BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1101 **Time: 2 Hours**

Course Name: HANDSKILLS AND FITTING **Max. Marks: 50**

Instruction:

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

Section – A

10X01 = 10 Marks

Q1. Which instrument used for scribing?

(A) scriber (C) Vernier calliper

(B) marking gauge (D) centre punch

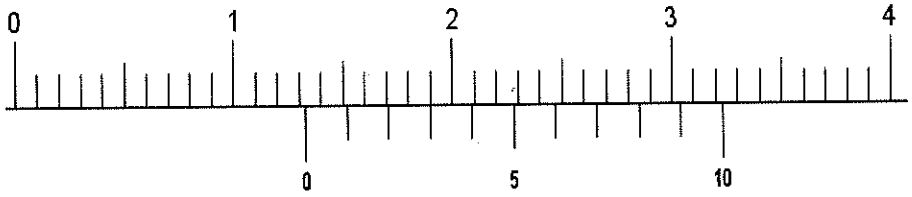
Q2. While using hacksaw which stroke is a cutting stroke?

(A) upward (C) forward

(B) downward (D) backward

Q3. Which measurement can you read?

Tenth Vernier



(A) 19.0mm (C) 133.0mm

(B) 13.3mm (D) 3.0mm

Q4. Which tool is most suitably used for scribing a circle?

(A) divider (C) Vernier caliper

(B) scriber (D) pencil

Q5. Which type of file is used for making guide way for sawing?

(A) Flat file (C) round file

(B) Semi round file (D) triangular file

Q6. What it sawing with large tooth spacing?

a) Aluminum (b) Stainless steel

c) Mild steel (d) Cast iron

Q7. Which material do you file with a single cut file?

(A) Mild steel
(B) Tool steel
(C) Stainless steel
(D) Tin

Q8. Which part does not belong to a file?

(C) Tang
(D) Blade
(C) Bow
(D) Heel

Q9. 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

Q10. Which file type is not available?

(A) Type E half round file
(B) Type H oval file
(C) Type D round file
(D) Type A flat hand file

Section – B

04×04 = 16 Marks

Q11. Explain the term counter bore and countersink.

Q12. Write 3 different types of scriber?

Q13. Explain how you should clean a file property

Q14. Why do you scribe Aluminium with a Pencil or a felt tip pen?

Section – C

04×06 = 24 Marks

Q15. Write the necessary points while scribing and Centre punching.

Q16. Write short note on

a) Least count b) Deburring c) Hinge

Q17. Write work plan for making a radius of 10mm on an aluminum workpiece

Q18. Describe different types of files and their uses.

Set - B

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Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

Answer sheet End-Sem. Examination

Course Code: MCS1101 **Time: 2 Hours**

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Section – A

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(A) upward (C) **forward**

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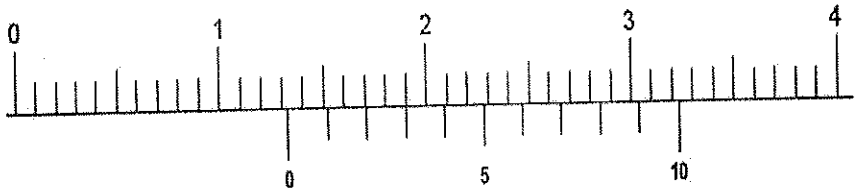
Q3. Which measurement can you read?

Tenth Vernier



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(B) **13.3mm** (D) 3.0mm

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(B) scriber (D) pencil

Q5. Which type of file is used for making guide way for sawing?

(A) Flat file (C) round file

(B) Semi round file (D) **triangular file**

Q6. What it sawing with large tooth spacing?

a) **Aluminum** (b) Stainless steel

c) Mild steel (d) Cast iron

Q7. Which material do you file with a single cut file?

(A) Mild steel (C) Stainless steel

(B) Tool steel (D) **Tin**

Q6. To avoid sticking of chips in file which lubricant we use

(A) water (C) **chalk**

(B) grease (D) coolant

Q7. Which part does not belong to a file?

(C) Tang (C) **Bow**

(D) Blade (D) Heel

Q8. Which instrument used for punching?

(A) scriber (C) Vernier calliper

(B) marking gauge (D) **centre punch**

Q9. 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

Q10. Which file type is not available?

(A) Type E half round file (C) Type D round file

(B) **Type H oval file** (D) Type A flat hand file

Section – B

04×04 = 16 Marks

Q11. Explain the term counter bore and countersink.

Ans. Counter bore – it is a cylindrical flat bottom hole profile that enlarges the coaxial hole.

Tool used for counter bore is called counter boring tool. First we have to drill a suitable hole for that. Typically used when a fasteners like socket head cap screw is required to sit flush with or below level of workpiece.

Counter sink – it is a conical hole cut into a workpiece, used to provide support or seat for fasteners below the level of workpiece.

Q12. Write 3 different types of scriber?

Ans. 1. Scriber- portable, can easily scribe any profile manually mostly used for straight lines.

2. Caliper-Whose one end is fixed and can scribe from another end used for flat surfaces.
3. Divider – used for circular scribing, we have to set the radius manually.

Q13. Explain how you should clean a file property

Ans. Use a fille brush to clean the file.

Traces of chips left behind which cannot be removed with a fille brush are removed with a file cleaner (brass or copper sheet) working in the direction of the overcut.

Q14. Why do you scribe Aluminium with a Pencil or a felt tip pen?

Ans. When marking with a "hard" steel needle, fine cracks may appear in the soft material. The material can break during further processing

Section – C

04×06 = 24 Marks

Q15. Write the necessary points while scribing and Centre punching.

Ans. Scribing

- Always wear safety glasses
- Keep the other tip of scriber covered while using it
- Always covered the scriber after using it
- always tilt the scriber so that it reaches the bottom edge of gauge
- scribing should be done once

Centre punch

- make 60 degree angle from base plate to match the center point
- always match the exact Centre
- always punch on a base plate
- avoid vibrations

Q16. Write short note on

a) Least count b) Deburring c) Hinge

Ans.

a) Least count – it is the smallest possible value measured by same instrument.

Can be calculate by the formula

$$\text{Least count} = \frac{\text{Value of one main scale division}}{\text{Total no. of Vernier scale division}}$$

b) Deburring- removing small amount of metals from edges to make them smooth for safety with the help of files. Always use the process similar like chamfer.

c) Hinge – a movable joint or mechanism on which a door, gate or lid swings as it opens and closes or which connects linked objects.

Q17. Write work plan for making a radius of 10mm on an aluminum workpiece

Ans. **Radius**

- Material checking
- Deburring
- Sizing
- Radius calculation (0.6r)- 0.6*10= 6mm
- Scribing 10mm from both corners and 6mm for chamfer
- punching
- filing for chamfer
- dividing chamfers
- filing for radius in see saw motion
- checking by light gap method
- finishing

Q18. Describe different types of files and their uses.

Ans. FILES – **depends on shapes:**

Triangular file - used for making way while sawing, used for filing triangular surfaces, for removing metal from center of surfaces.

Semi round – for filing semi round surfaces, for filing arcs.

Flat file – for filing flat surfaces, for making chamfers

Square file – for removing small metal surface from little corners where flat files are not accessible

Round file – for filing fully round surfaces.

Also depending upon pitch:

Coarse pitch – files whose teeth has higher pitch and removes much material, having large surface roughness

Medium pitch – whose surface roughness is lower than coarse file, having medium pitch between teeth.

Fine pitch - Whose surface roughness is low, very fine pitch, used for finishing purpose.

Set - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1102 **Time: 2 Hours**

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

Instruction:

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

Section – A

10X01 = 10 Marks

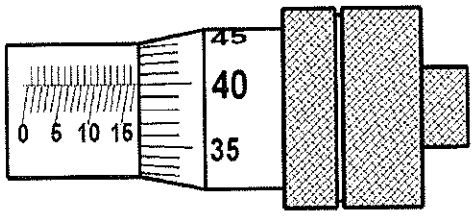
Q1. The smallest value that can be measured by the measuring instrument is called its

(A) accuracy
(C) least count
(B) tolerance
(D) error

Q2. With which tool can be measured 12.5+/-0.3?

(A) Steel ruler
(C) Tape measure
(B) Micrometer gauge
(D) Folding rule

Q3. Which measurement can you read?



(A) 15.0mm
(C) 16.40mm
(B) 16.9mm
(D) 17.4mm

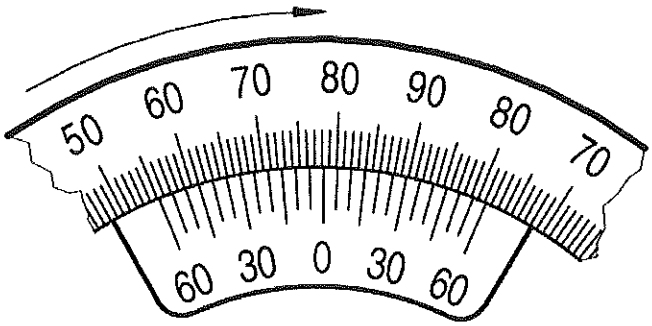
Q4. Which part does not belong to a Vernier caliper?

(A) Measuring jaw
(C) Scale sleeve
(B) The clamp
(D) Depth measuring rod

Q5. Which tool is a gauge?

(A) Bevel angle
(C) Punch
(B) Protractor
(D) Vernier Caliper

Q6. Read the measurement

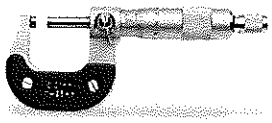


(A) 78 degree 15 min.
(C) 79 degree 15 min.
(B) 81 degree 15 min.
(D) 81 degree 40 min.

Q7. Which tool is most suitably used for scribing a circle?

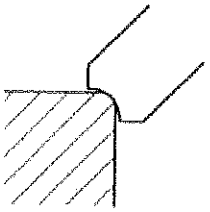
(A) divider
(C) Vernier caliper
(B) scriber
(D) pencil

Q8. Name the instrument



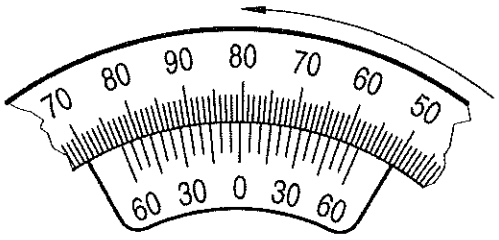
(A) divider
Vernier caliper
(B) Micrometer
(D) protractor

Q9. What conclude from figure?



(A) radius too small
(C) radius large
(B) accurate radius
(D) can't say

Q10. Read the measurement



(A) 78 degree 15 min.
(C) 80 degree 20 min.
(B) 81 degree 15 min.
(D) 81 degree 40 min.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Section – B

04X04 = 16 Marks

Q11. Write short note on measuring errors, why do we measure parts

Q12. Name 8 different measuring instruments/gauges

Q13. For what do we use block gauges?

Q14. Write short note on measuring errors.

Section – C

04X06=24 Marks

Q15. Explain subjective and objective testing.

Q16. Make labelled diagram of Vernier calliper or micrometre

Q17. Explain the terms measuring and gauging and difference between them

Q18. Should the temperature of a gauge be cooler or warmer than that of the Test piece? Reasons for your opinion.

Set - B

Registration No.: .....

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

School of Metal Construction Skills

Answer key- B

B. Voc. Program, 1st SEM

Course Code: MCS 1102 **Time: 1 Hour**

Course Name: Measuring **Max. Marks: 20**

Instruction:

1. All questions are compulsory.
2. Missing data if any can be suitably assumed.

Section – A

10×01 = 10 Marks

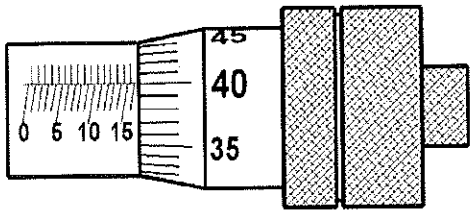
Q1. The smallest value that can be measured by the measuring instrument is called its

(A) accuracy
(C) **least count**
(B) tolerance
(D) error

Q2. With which tool can be measured 12.5+/-0.3?

(A) Steel ruler
(C) Tape measure
(B) **Micrometer gauge**
(D) Folding rule

Q3. Which measurement can you read?



(A) 15.0mm
(C) **16.40mm**
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(D) 17.4mm

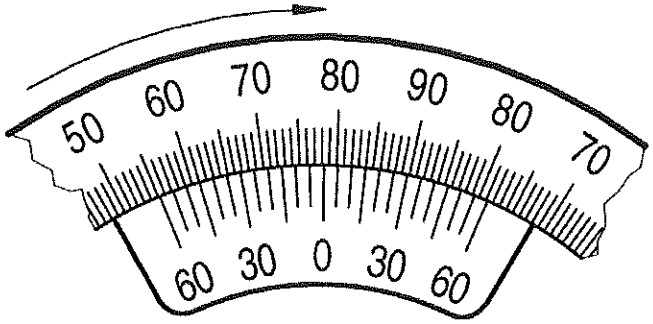
Q4. Which part does not belong to a Vernier caliper?

(A) Measuring jaw
(C) **Scale sleeve**
(B) The clamp
(D) Depth measuring rod

Q5. Which tool is a gauge?

