....current.
    a) DCSP
    b) AC
    c) DCRP
8. Wire feeding system is used for .....
    a) Control the gas supply
    b) Adjust the voltage
    c) Adjust the wire speed
    d) Control the welding speed
9. In TIG welding, the time of gas flow after pressing the stop button is known as.....
    a) Post Flow Time
    b) Pre Flow Time
    c) Down Slope Time
    d) Up Slope Time
10. What is the main reason to use a Welding Helmet?
    a) To aid visibility
    b) To protect their eyes when removing slag
    c) To protect their eyes from flashes
    d) To offer protection from radiation

Section- B

11. Write a short note on 'Metal Transfer in Welding.
12. Write the steps for Tack Welding. (only name)
13. List the advantages of Welding Inverter over other welding power sources?
14. What is meant by the term 'Welding defect'?
15. Define Lorentz force?
16. Explain the need of electrode grinding in TIG welding?

BSDU

Section- C

17. Describe representation of welding seam in drawing?
18. Differentiate between the electrodes 'E6013' and 'E7018'?
19. Draw a design of the MIG / MAG welding System?

STANDING OPERATING PROCEDURE: SCHOLARSHIPS AND FEE CONCESSIONS

1. **General**. Bhartiya Skill Development University (BSDU) is a premier skill development University of national repute. The University is conducting various skill development programmes in different streams for 10+2 or equivalent passed students. The university is charging fees for the courses offered as per course duration and specification. In order to help the students hailing from different categories, the University offers various scholarships and fee concessions to such students to acquire higher education. The University also offers scholarships and fee waiver to meritorious students and wards of employees irrespective of class and communities. This SOP lays down guidelines and procedures for grant of fee concession, scholarship and awards to various students undergoing skills programme at the University. This concession will be applicable only when the student is undergoing training in BSDU and will not be applicable while the student is undergoing internship with the industry.

2. **Rules for Grant of Scholarship.** The following guidelines will be observed while granting scholarship to the students of BSDU:-

(a) **Meritorious Students of State/CBSC**

i. **For Boys**. Any student having more than 80% marks in 10+2 (or equivalent) examination will be allowed scholarship equivalent to 100% tuition fee. Those having marks between 70 to 80% in 10+2 (or equivalent) examination will be allowed 50% of tuition fee as scholarship.

ii. **For Girls.** Girl students who have obtained 75% and above marks in 10+2 (or equivalent) examination will be allowed scholarship equivalent to full fee and 50% of the tuition fee if marks obtained are 65 to 75%.

iii Above scholarships will be allowed at the time of admission and continue for the first year only. For retention of the scholarships in the subsequent years, a boy student has to maintain minimum 8.0 CGPA and girl should maintain minimum 7.5 CGPA for every year. The whole process will be applicable year-wise only. If any student getting scholarship falls below the required CGPA, he/she will not be entitled to this scholarship thereafter.

(b) **Meritorious Students through University Entrance Examination for Admission**

(i) **For Boys.** This scholarship will be granted to students based on their merit in the entrance exam for admission to various degree courses of the University. Scholarship equivalent to 50% of the tuition fee will be allowed to boys with 90% & higher marks at the entrance examination. For those between 80 to 90% marks, 30% of tuition fee will be allowed.

Answer - Key

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SUMMER SEMESTER, B.VOC. PROGRAM
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Course Code: A-POL1007 **Course Name**: Welding
Time (Minutes): 60 **Maximum Marks**: 20

Section- A **(0.5x10=5 Marks)**

1. Ampere is the unit of .....? 0.5 Marks
   Ans. Current
2. What is the code for MAG Welding? 0.5 Marks
   Ans. 135
3. Tensile strength of electrode E7018 is... 0.5 Marks
   Ans. 490 Mpa
4. What type of coating is found on electrode E6013? 0.5 Marks
   Ans. High Titania potassium
5. The gap between the electrode and the workpiece should be about? 0.5 Marks
   Ans. Core wire Diameter
6. What type of current does a welding Inverter supplies? 0.5 Marks
   Ans. Both
7. MIG welding is always performed on .....current. 0.5 Marks
   Ans. DCRP
8. Wire feeding system is used for ..... 0.5 Marks
   Ans. control the wire speed
9. In TIG welding, the time of gas flow after pressing the stop button is known as.....
10. **Ans. Post flow time** 0.5 Marks
11. What is the main reason to use a Welding Helmet? 0.5 Marks
    Ans. To offer protection from radiation

Section- B **(1x6=6 Marks)**

11. Write a short note on 'Metal Transfer in Welding'

Ans. **The gas metal arc welding (GMAW) process uses four basic modes to transfer metal from the electrode to the workpiece. Each mode of transfer depends on the welding process, the welding power supply, and the consumable, and each has its own distinct characteristics and applications.**

- **Short – Circuit**
- **Globular**
- **Spray Arc**
- **Pulse** 0.25x4=1 Marks

Answer Key

12. Write the steps for Tack Welding. (only name)

Ans. Steps are:

a. **Aligning**
b. **Clamping**
c. **Tack** 0.33x3=1 Marks

13. List the advantages of Welding Inverter over other welding power sources?

Ans. Small setup, more portable and light weight and multi process welding capability.