(A) **Bevel angle**
(C) Punch
(B) Protractor
(D) Vernier Caliper

Q6. Read the measurement



(A) 78 degree 15 min.

(B) 81 degree 15 min.

(C) **78 degree 15 min.**

(D) 81 degree 40 min.

Q7. Which tool is most suitably used for scribing a circle?

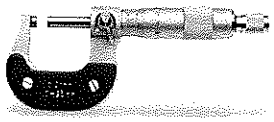
(A) **divider**

(B) scriber

(C) Vernier caliper

(D) pencil

Q8. Name the instrument



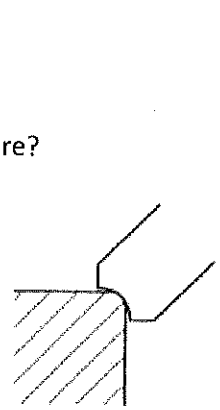
(A) divider

(B) **Micrometer**

Vernier caliper

(D) protractor

Q9. What conclude from figure?



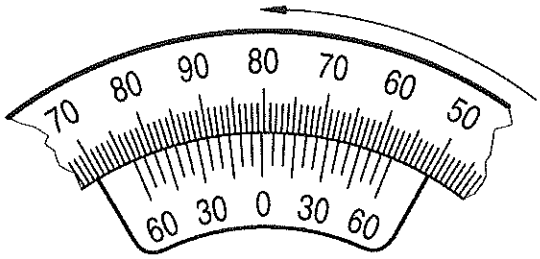
(A) **radius too small**

(B) accurate radius

(C) radius large

(D) can't say

Q10. Read the measurement



(A) 78 degree 15 min.

(B) 81 degree 15 min.

(C) **80 degree 20 min.**

(D) 81 degree 40 min.

Section – B

04X04 = 16 Marks

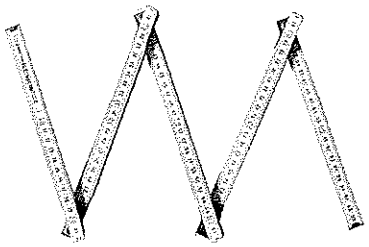
Q11. Why do we measure parts?

Ans. -Reproducibility of parts

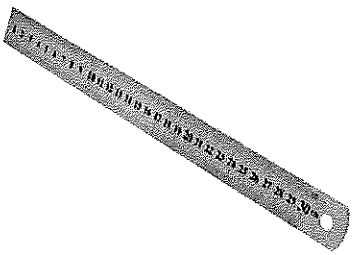
-Early detection of errors
-Guarantee the function of parts
-Reduce costs
-Reduce waste
-Reduce process time
-Safety

Q12. Name 8 different measuring instruments/gauges

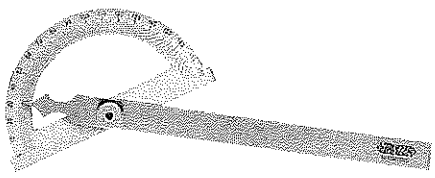
Ans.



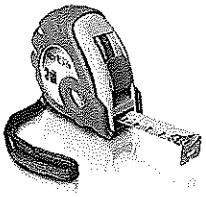
Folding rule



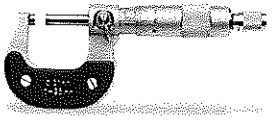
steel ruler



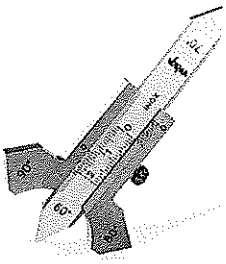
Protractor



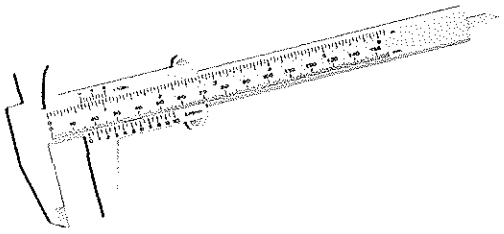
Laser measure



Tape measure



Micrometer gauge



Welding gauge

Vernier calipper

Q13. For what do we use block gauges?

Ans. Micrometer gauges must be checked from time to time in order to ensure that the measured values that they are delivering are correct.

Q14. Write short note on measuring errors.

Ans. The parallelism of the measuring jaw of the vernier gauge is checked using the light gap method.

The accuracy of the measuring tools is dependent upon the reference temperature (20°C).

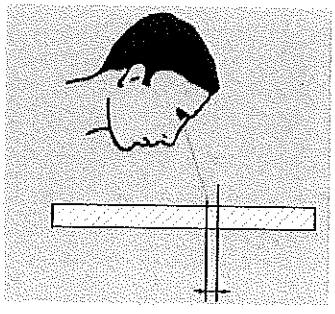
Workpieces/measuring depths must be clean and burr-free for measuring.

The measuring jaws must be directed as high as possible above the workpiece.

Do not tilt the vernier gauge during measuring.

Do not apply too much pressure when pressing the moving measuring jaw against the surface to be measured.

Look at the reading from above.



The vernier gauge is a precision measuring tool and must therefore be protected against soiling and damage.

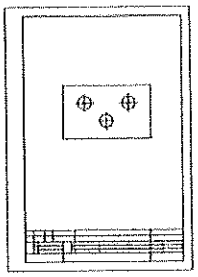
Section – C

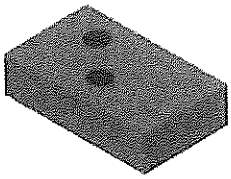
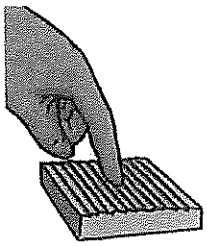
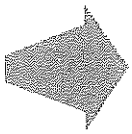
04X06=24 Marks

Q15. Explain subjective and objective testing.

Ans. Subjective testing

Subjective test methods lead to conclusions which can vary greatly from one tester to the next.



good/ bad

You can see, that at the work piece one rough
Hole is missing

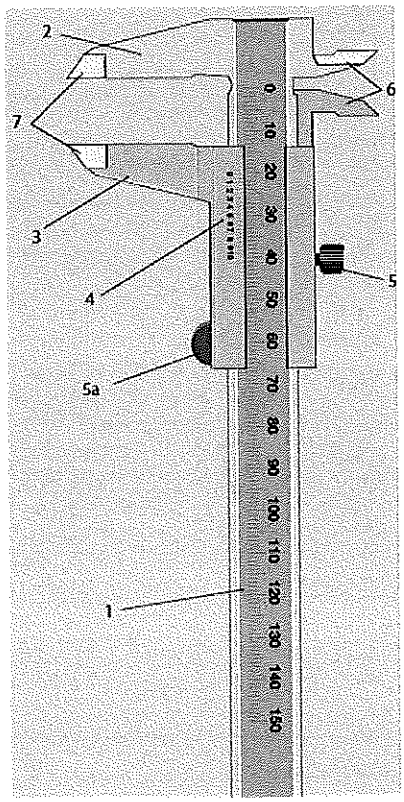
you can feel, that the surface is too

Objective testing

Objective test methods must produce results that always contain am measured value or a conclusion that is unequivocal. In other words, anyone carrying out the test using the same method must come to the same result.

Q16. Make labelled diagram of Vernier calliper or micrometre

Components of a Vernier Calliper



Measurements with an accuracy of 0.1 mm or up to 0.05 mm can be read off from a vernier gauge.

1. The bar with the line graduation in millimetres

2. The fixed measuring jaw

3. The adjustable measuring jaw

4. The slide with Vernier graduation

5a. The retaining screw (type 1A)

5b. The clamp (type 2A)

6 The cutting areas for measuring internal dimensions

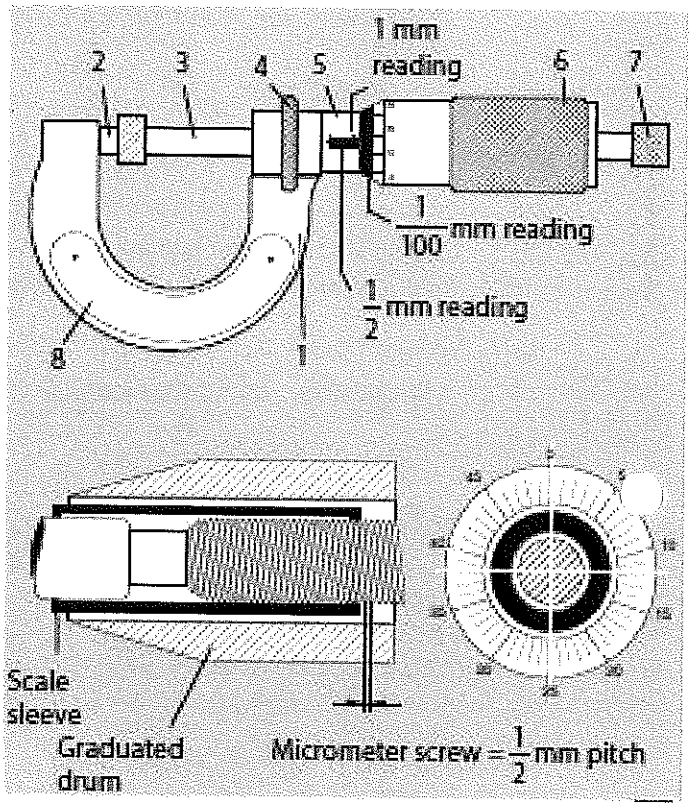
7. The measuring areas to measuring threads

8. The depth measuring rod for measuring drill depths, groove depths and ridge heights

OR

Components of a micrometre gauge

A micrometer gauge is used to measure external dimensions with a dimensional accuracy of 1/100 mm.



1. Bow (marked with measuring range)

2. Measuring pin (fixed end)

3. Micrometer screw

4. Retaining screw

5. Scale sleeve

6. Graduated drum (thimble)

7. Coupling (ratchet)

8. Plastic plates (thermal insulation marked with measuring range)

Q17. Explain the terms measuring and gauging and difference between them

Ans. Measuring is the process by means of which a measured value is determined ba comparing a given size with a statutory unit of measure.
Gauging is the process of determining wheter specific lengths, angles or shapes of a test object comply with given dimensional or physical limits gauges or the direction in which these are exceeded. Gauging does not determine the extent of any deviation from these limits.

Measuring something gives it a numeric value, an actual size and unit.

Gauging something just makes sure that it is between tolerances without actually having to measure it.

Q18. Should the temperature of a gauge be cooler or warmer than that of the Test piece? Reasons for your opinion.

Ans. The parallelism of the measuring jaw of the vernier gauge is checked using the light gap method.

The accuracy of the measuring tools is dependent upon the reference temperature (20°C).

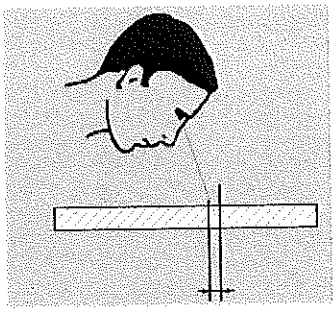
Workpieces/measuring depths must be clean and burr-free for measuring.

The measuring jaws must be directed as high as possible above the workpiece.

Do not tilt the vernier gauge during measuring.

Do not apply too much pressure when pressing the moving measuring jaw against the surface to be measured.

Look at the reading from above.



Set - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1103 **Time: 2 Hours**

Course Name: Electrode welding (MMAW) **Max. Marks: 50**

Instruction:

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

Section – A

10X01 = 10 Marks

Q1. Weld seam symbol is placed on.

a.) Reference line b.) Arrow line

c.) fork d.) None of above

Q2. What is the code for MMA welding?

a.) 141 b.) 131

c.) 111 d.) 311

Q3. Which is the destructive weld, seam inspection procedure?

a.) liquid penetration test b.) X-ray inspection

c.) bend test c.) Visual inspection

Q. 4 what is the coating material in E7018?

a.) high Titania potassium b.) Low hydrogen potassium

c.) High Titania sodium d.) Low hydrogen sodium

Q5. Which shielding gas is provided in SMAW to protect the molten pool?

a.) argon b.) Helium

c.) nitrogen d.) None of above

Q6. For which metal we can use E 7018 electrode?

a.) low carbon steel b.) Stainless steel

c.) high carbon steel d.) Aluminium

Q7. Which polarity gives the maximum heat to work piece?

a.) DCSP b.) DCRP

a.) AC d.) All of above

Q8. What is the use of welding helmet?

a.) To protecting eyes from U.V. rays

b.) To protecting the eyes form radio waves

c.) visible rays

d.) Gamma rays

Q9. What is the name of shown picture?

a.) belt grinder

b.) Angle grinder

c.) pencil grinder

d.) Bench grinder

Q10. Name the covering material for E 6013.

a.) high Titania potassium

b.) Low hydrogen potassium

c.) high Titania sodium

d.) Low hydrogen sodium

Section – B

04X04 = 16 Marks

Q11. How to reduce the blowing effect?

Q12. Write down the steps for TACK welding.

Q13. Explain the details given on reference line and on fork.

Q14. What is welded joints? Give the name of any four type of welded joints and explain them in brief.

Section – C

04X06 = 24 Marks

Q15. Define welding and give advantages and disadvantages of welding.