0.5x2=1 Marks

14. What do you mean by welding defect?

Ans. A welding defect is any flaw that compromises the usefulness of a weldment.

1 Marks

15. Define Lorentz force?

Ans. The Lorentz force is the most important influencing variable during drop transfer, which takes place in free flight. This force is generated by the surrounding magnetic field and causes the fused end of the electrode to constrict and separate.

1 Marks

16. Explain the need of electrode grinding in TIG welding?

Ans. Needs Are:

- **Improves electron emission**
- **Improved current capability**
- **Better starts**
- **Improved arc stability**
- **With stands heat better** 0.33x3=1 Marks

Section- C **(3x3=9 Marks)**

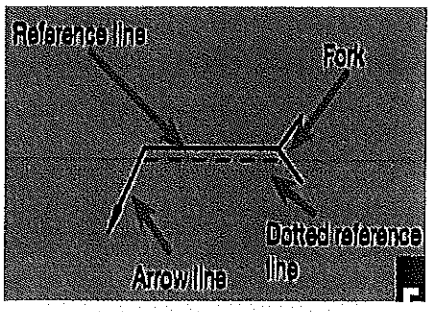
17. Describe representation of welding seam in drawing? 3 Marks

Ans.

Arrow Line- Shows the welding Position

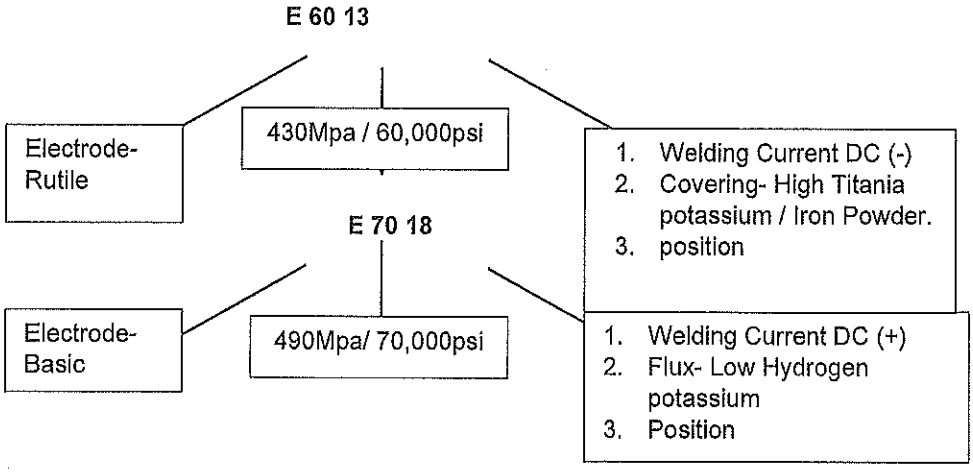
Reference Line (Solid) } **Their Intersection shows the plane of welding**
Dotted Reference Line }

Fork- Contain the supplementary Information of the welding



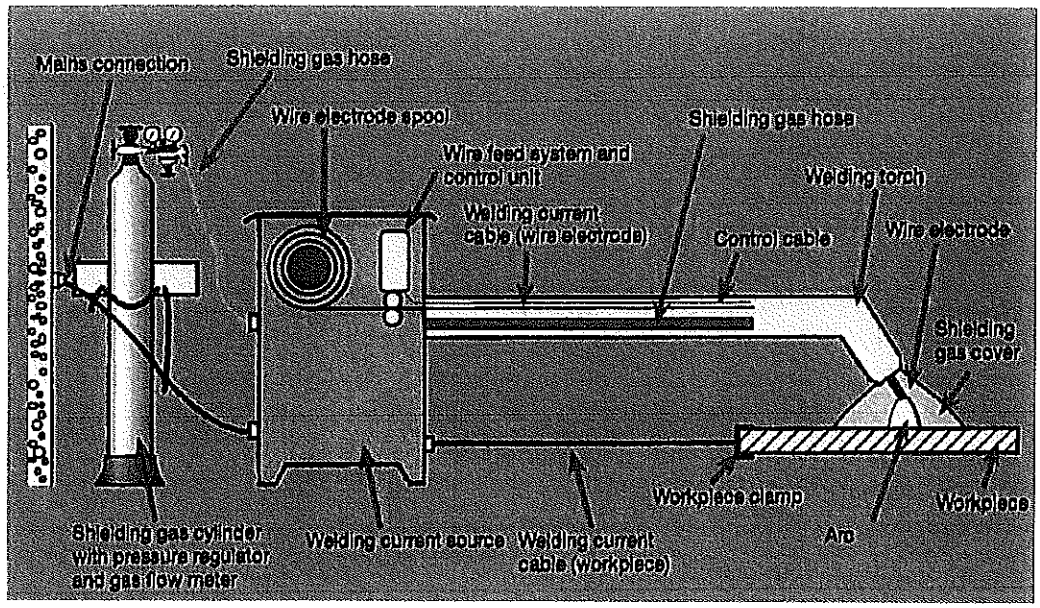
18. Differentiate between the electrodes 'E6013' and 'E7018'?

Ans. 3 Marks



19. Draw a design of the MIG / MAG welding System? 3 Marks

Ans.



Answer Key