Q16. Write short note on "Power source used in MMA Welding".

Q17. Give the uses of welding hand tools along with their diagram.

Q18. What is protective gear? Give the use of six protective gear.

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer **Semester)**

B. Voc. Program, I-Semester,

Answer sheet End-Sem. Examination

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c.) fork d.) None of above

Q2. What is the code for MMA welding?

a.) 141 b.) 131

c.) **111** d.) 311

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c.) **bend test** c.) Visual inspection

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a.) high Titania potassium b.) Low **hydrogen potassium**

c.) High Titania sodium d.) Low hydrogen sodium

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c.) nitrogen d.) **None of above**

Q6. For which metal we can use E 7018 electrode?

a.) **low carbon steel** b.) Stainless steel

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c.) pencil grinder d.) Bench grinder

Q10. Name the covering material for E 6013.

a.) **high Titania potassium** b.) Low hydrogen potassium

c.) high Titania sodium d.) Low hydrogen sodium

Section – B

04X04 = 16 Marks

Q11. How to reduce the blowing effect?

Ans.

1. Inclining the electrode
2. using numerous, strong tack welding points
3. The welding sequence
4. Attaching more than 1 lead.

Q12. Write down the steps for TACK welding.

Ans.

1. Aligning
2. Clamping
3. Tack welding

Q13. Explain the details given on reference line and on fork.

Ans. Details on the reference line:

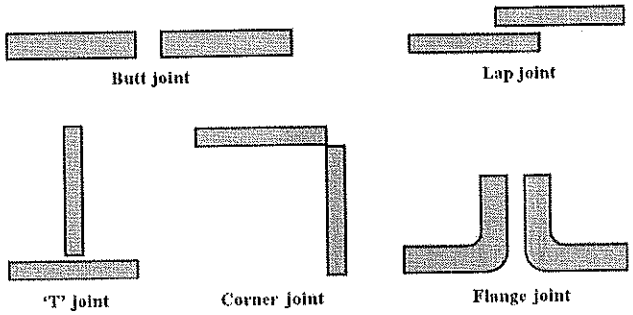
1. Seam thickness
2. Seam symbol
3. Seam width (if necessary)
4. Number of seams X seam length (with intermittent seams)
5. Seam spacing (with intermittent seams)

Details on the Fork:

1. Process
2. Evaluation group
3. Welding position
4. Additional material

Q14. What is welded joints? Give the name of any four type of welded joints and explain them in brief.

Ans. The welded joint is the area in which the work pieces are to be welded to one another. The joint type is determined by the position/arrangement of the workpieces relative to one another.



Types of Welded Joints

Section – C

04X06 = 24 Marks

Q15. Define welding and give advantages and disadvantages of welding.

Advantages

Welding joins components securely together and produces sealed joints.

For this reason, pipes are joined by welding.

Welding is, in many cases, the most economical joining procedure.

Therefore, it is often used in mass production, for example, for spot welding vehicle chassis parts together by robots.

In contrast to bonding, soldering or brazing, only small joining surfaces are required for welding.

Disadvantages

Among the disadvantages of welding are the structural changes and heat distortion in the welding zone, both caused by the high temperatures required.

In addition, only identical or similar metals can be welded together.

Furthermore, not all metals are suitable for welding.

High carbon content steel parts, for example, can not be welded.

Q16. Write short note on "Power source used in MMA Welding".

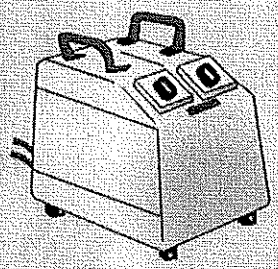
Welding Transformer

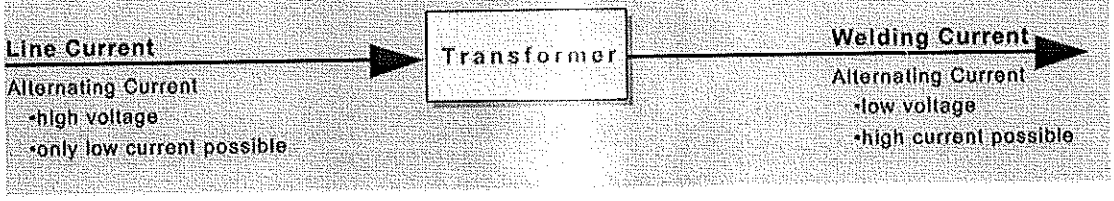
Welding transformers are used to weld with alternating current.

They step down the line voltage.

Welding transformers are easy to handle, economical and low maintenance. They are used primarily on construction sites, for installations and by do it yourselfers.

When welding with alternating current, however, the arc striking and welding properties are not optimal.





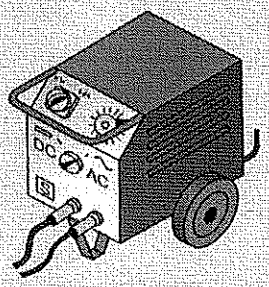
Welding Rectifier

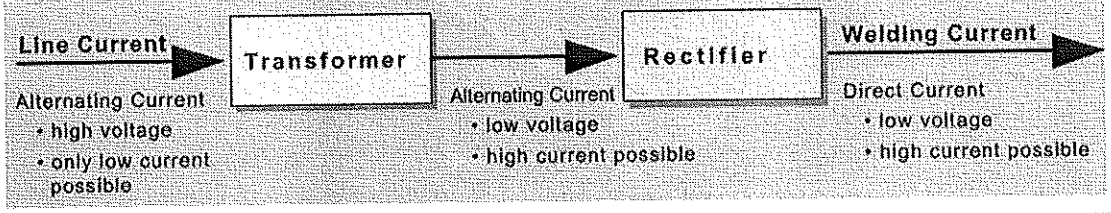
The welding rectifier is a combination of transformer and downstream rectifier.

Welding rectifiers are economical, low maintenance and have very good arc striking and welding properties.

Most of these machines can also be used to weld with alternating current by switching off the rectifier.

They are used in shops and on construction sites.





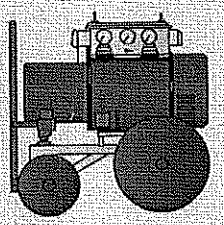
Alternating Current
- high voltage
- only low current possible

Alternating Current
- low voltage
- high current possible

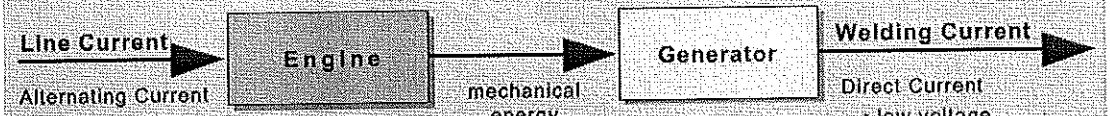
Direct Current
- low voltage
- high current possible

Welding Generator

The welding generator has an electric motor or a combustion engine and a generator.
The motor or engine drives the generator via a common shaft.
The generator then converts the mechanical energy back into electrical energy, mostly in the form of direct current.
As a so-called portable welder, the combustion engine driven welding generator is especially well suited for use on construction sites.
Welding generators are, however, loud, expensive to produce and high maintenance.



Welding Generator



Alternating Current
- high voltage
- only low current possible

mechanical energy

Direct Current
- low voltage
- high current possible

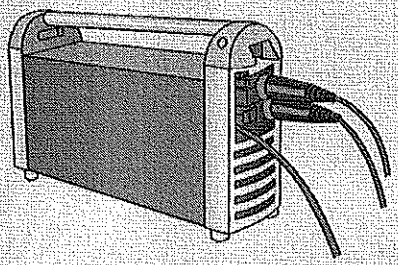
Welding Inverter

In contrast to traditional welding power sources, the welding converter rectifies the current before sending it to the transformer.

This allows the transformer and the other downstream components to be designed considerably smaller and lighter.

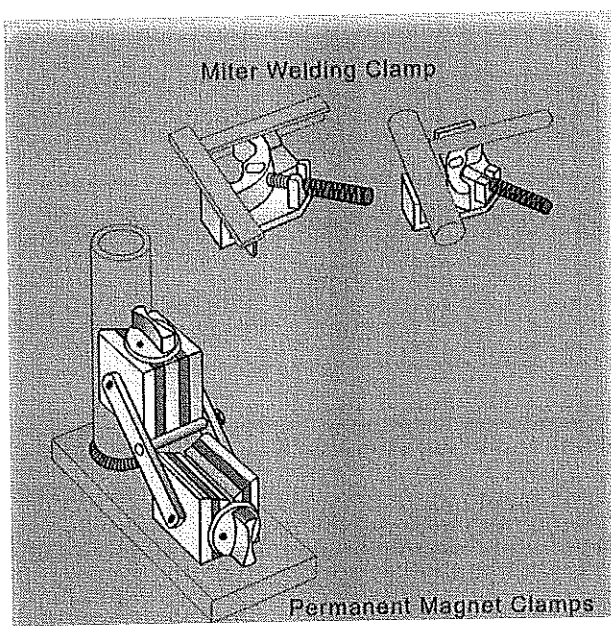
The welding inverter is therefore a high performance welding power source with a very compact construction.

Because they also consume little energy and offer better control of the welding process, they are used very frequently nowadays.



Q17. Give the uses of welding hand tools along with their diagram.

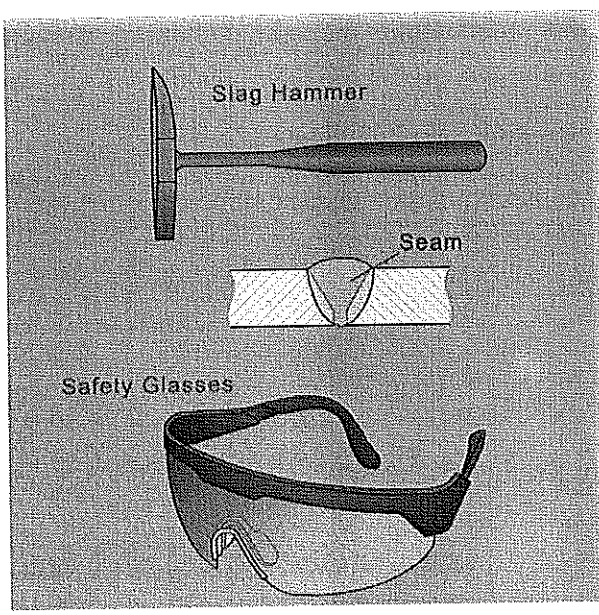
Ans.



Clamping Devices

Once they have been aligned, the parts being welded must be held securely in place.

Therefore, permanent magnet clamps and miter welding clamps, among others, are used to hold parts and keep them from shifting.

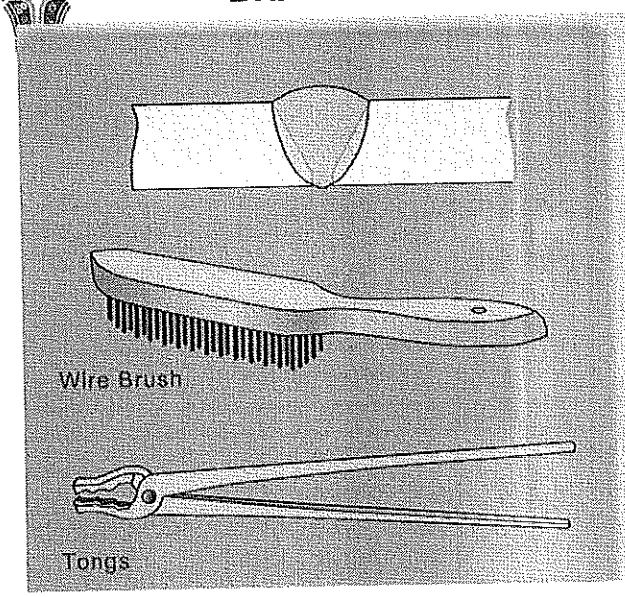


Tools

During manual shielded metal arc welding, a slag coating forms over the weld seam.

This coating is removed by tapping lightly with the slag hammer.

Eye protection must always be worn during this process.



Tools

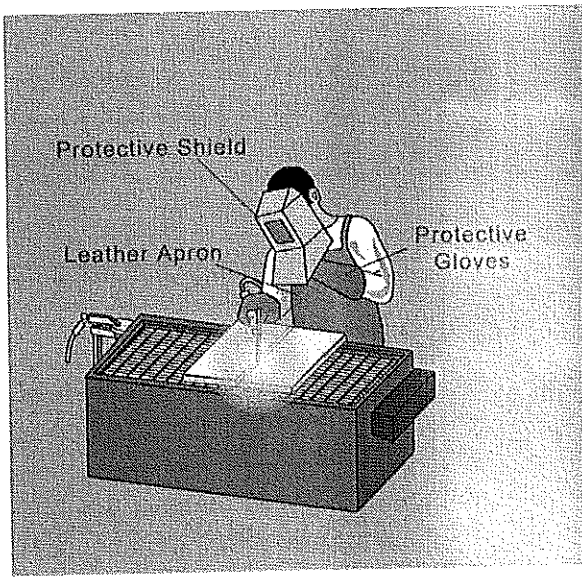
Before welding, the wire brush is used to remove rust and paint residue from the weld groove.

After welding, it is used to clean the seam.

Hot weldments are held and moved with tongs.

Q18. What is protective gear? Give the use of six protective gear.

Ans.



Protective Gear

The welding arc, in addition to radiating heat and bright visible light, also radiates invisible ultraviolet and infrared rays of high intensity.

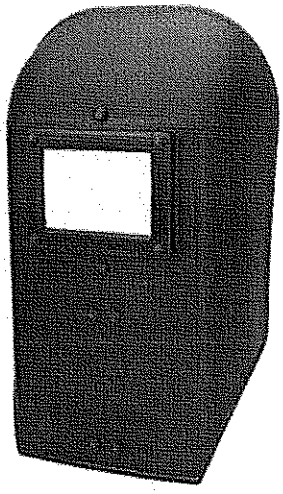
The protective gear that is always worn during manual shielded metal arc welding prevents serious eye and skin injuries.

Protective Equipment

1. WELDING HELMET

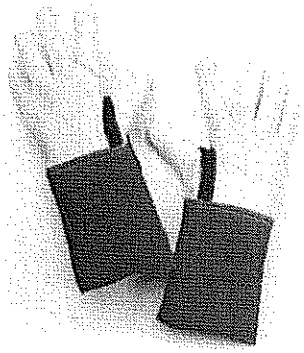
King Shield - Auto

2. HAND SHIELD King Shield - Hand



3. Hand Gloves- MIG/ MMA

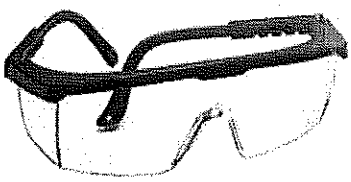
4. Hand Gloves- TIG



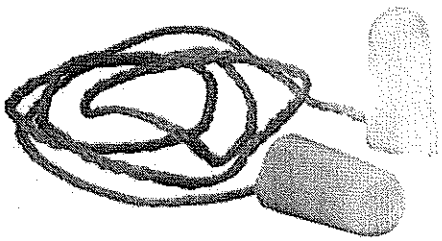
5. Welding Apron

6. Safety Shoes

7. Safety Goggle



8. Ear Plug



Set-B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1104 **Time: 2 Hours**

Course Name: Tungsten Inert Gas Welding (GTAW) **Max. Marks: 50**

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
3. Section A contains 10 Questions. Each question carries 01 Marks.
4. Section B contains 04 Questions. Each question carries 04 Marks.
5. Section C contains 04 Questions. Each question carries 06 Marks.

Section – A

10X01 = 10 Marks

Q1. Which of the following gad mixture is used in TIG welding?

a) Argon + CO_2
b) Argon + He
c) He + H_2
d) Argon + N_2

Q2. TIG welding best suited for

a) Mild steel
b) Stainless steel
c) Aluminium
d) Silver

Q3. Preheating is essential in welding for

(A) High speed steel (C) Stainless steel
(B) Cast iron (D) silver

Q4. Which of the following is inert gas?

(A) Argon (C) $C0_2$
(B) H_2 (D) O_2

Q5. Which current is used in TIG WELDING?

(A) AC (C) DC
(B) AC and DC both (D) none of the above

Q6. Which of the following welding process uses non – consumable electrode?

(A) MIG
(B) FCAW
(C) MMA
(D) TIG

Q7. Which of the following tungsten electrode is best suited for welding Aluminium in TIG welding?

a) Tungsten with 2% thorium
b) Tungsten with 2% Zirconium
c) Pure Tungsten
d) Tungsten with 1.5% Lanthanum

Q8. Which polarity is used for welding Aluminium?

(A) DCEP
(B) AC
(C) DCEN
(D) DCEP AND DCEN

Q9. When Helium is used in TIG welding

(A) Less penetration is required
(B) Much penetration required
(C) For cold welds
(D) For thin sheet metal

Q10. What is ISO code for TIG WELDING?

(A) 114
(B) 136
(C) 311
(D) 141

Section – B

04X04 = 16 Marks

Q11. Why we can use TIG welding?
Q12. Define CC AND CV
Q13. Why we generally don't use DCEP in TIG welding
Q14. What is the function of water cooling in TIG?

Section – C

04X06 = 24 Marks

Q15. Describe tungsten grinding process for different materials.
Q16. Draw the labelled view of TIG welding torch.
Q17. How electrode shape depends upon welding current type and workpiece material?
Q18. How and why pulse TIG is performed?

Set - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

Answer sheet End-Sem. Examination

Course Code: MCS1104 **Time: 2 Hours**

Course Name: Tungsten inert gas welding (GTAW) **Max. Marks: 50**

Instruction:

1. Attempt all questions.
2. Use of Calculators is prohibited.
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Section – A

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d) Silver

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(B) **Cast iron**
(C) Stainless steel
(D) silver

Q4. Which of the following is inert gas

(A) **Argon**
(B) H_2
(C) $C0_2$
(D) O_2

Q5. Which current is used in TIG WELDING?

(A) AC
(B) **AC and DC both**
(C) DC
(D) none of the above

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(A) MIG
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(C) MMA
(D) TIG

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Q10. What is ISO code for TIG WELDING?

(A) 114
(B) 136
(C) 311
(D) **141**

Section – B

04X04 = 16 Marks

Q11. Why we use TIG welding?

Ans. Can be used to join almost all metals, with superior weld quality, generally free of defects

Free from spatter that occurs with other arc welding processes

Can be used with or without filler metal as required for the specific application

Provides excellent control of root pass weld penetration

Can be used to produce inexpensive autogenous (fusion) welds with good penetration

Provides for separate control over the heat input and filler metal additions

Q12. Define CC AND CV

Ans. Direct-current (DC) power supplies can be constant-voltage (CV) or constant-current (CC). CV equipment, typically used for semiautomatic and wire-fed processes like gas metal arc welding (GMAW) or flux-cored arc welding (FCAW), provides a consistent preset voltage.

Q13. Why we generally don't use DCEP in TIG welding

Ans. In TIG, if you really want to pour heat into the workpiece, you use DCEN. If you use DCEP, you can melt the tungsten in a hurry.

That makes sense if you remember that electrons are negatively charged, so when you TIG with DCEN, the electrons flow from the tungsten electrode into the workpiece, heating it as they impact it.

With stick welding, it's not so easy to remember, but in general the opposite is true: If you want a lot of penetration with stick, you use DCEP. If you want shallower penetration with stick, you use DCEN.

Q14. What is the function of water cooling in TIG?

Ans. Cooling of the TIG Torch some torches are constructed in such a way that it is the flowing shielding gas that cools the torch. However, the torch also gives off heat to the surrounding air.

Other torches are constructed with cooling tubes. Water-cooled torches are mainly used for welding with larger current intensities and AC-welding.

Usually a water-cooled TIG torch is smaller than an air-cooled torch designed to the same maximum current intensities.

Section – C

04X06 = 24 Marks

Q15. Describe tungsten grinding process for different materials

Ans. The complete electrode geometry for DC welding comprises the electrode diameter, the included angle (taper), and the tip (flat) (see **Figure 1**).

The choice of geometry will always affect electrode life, arc starting, weld penetration, and arc shape. Regardless of the geometry selected, the electrode configuration must be tested during welding procedure development. The geometry should be noted as a critical process variable for the weld procedure and held to close tolerances for all subsequent welds.

Electrode Diameter. The best place to start when choosing the electrode diameter is to consult the welding equipment manufacturer's recommendations. While small diameters are easier to arc-start, large diameters accommodate higher amperages and last longer than smaller diameters. However, if current levels are higher than recommended, the tungsten will deteriorate too rapidly, fall into the weld

pool, and contaminate the weld. Conversely, if the current is too low for the electrode diameter, the arc will become unstable.

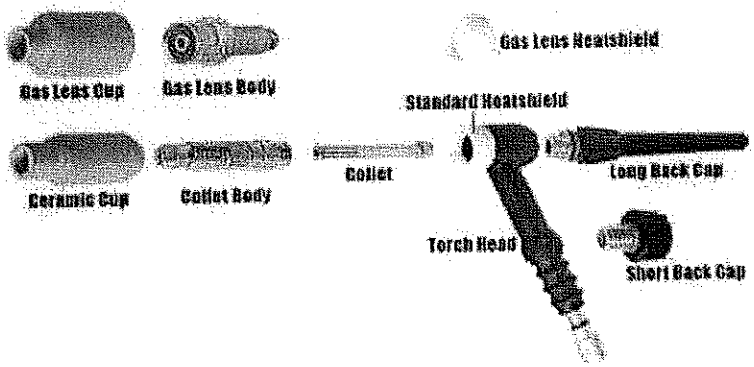
Electrode Included Angle (Taper). Electrodes for DC welding should be ground longitudinally and concentrically with diamond wheels to an included angle in conjunction with the tip/flat preparation.

A blunt taper with a large included angle results in longer electrode life, better weld penetration, narrower arc shape, and the ability to handle more amperage without eroding. A sharp taper with a small included angle offers less arc wander and a wider, more consistent arc.

Tip (Flat). The shape of the tungsten electrode tip is an important process variable in precision arc welding, because as the flat size increases, so does the chance of arc wander and starting difficulty. However, increasing the flat also improves weld penetration and increases electrode life (see**Figure 2**).

An incorrect, inconsistent flat can cause pointed electrode tips to drop into the weld pool. It also can result in arc instability, reduced electrode life, and changes in arc voltage from one electrode to another.

Q16. Draw the labelled view of TIG welding torch



Q17. How electrode shape depends upon welding current type and workpiece material?

Ans. The choice of geometry will always affect electrode life, arc starting, weld penetration, and arc shape. Regardless of the geometry selected, the electrode configuration must be tested during welding procedure development.

Q18. How and why pulse TIG is performed

Ans. When TIG welding, you generally set your desired max amperage on your welder and control the amperage output with your foot pedal. During your weld you typically keep the pedal throttle pretty constant - making slight adjustments to add more heat, or backing off a little if it is gets too hot. The distance the pedal is pressed down directly reflects the output on the TIG torch.

With pulse welding, you operate the foot pedal just like before, only a pulsed waveform is output from the TIG torch instead of a steady amperage. Also like before, you can make the same adjustments with the pedal e.g. to add more heat or back off.

Pulse also works with AC welding as well, which is commonly used to weld aluminum.

- The same weld penetration can be obtained with less power and less heat. The more heat, the more your material will warp from the welding process. This is especially important for welding sheet metal.
- Welders have a working duty cycle rating (not to be confused with pulse duty cycle) based on the relationship between amperage used versus time needed to wait for welder to cool off and be usable again. The less power you use, the less time the machine needs to cool down, and the more productive a user can be.
- Pulse features allow the user to create a uniform and reliable weld more easily.
- A pulsed weld is visually appealing, and gives the appearance of a perfect weld that was created by a machine - that nice stack of dimes look.
- The user can go back over ugly welds that were previously made to make them look nicer.

Set - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1105 **Time: 2 Hours**

Course Name: Inert gas welding (GMAW) **Max. Marks: 50**

Instruction:

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

Section – A

10X01 = 10 Marks

Q1. Which of the following material transfer is not in MIG/MAG welding

a) Spray transfer
b) Short circuit transfer
c) Pinch transfer
d) Globular transfer

Q2. Which of the following gas used to weld Aluminium in MIG welding

a) Pure argon
b) CO_2
c) Argon + CO_2
d) Nitrogen

Q3. Which of the following process use consumable electrode?

a) TIG welding
b) Spot resistance welding
c) MIG welding
d) Laser Welding

Q3. Gas preheater is used for which gas in MIG/MAG

(A) Argon
(B) He
(C) 100% CO_2
(D) Ar.+CO_2

Q4. In term E70 S-6 what 'S' stands for?

(A) solid
(B) Small
(C) stress
(D) strength

Q5. Which polarity is used in GMAW?

(A) DCEN
(B) AC
(C) DCEP
(D) all of the above

Q6. What is ISO code for Gas Shielded flux cored arc welding?

(A) 131
(B) 136
(C) 111
(D) 114

Q7. What is ISO code for Gas-less (self-shielded) Shielded flux cored arc welding?

a) 114
b) 141
c) 143
d) 311

Q8. Weld symbol for square butt joint is

(A) II
(B) V
(C) X
(D) O

Q9. Weld spatter is

(A) Flux
(B) Electrode coating
(C) Welding defect
(D) Welding test

Q10. What is formula of gas flow setting?

(A) 10 x wire diameter
(B) 12 x wire diameter
(C) 8 x wire diameter
(D) 2 x wire diameter

Section – B

04X04 = 16 Marks

Q11. What is the function of water cooling MIG/MAG welding?

Q12. What is FCAW? How this is different from MAG Welding?

Q13. Write advantage of MIG/MAG welding.

Q14. Why we don't use argon on ferrous metal MIG welding?

Section – C

04X06 = 24 Marks

Q15. Describe the brief diagram of welding torch.

Q16. Define AC current and DC current.

Q17. How can we use active gas like $C0_2$ in MAG welding?

Q18. Describe what kind of material transfer in MIG/MAG welding.

Set - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

Answer sheet End-Sem. Examination

Course Code: MCS1105 **Time: 2 Hours**

Course Name: Smaw gas welding (GMAW) **Max. Marks: 50**

Instruction:

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

Section – A

10X01 = 10 Marks

Q1. Which of the following material transfer is not in MIG/MAG welding

a) Spray transfer
b) Short circuit transfer
c) Pinch transfer
d) Globular transfer

Q2. Which of the following gas used to weld Aluminium in MIG welding

a) Pure argon
b) CO_2
c) Argon + CO_2
d) Nitrogen

Q3. Which of the following process use consumable electrode?

a) TIG welding
b) Spot resistance welding
c) MIG welding
d) Laser Welding

Q3. Gas preheater is used for which gas in MIG/MAG

(A) Argon
(B) He
(C) **100% CO_2**
(D) Ar.+CO_2

Q4. In term E70 S-6 what 'S' stands for?

(A) **solid**
(B) Small
(C) stress
(D) strength

Q5. Which polarity is used in GMAW?

(A) DCEN
(B) AC
(C) DCEP
(D) **all of the above**

Q6. What is ISO code for Gas Shielded flux cored arc welding?

(A) 131
(B) **136**
(C) 111
(D) 114

Q7. What is ISO code for Gas-less (self-shielded) Shielded flux cored arc welding?

a) 114
b) 141
c) 143
d) 311

Q8. Weld symbol for square butt joint is

(A) **II**
(B) V
(C) X
(D) O

Q9.Weld spatter is

(A) Flux
(B) Electrode coating
(C) **Welding defect**
(D) Welding test

Q10. What is formula of gas flow setting?

(A) **10 x wire diameter**
(B) 12 x wire diameter
(C) 8 x wire diameter
(D) 2 x wire diameter

Section – B

04X04 = 16 Marks

Q11. What is the function of water cooling MIG/MAG welding?

Ans. The water system will remove heat from your tips and nozzles anywhere from 30 seconds to 2 minutes after you finish welding any length of time to the point of touch. (don't recommend welding bare handed, though!). Your nozzles and tips will also last longer – sometimes at low amperages, too long, tips may reduce ability to conduct when used too long, to the point it could damage gun.

It's always recommended to change tips on days you weld or amount of wire used. Water-cooled guns are also surprisingly light weight; the liquid and the pressure flowing through the cable makes them somewhat buoyant. A water-cooled gun that's 500 amp, for instance, is about the same as 350 amp air-cooled gun.

Q12. What is FCAW? How this is different from MAG Welding?

Ans. The main **difference** between **flux cored arc welding** and **GMAW welding** is the way the electrode is shielded from the air. **Flux cored arc welding** just like the name implies, has a hollow wire with **flux** in the center, just as the name states, a '**Flux** Core'.

Q13. Write advantage of MIG/MAG welding.

Ans. **M.I.G. and M.A.G.S. Advantages**

1) Higher welding speeds
2) Greater deposition rates
3) Less post welding cleaning (e.g. no slag to chip off weld)
4) Better weld pool visibility
5) No stub end losses or wasted man hours caused by changing electrodes
6) Low skill factor required to operate M.I.G / M.A.G.S welding torch
7) Positional welding offers no problems when compared to other processes. (Use dip or pulsed mode of transfer)
8) The process is easily automated
9) No fluxes required in most cases
10) Ultra low hydrogen process

Q14. Why we don't use argon on ferrous metal MIG welding?

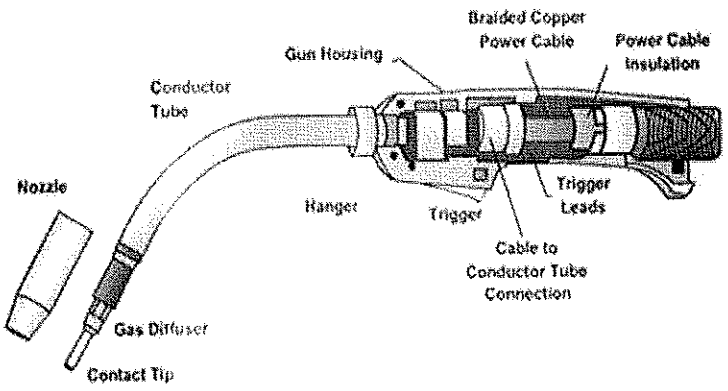
Ans. 100% Argon doesn't provide enough thermal conductivity for a fluid weld pool when MIG welding on ferrous metals. The outer edges of the arc remain cool, resulting in a deep but narrow penetration profile, and minimal fusion.

And with more spatter and an erratic arc, to go along with a stiff weld puddle, this is not a welding setup you would enjoy using on a regular basis. For **full-time use**, 100% Argon is not a suitable replacement for MIG-mixed shielding gas.

Section – C

04X06 = 24 Marks

Q15. Describe the brief diagram of welding torch.



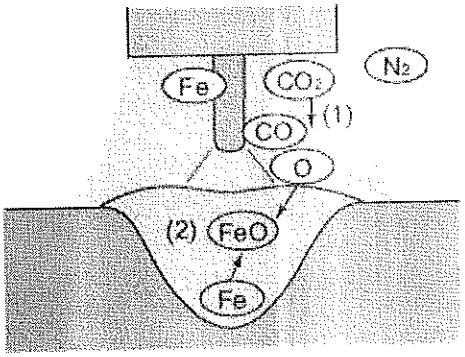
Q16. Define AC current and DC current.

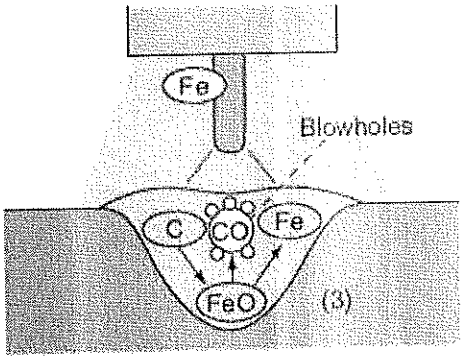
Ans. **Alternating Current** (AC) is a type of electrical current, in which the direction of the flow of electrons switches back and forth at regular intervals or cycles. Current flowing in power lines and normal household electricity that comes from a wall outlet is alternating current. The standard current used in the U.S. is 60 cycles per second (i.e. a frequency of 60 Hz); in Europe and most other parts of the world it is 50 cycles per second (i.e. a frequency of 50 Hz.).

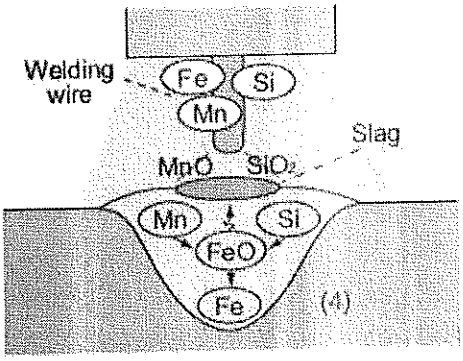
Direct current (DC) is electrical current which flows consistently in one direction. The current that flows in a flashlight or another appliance running on batteries is direct current.
One advantage of alternating current is that it is relatively cheap to change the voltage of the current. Furthermore, the inevitable loss of energy that occurs when current is carried over long distances is far smaller with alternating current than with direct current.

Q17. How can we use active gas like $C0_2$ in MAG welding?

Ans. Iron becomes brittle when it combines with nitrogen that exists much in the atmosphere. CO2 gas, therefore, is often used to shield the weld pool from the atmosphere. CO2 gas can be decomposed by the ultra-high temperature arc heat into CO and O near the arc.







$$CO_2 \rightleftarrows CO + O \cdots (1)$$

The decomposed O combines with molten iron to form FeO.

Sequentially, C that is contained in steel is easier to combine with O than Fe deprives O from FeO to generate CO gas, which is apt to left in the weld metal to form blowholes. A weld metal that contains blowholes cannot be deemed to be sound.

$$FeO + C \rightleftarrows Fe + CO \quad \cdots (3)$$

To improve the soundness, a welding wire that contains Si and Mn that have stronger affinity with O is used ; in this case, O in FeO combines not with C but with Si and Mn and floats up on the surface of the weld pool to form slag of SiO2 and MnO. Though slag is formed, the weld metal becomes sound without blowholes.

$$FeO + Mn \rightleftarrows Fe + MnO \quad \cdots (4)$$
$$2FeO + Si \rightleftarrows 2Fe + SiO_2$$

Besides Si and Mn that prevent blowholes, various other chemical elements are added to the welding wire in order to let the weld metal possess required strength, impact toughness, corrosion resistance and other properties

Q18. Describe what kind of material transfer in MIG/MAG welding.

Ans. MIG welding has four ways of transferring the wire to the joint.

- Short circuit
- Globular
- Spray
- Pulsed spray

Short circuit transfer is a transfer used when a lower voltage is used for MIG welding. Short circuit transfer occurs when the wire contacts the metal creating short circuits. During this short circuit the wire contacting the metal heats up and melts into the joint by creating a puddle from contact. Then another contact begins and the process keeps repeating many times a second.

Globular transfer is similar to short circuit transfer. Globular transfer occurs when the wire arcs and it creates a glob that hangs off of the wire. Then the glob falls to the metal filling the joint and then the process begins again

Spray Transfer is a transfer where a higher voltage is applied and the electrode does not contact the metal. The transfer is exactly like it sounds. The wire sprays or has very fine mist transferring to the metal.

Set - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1106 **Time: 2 Hours**

Course Name: Brazing/ Soldering/ oxy-fuel processes **Max. Marks: 50**

Instruction:

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

Section – A

10X01 = 10 Marks

Q.1: Which gas flame attains maximum temperature while burning with oxygen?

a.) acetylene b.) Hydrogen

c.) Propene d.) methane

Q.2: Where we ignite the mixture of acetylene and oxygen in oxy-acetylene welding?

a.) In cylinders b.) In nozzle

c.) In front of nozzle d.) In hose pipe

Q.3: Which gas cannot be used as a fuel gas in oxy-fuel welding?

a.) methane b.) argon

c.) propene d.) hydrogen

Q.4: Which thing can be compressed easily?

a.) gas b.) liquid

c.) solid d.) all can be compressed with same easiness

Q.5: What is the pressure where acetylene can explode?

a. 0.25 bar b. 0.5 bar

c. 1.5 bar d. 2.0 bar

Q.6: What is the color for acetylene hose?

a.) blue b.) red

c.) green d.) yellow

Q.7: What is the color for oxygen hose?

a.) blue b.) Red

c.) green d.) yellow

Q.8: Which fittings has groove?

a.) acetylene fittings b.) Argon fittings

c.) oxygen fittings d.) none of above

Q.9: what is used for eliminating flashback?

a.) pressure regulator b.) nozzle

c.) cylinder cap d.) control valve

Q.10: What could be the operating pressure for oxygen in oxy-acetylene welding?

a.) 200 bar b.) 5bar

c.) 100 bar d.) 150 bar

Section – B

04X04 = 16 Marks

Q.11: Why pressure regulator used in oxy-acetylene welding?

Q.12: write short note on "fittings of pressure regulator".

Q.13: How to set the flame in oxy-acetylene welding?

Q.14: Write short note on flames used in oxy-acetylene welding.

Section – C

04X06 = 24 Marks

Q.15 Explain Forehand and Backhand welding technique.

Q.16 Explain the equipment used for oxy-acetylene welding.

Q.17: Explain the cutting torch and cutting process for oxy-acetylene cutting.

Q.18: Write short note on:

1. Use of brazing flux
2. Brazing filler metals

Set-B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

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School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

Answer sheet End-Sem. Examination

Course Code: MCS1106 **Time: 2 Hours**

Course Name: Brazing/ Soldering/ oxy-fuel processes **Max. Marks: 50**

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Section – A

10X01 = 10 Marks

Q.1: Which gas flame attains maximum temperature while burning with oxygen?

a.) **acetylene** b.) Hydrogen

c.) Propene d.) Methane

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a.) In cylinders b.) In nozzle

c.) **In front of nozzle** d.) In hose pipe

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d.) None of above

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a.) pressure regulator
b.) Nozzle
c.) cylinder cap
d.) **Control valve**

Q.10: What could be the operating pressure for oxygen in oxy-acetylene welding?

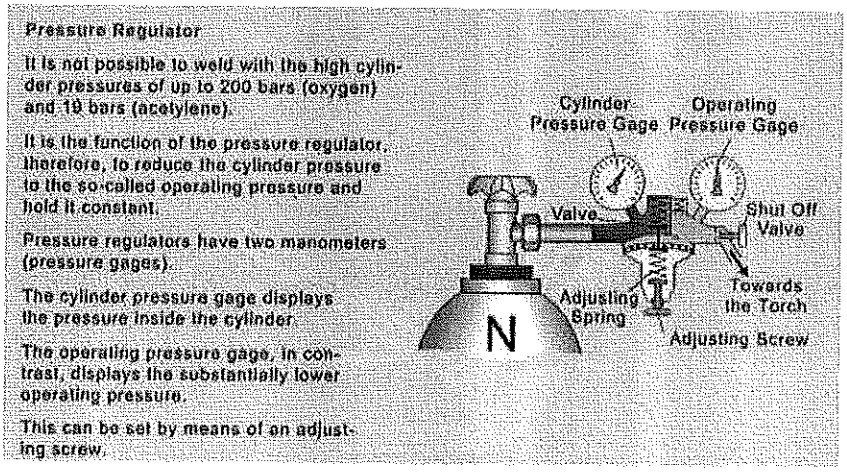
a.) 200 bar
b.) **5bar**
c.) 100 bar
d.) 150 bar

Section – B

04X04 = 16 Marks

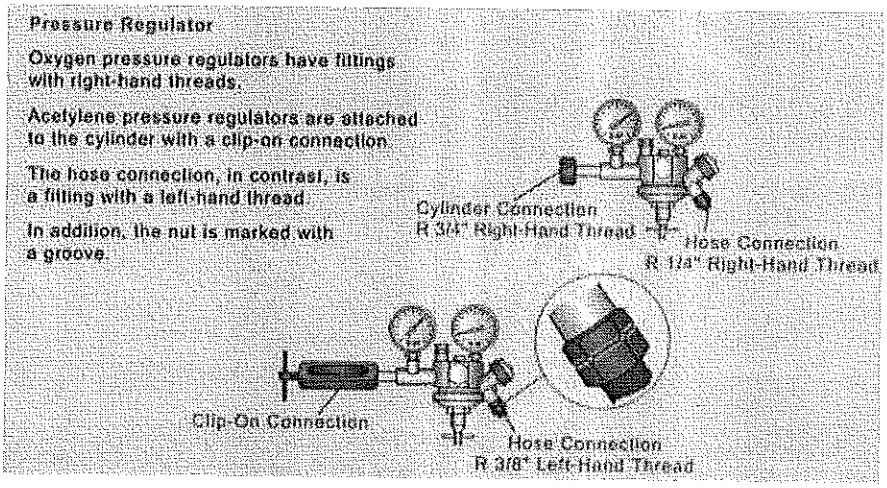
Q.11: Why pressure regulator used in oxy-acetylene welding?

Ans.



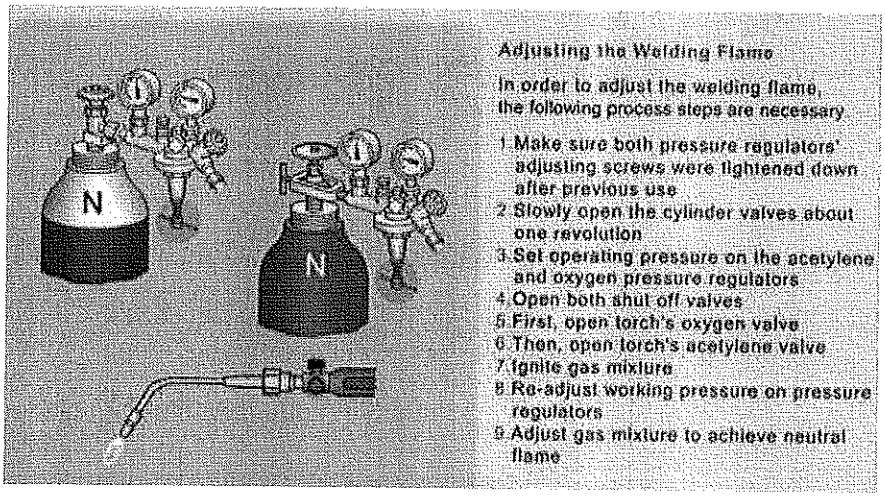
Q.12: write short note on "fittings of pressure regulator".

Ans.



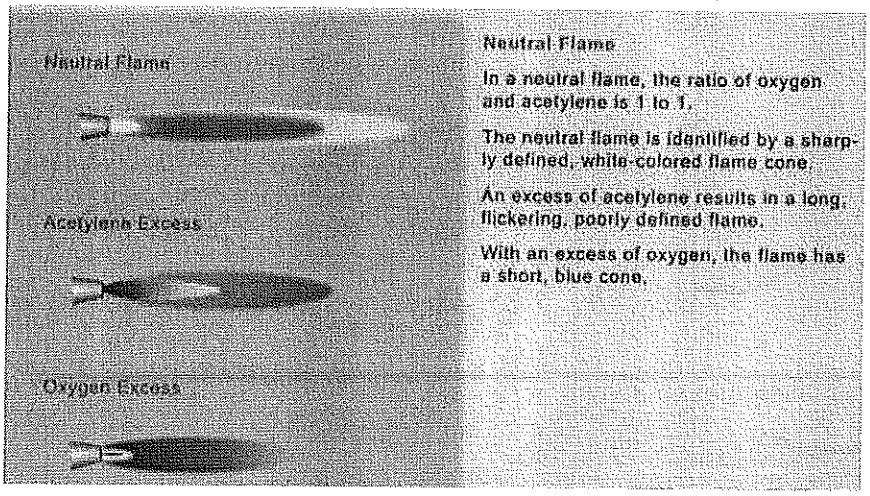
Q.13: How to set the flame in oxy-acetylene welding?

Ans.



Q.14: Write short note on flames used in oxy-acetylene welding.

Ans.



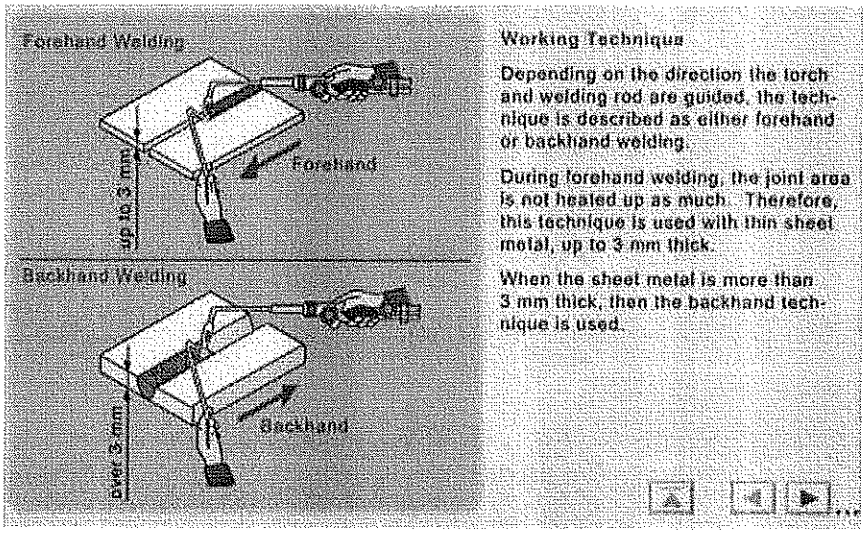
BHARTIYA SKILL DEVELOPMENT UNIVERSITY

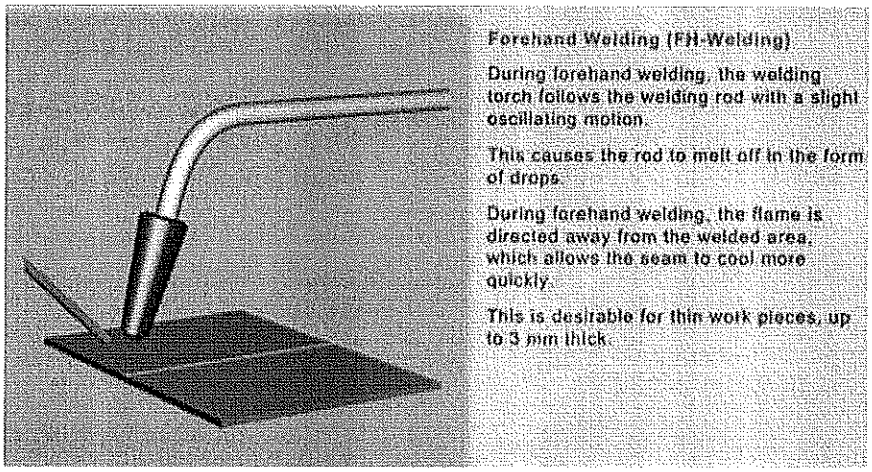
Section – C

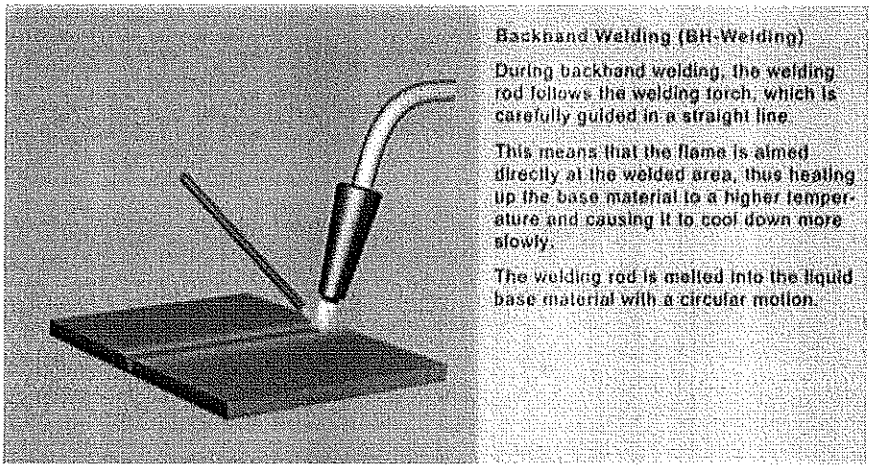
04X06 = 24 Marks

Q.15 Explain Forehand and Backhand welding technique.

Ans. Ans.







Q.16 Explain the equipment used for oxy-acetylene welding.

Ans.

Essential equipment components

The basic oxyacetylene torch comprises:

- torch body (or handle)
- two separate gas tubes (through the handle connected to the hoses)
- separate control valves
- mixer chamber
- flame tube
- welding tip

Hoses

Hoses between the torch and the gas regulators should be colour-coded; in the UK: red for acetylene, and blue for oxygen. Fittings on the oxygen hose have right-hand threads; while those on the acetylene hose have left-hand threads.

Gas regulators

The primary function of a gas regulator is to control gas pressure. It reduces the high pressure of the bottle-stored gas to the working pressure of the torch, and this will be maintained during welding.

Nozzles

Welding torches are generally rated according to thickness of material to be welded. They range from light duty (for sheet steel up to 2mm in thickness) to heavy duty (for steel plate greater than 25mm in thickness).

Control valve

Flame traps (also called flashback arresters) must be fitted into both oxygen and acetylene gas lines to prevent a flashback flame from reaching the regulators. Non-return spring-loaded valves can be fitted in the hoses to detect/stop reverse gas flow.

Cylinders

In oxy-acetylene welding, we need an oxygen cylinder and an acetylene cylinder.

Colour for oxygen cylinder is black and for acetylene is maroon.

Oxygen cylinder is generally filled at a pressure of 230 bar and acetylene cylinder is at 19 bar.

Q.17: Explain the cutting torch and cutting process for oxy-acetylene cutting.

Ans.

Cutting torch

A cutting torch head is used to cut materials. It is similar to a welding torch, but can be identified by the oxygen blast trigger or lever.

The diameter of the cutting oxygen hole is selected according to the material thickness. There are two types of nozzle; standard and high speed. The standard nozzle usually has a parallel sided, central bore for the oxygen jet, which is surrounded by an annulus or a ring of smaller diameter ports for the pre-heating gas mixture, Fig. 2. There are many designs and arrangements of the preheating ports that focus the flame for heating and to protect the oxygen jet from air entrainment.

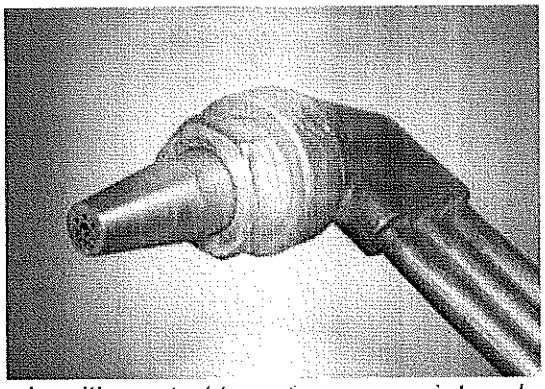


Fig. 2. Standard nozzle with central bore for oxygen jet and a ring of ports for the pre-heating gas mixture

High-speed nozzles are capable of being used with higher oxygen pressures, up to 10 bar. The essential difference is that the cutting oxygen is forced through a convergent / divergent orifice which speeds up the gas flow rate to near supersonic levels. High-speed nozzles are primarily used in mechanised equipment to exploit the higher speeds for cutting long lengths.

Cutting process

When cutting, the metal is first heated by the flame until it is cherry red. Once this temperature is attained, oxygen is supplied to the heated parts by pressing the oxygen-blast trigger. This oxygen reacts with the metal, forming an oxide and producing heat. It is the heat that continues the cutting process. The cutting torch only heats the metal to start the process; further heat is provided by the burning metal.

The melting point of the iron oxide is around half that of the metal being cut. As the metal burns, it immediately turns to liquid iron oxide and flows away from the cutting zone. However, some of the iron oxide remains on the workpiece, forming a hard "slag" which can be removed by gentle tapping and/or grinding.

Q.18: Write short note on:

1. Use of brazing flux

2. Brazing filler metals

Ans.

Use of brazing flux

1. Fluxes improves the flow of filler metal into the brazing gap
2. They also help to ensure a clean metal work piece surface.
3. Prevents oxidation during the brazing process.
4. The residual oxides are chemically bonded by the flux.

Brazing filler metals

Braze families

Brazing alloys form several distinct groups; the alloys in the same group have similar properties and uses.

- Pure metals
  Unalloyed. Often-noble metals – silver, gold, palladium.

  - Ag-Cu
    Silver-copper. Good melting properties. Silver enhances flow. Eutectic alloy used for furnace brazing. Copper-rich alloys prone to stress cracking by ammonia.

    - Ag-Zn
      Silver-zinc. Similar to Cu-Zn, used in jewellery due to its high silver content so that the product is compliant with hallmarking. The colour matches silver, and it is resistant to ammonia-containing silver-cleaning fluids.

      - Cu-Zn (brass)
        Copper-zinc. General purpose, used for joining steel and cast iron. Corrosion resistance usually inadequate for copper, silicon bronze, copper-nickel, and stainless steel. Reasonably ductile. High vapour pressure due to volatile zinc, unsuitable for furnace brazing. Copper-rich alloys prone to stress cracking by ammonia.

        - Ag-Cu-Zn
          Silver-copper-zinc. Lower melting point than Ag-Cu for same Ag content. Combines advantages of Ag-Cu and Cu-Zn. At above 40% Zn the ductility and strength drop so only lower-zinc alloys of this type are used. At above 25% zinc less ductile copper-zinc and silver-zinc phases appear. Copper content above 60% yields reduced strength and liquids above 900 °C. Silver content above 85% yields reduced strength, high liquids and high cost. Copper-rich alloys prone to stress cracking by ammonia. Silver-rich brazes (above 67.5% Ag) are hallmarkable and used in jewellery; alloys with lower silver content are used for engineering purposes. Alloys with copper-zinc ratio of about 60:40 contain the same phases as brass and match its colour; they are used for joining brass. Small amount of nickel improves strength and corrosion resistance and promotes wetting of carbides. Addition of manganese together with nickel increases fracture toughness. Addition of cadmium yields Ag-Cu-Zn-Cd alloys with improved fluidity and wetting and lower melting point; however cadmium is toxic. Addition of tin can play mostly the same role.

          - Cu-P
            Copper-phosphorus. Widely used for copper and copper alloys. Does not require flux for copper. Can be also used with silver, tungsten, and molybdenum. Copper-rich alloys prone to stress cracking by ammonia.

- Ag-Cu-P

Like Cu-P, with improved flow. Better for larger gaps. More ductile, better electrical conductivity. Copper-rich alloys prone to stress cracking by ammonia.

- Au-Ag

Gold-silver. Noble metals. Used in jewellery.

- Au-Cu

Gold-copper. Continuous series of solid solutions. Readily wet many metals, including refractory ones. Narrow melting range, good fluidity.[22] Frequently used in jewellery. Alloys with 40–90% of gold hardened by ordering but stay ductile. Nickel improves ductility. Silver lowers melting point but worsens corrosion resistance. To maintain corrosion resistance, gold must be kept above 60%. High-temperature strength and corrosion resistance can be improved by further alloying, e.g., with chromium, palladium, manganese, and molybdenum. Added vanadium allows wetting ceramics. Gold-copper has low vapor pressure.

- Au-Ni

Gold-Nickel. Continuous series of solid solutions. Wider melting range than Au-Cu alloys but better corrosion resistance and improved wetting. Frequently alloyed with other metals to reduce proportion of gold while maintaining properties. Copper may be added to lower gold proportion, chromium to compensate for loss of corrosion resistance, and boron for improving wetting impaired by chromium. Generally no more than 35% Ni is used, as higher Ni/Au ratios have a wide melting range. Low vapor pressure.

- Au-Pd

Gold-Palladium. Improved corrosion resistance over Au-Cu and Au-Ni alloys. Used for joining superalloys and refractory metals for high-temperature applications, e.g. jet engines. Expensive. May be substituted for by cobalt-based brazes. Low vapor pressure.

- Pd

Palladium. Good high-temperature performance, high corrosion resistance (less than gold), high strength (more than gold). Usually alloyed with nickel, copper, or silver. Forms solid solutions with most metals, does not form brittle intermetallics. Low vapor pressure.

- Ni

Nickel alloys, even more numerous than silver alloys. High strength. Lower cost than silver alloys. Good high-temperature performance, good corrosion resistance in moderately aggressive environments. Used for stainless steels and heat-resistant alloys. Embrittled with sulfur and low-melting point metals, e.g. zinc. Boron, phosphorus, silicon and carbon lower melting point and rapidly diffuse to base metals. This allows diffusion brazing, and lets the joint be used above the brazing temperature. Borides and phosphides form brittle phases. Amorphous preforms can be made by rapid solidification.

- Co

Cobalt alloys. Good high-temperature corrosion resistance, possible alternative to Au-Pd brazes. Low workability at low temperatures, amorphous preforms prepared by rapid solidification.

- Al-Si

Aluminium-silicon. For brazing aluminium.

- Active alloys

Containing active metals, e.g., titanium or vanadium. Used for brazing non-metallic materials, e.g. graphite or ceramics.

Sol - B

BHARTIYA SKILL DEVELOPMENT UNIVERSITY

Registration No.: .....

School of Metal Construction Skills

Session: 2019-20 (Summer Semester)

B. Voc. Program, I-Semester,

End-Sem. Examination

Course Code: MCS1107 **Time: 2 Hours**

Course Name: Elementary drawing understanding **Max. Marks: 50**

Instruction:

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

Section – A

10X01 = 10 Marks

1. Continuous thin line is use for showing _____.
   a) Dimension lines c) Short break lines
   b) Invisible surface d) Long break lines

2. In Aligned system of dimensioning, the dimensions may be read from
   a) Bottom or right hand edges
   b) Bottom or left hand edges
   c) Only from left hand
   d) Only from bottom

3. Orthographic projection represents three dimensional objects in
   a) One dimension c) Three dimension
   b) Two dimension d) All of above

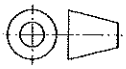
4. Hatching lines are drawn at ___ degree to reference line
   a) 30 c) 45
   b) 60 d) 90

5.  This is a _____ symbol.
   a) Straightness c) Symmetry
   b) Rectangularity d) Flatness

6. Which one of the following detail is belonging to the title box?
   a) Size of sheet c) Bill of material
   b) Multi-views d) scale

7. In parallel projection the object is placed at _____.

a) Infinity distance
c) Finite distance
b) 400km
d) Not clearly says

8.  This symbol shows_____angle projection.

a) 1st angle
c) 4th angle
b) 2nd angle
d) 3rd angle

9. In Third angle projection object kept in which quadrant?

a) First quadrant
c) Second quadrant
b) Third quadrant
d) Fourth quadrant

10. The dotted lines represent.

a) Hidden edges
c) Projection lines
b) Center line
d) Hatching lines

Section – B

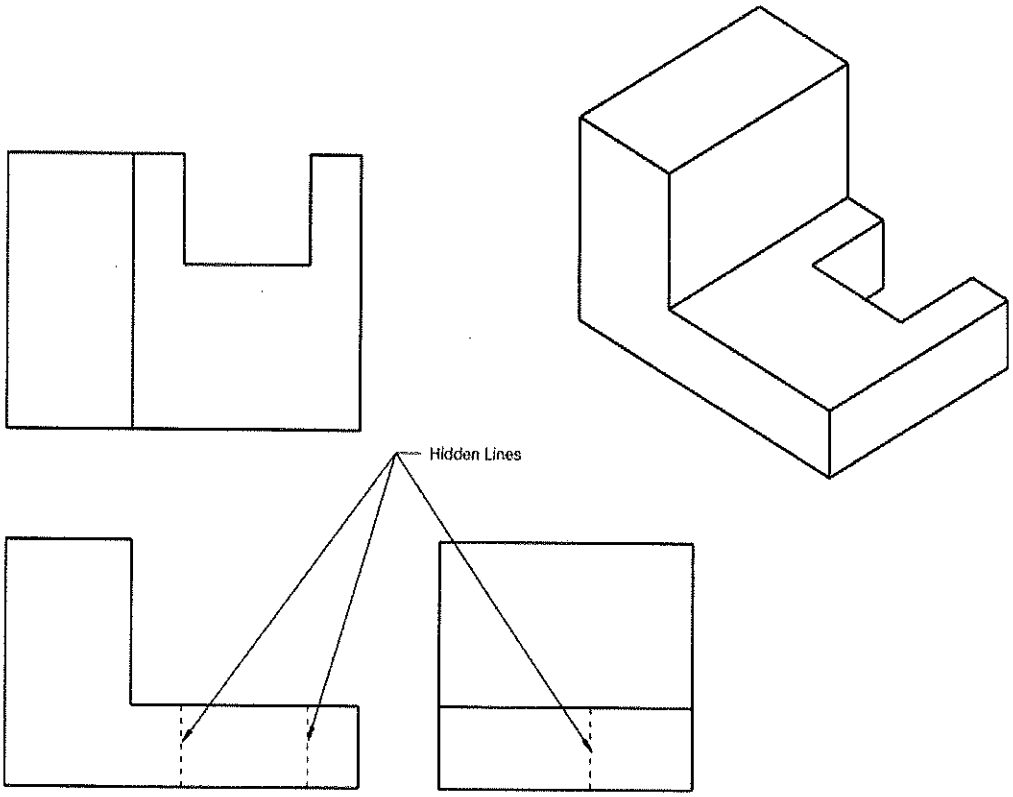
04X04 = 16 Marks

Q11. What kind of information title box carry?

Q12. What are the difference between parallel and perspective projection?

Q13. What are the rules of dimensioning?

Q14. Give all necessary dimensions to the drawing.



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Section – C

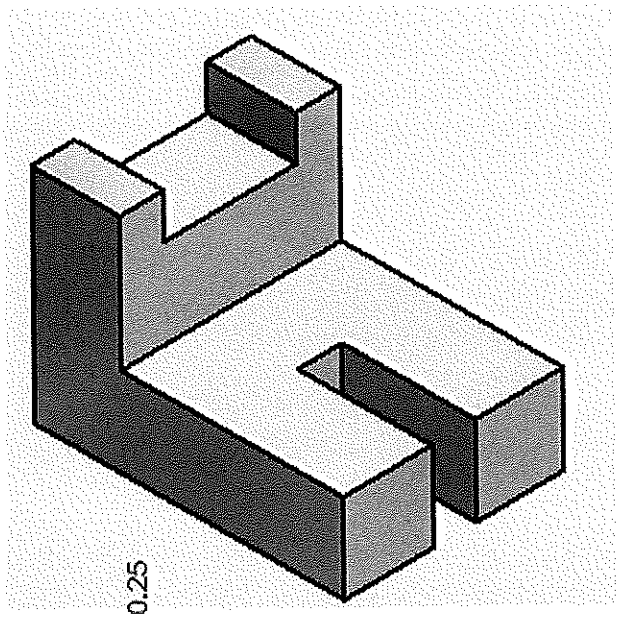
04X06 = 24 Marks

Q15. What are the types of drawing explaining each?

Q16. Explain multi-view projection in first and third angle projection.

Q17. What are they six principle view in orthography projection and why we use only three principle view?

Q18. Draw the all multi-view of this drawing.



Set B

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Answer sheet End-Sem. Examination

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Section – A

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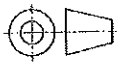
8.  This symbol shows_____angle projection.
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10. The dotted lines represent.
   a) **Hidden edges**
   b) Center line
   c) Projection lines
   d) Hatching lines

Section – B

04X04 = 16 Marks

Q11. What kind of information title box carry?

Ans: - information carried by title box is

- Drawing title (hence the name "title block")
- Drawing number
- Part number(s)
- Name of the design activity (corporation, government agency, etc.)
- Identifying code of the design activity (such as a CAGE code)
- Address of the design activity (such as city, state/province, country)
- Measurement units of the drawing (for example, inches, millimeters)
- Default tolerances for dimension callouts where no tolerance is specified
- Boilerplate callouts of general specs
- Intellectual property rights warning

Q12. What are the difference between parallel and perspective projection?

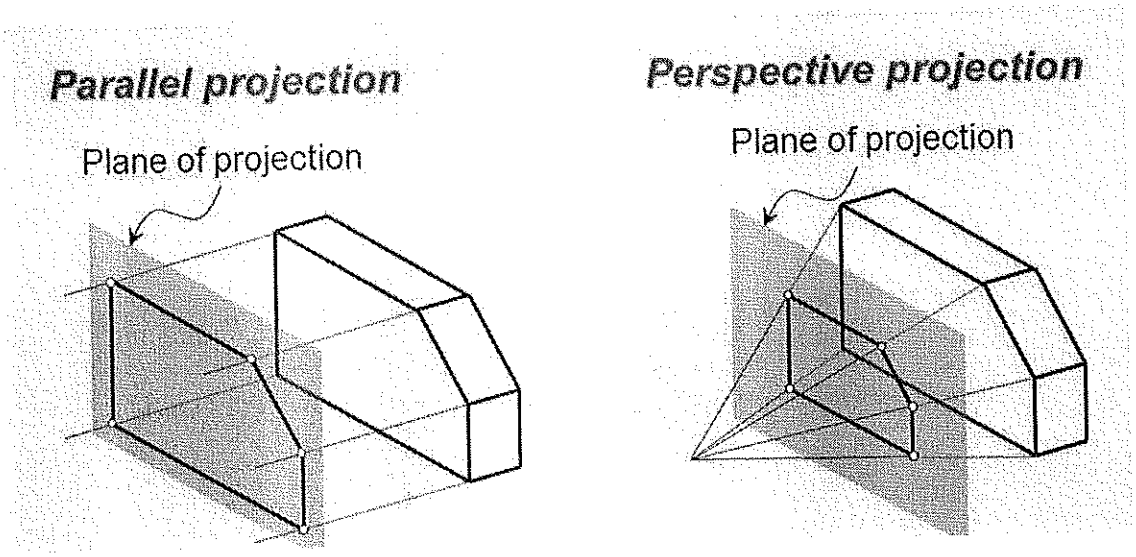
Ans: -

Parallel projection: Distance from the observer to the object is infinite projection

Lines are parallel – object is positioned at infinity.

Less realistic but easier to draw.

Perspective projection: Distance from the observer to the object is finite and
The object is viewed from a single point – projectors are not parallel.
Perspective projection mimic what the human eyes see, however they are
Difficult to draw.



Q13. What are the rules of dimensioning?

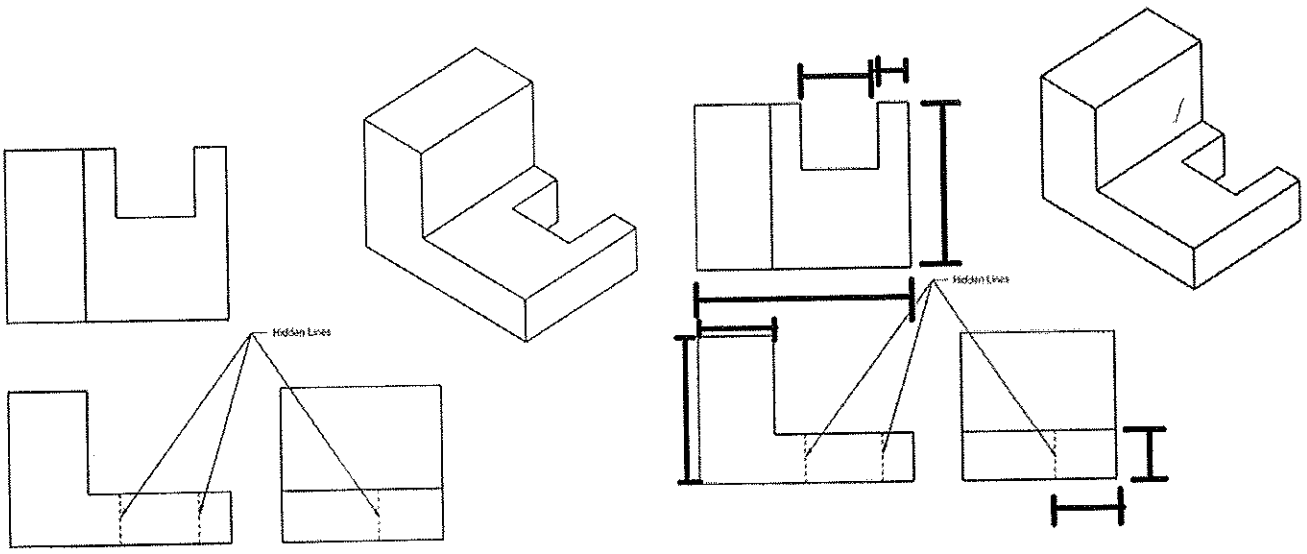
Ans: Rules for Dimensioning a Technical Drawing

1. Each dimension should be given clearly, so that it can be interpreted in only one-way.
2. Dimensions should not be duplicated, or the same information given in twodifferent ways, and no dimensions should be given except those needed toproduce or inspect the part.
3. Dimensions should be given between views whenever possible. However, it issometimes necessary to place a dimension above or below a view.
4. Dimensions should be given so that it will not be necessary for the machinist tocalculate, scale, or estimate any dimension.
5. Dimensions should be attached to the view where the shape is best shown. Thisis most frequently the front view.
6. Dimensions should be placed in the views where features dimensioned areshown true shape. This sometimes means dimensioning an auxiliary view.
7. Avoid dimensioning to hidden lines wherever possible.
8. Dimensions should not be placed upon a view unless clearness is promoted, andlong extension lines are avoided.
9. Dimensions applying to two adjacent views should be placed between views, unless clearness will be promoted by placing them outside the view.
10. The longer dimensions should be placed outside all intermediate or shorterdimensions, so that dimension lines will not cross extension lines.
11. In machine drawings, omit all inch marks, except when necessary for clearness; for example, 1" VALVE.
12. A dimension should be attached to only one view: extension lines should not connect two views.
13. Detail dimensions should "line up" in chain fashion.
14. Avoid a complete chain of detail dimensions; better to omit one. Otherwise, addREF (reference) to one detail dimension, or to the overall dimension.

15. Dimension lines should be spaced uniformly throughout the drawing. Theyshould be spaced at least 3/8" from the object, and 1/4" apart.
16. No line of the drawing should be used as a dimension line or coincide with dimension line.
17. Dimension line should never cross other dimension lines.

Q14. Give all necessary dimensions to the drawing.

Ans: -



Section – C

04X06 = 24 Marks

Q15. What are the types of drawing explaining each?

Ans: - types of drawing:

a) Component drawing: - component drawing contains all necessary information to produce the part
   - Graphical representation of the component shape.
   - Full dimensioning
   - Permissible deviations from dimension, shape and position
   - Material or blank
   - Surface texture

b) General drawing: - indicates the arrangements of the individual parts in the product.
   - Graphic representation of the parts in products.
   - Main and connection dimension of the product

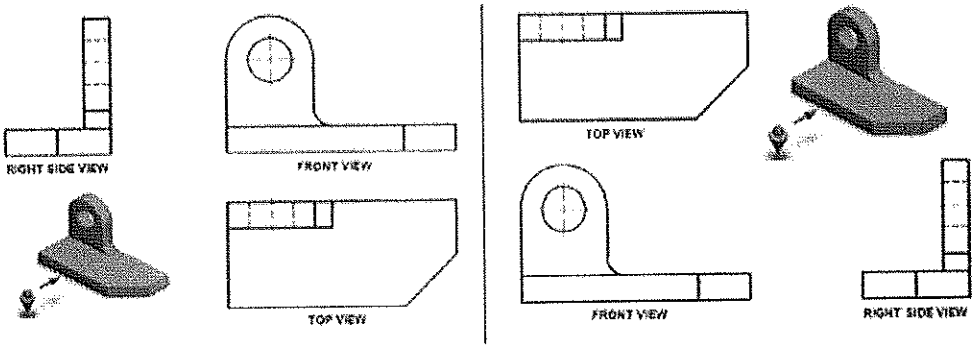
- Information about individual parts (for example, input quantity and unit, designation, type, size, material/raw part, weight)
- Part list and item numbers required.

c) Hand sketches: - indicates the arrangement of the individual part in product
An exploded view drawing is a type of drawing, that shows the intended assembly of mechanical or other.

d) Exploded drawings: - indicates the arrangement of the individual parts in the product.

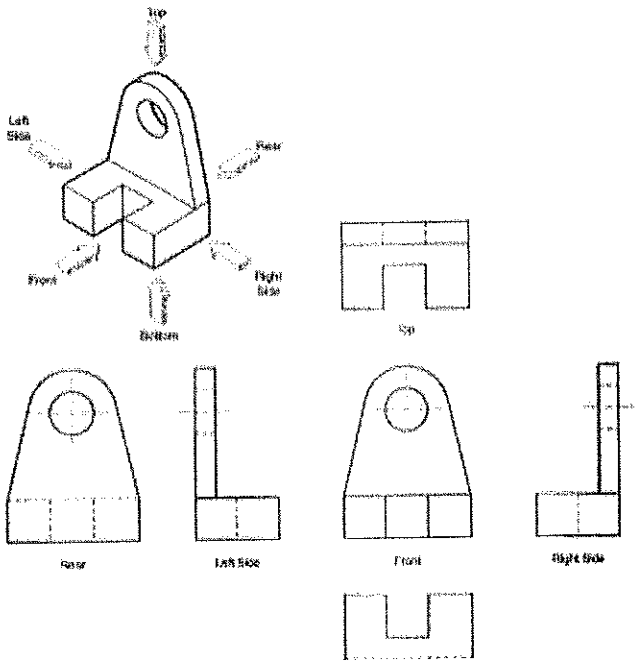
Q16. Explain multi-view projection in first and third angle projection.

Ans: -

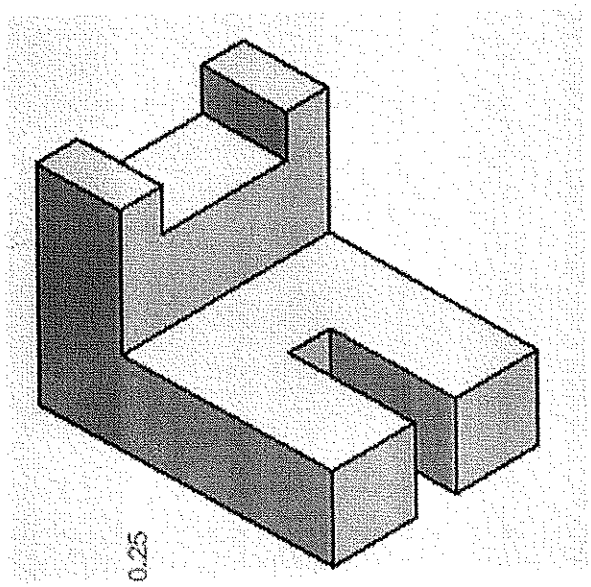


Q17. What are they six principle view in orthography projection and why we use only three principle view?

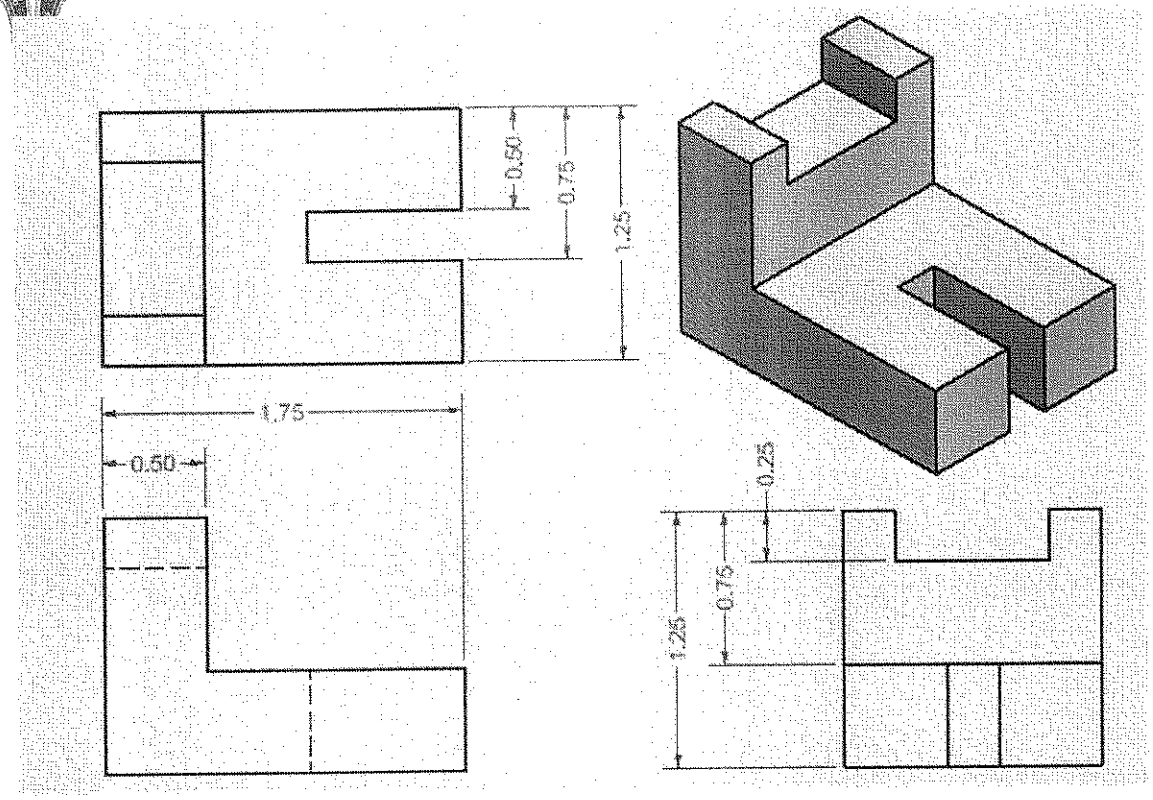
Ans: - In orthographic projection there are 6 principle views of an object, front, top, L side, R side, rear, and back views. The three most commonly views drawn on a technical drawing are the front, back, and side views most other views are not needed.



Q18. Draw the all multi-view of this drawing in 3rd angle projection.



Ans: -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0.75
1.25
1.75
0.50
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0.75
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