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higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE (VOCATIONAL)

ENGINEERING FABRICATION: SHEET METAL WORK
NQF LEVEL 3

(6031023)

7 December 2020 (X-paper)
09:00–12:00

This question paper consists of 12 pages.

347Q1N2007

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TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer all the questions.
2. Read all the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Use only a black or blue pen.
5. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.6) in the ANSWER BOOK.

1.1.1 Metals have many physical and chemical properties. The … property is the ratio between the weight of the metal and the weight of an equal volume of water.

A conductivity
B specific gravity
C fusibility
D magnetic

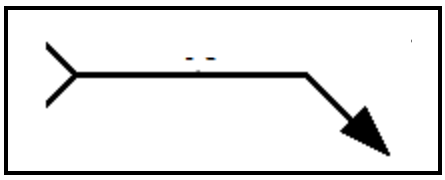
1.1.2 … is a metal alloy, manufactured from a combination of tin and lead.

A Solder
B Bronze
C Brass
D Duralumin

1.1.3 Close the … immediately during a flashback situation.

A acetylene cylinder valve
B acetylene regulator
C oxygen cylinder valve
D oxygen regulator

1.1.4 Which weld symbol indicates the *contour symbol* on the welding symbol shown below?



A F
B —
C A
D R

1.1.5 The … is the measurement of a slope.

A rise
B height
C scale
D gradient

1.1.6 A … is a device that automatically regulates temperatures.

A heat pump system
B radiant heat system
C thermostat
D heat exchanger

(6 × 1) (6)

1.2 Complete the following sentences by writing only the missing word(s) next to the question number (1.2.1–1.2.6) in the ANSWER BOOK.

1.2.1 The … cutting process melts, burns or vaporises the material, leaving an edge of high quality of surface finish.

1.2.2 During the plasma cutting process, … is forced and blown out of the nozzle at high speed.

1.2.3 In a high-pressure oxyacetylene system … is supplied in the cylinder and should not necessarily be added to the acetylene.

1.2.4 The flashback arrestor is fitted between the … and the blowtorch.

1.2.5 Refrigerators are the most common type of cooling system. They are based on the principle that as a liquid change to … it absorbs a large amount of heat.

1.2.6 … drawings are used to indicate and describe the interior portions of an object or structure.

(6 × 1) (6)

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1.3 Choose an item from COLUMN B that matches a description in COLUMN A. Write only the letter (A–L) next to the question number (1.3.1–1.3.6) in the ANSWER BOOK.

COLUMN A		COLUMN B	
1.3.1	It is a mixture of two or more metals	A	straight-pein hammer
1.3.2	Used to hammer in confined spaces or awkward places	B	statutory
1.3.3	Acetylene prepared in a gas generator	C	nonferrous metal
1.3.4	The nozzle of a blowtorch is manufactured from this type of material	D	low-pressure oxy-acetylene system
1.3.5	Heating, ventilation and air conditioning	E	high-pressure oxy-acetylene system
1.3.6	The use of PPE in the workshop	F	forced air systems
		G	HVAC
		H	own choice
		I	copper
		J	brass
		K	ball-pein hammer
		L	alloy

(6 × 1) (6)

1.4 Indicate whether the following statements are TRUE or FALSE by writing only 'True' or 'False' next to the question number (1.4.1–1.4.6) in the ANSWER BOOK.

1.4.1 Bolting forms part of the group of self-secured joints.

1.4.2 The following formula can be used to calculate the area of a half-circle:

$$A = \frac{\pi r^2}{2}$$

1.4.3 A pressure regulator consists of two gauges. One gauge indicates the cylinder pressure and the other the flow of gas to the blowpipe.

1.4.4 When setting the oxyacetylene flame, the carburising flame is created by setting the oxygen in excess.

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1.4.5 A heat pump system is a heat-recovery ventilation device that replaces the warm air inside with cold air.

1.4.6 A round object lying unsupported on a worktable is classified as an unsafe act.

(6 × 1) (6)

1.5 Complete each of the following sentences by choosing an item from the list below. Write only the answer next to the question number (1.5.1–1.5.6) in the ANSWER BOOK.

white; joggling; increase; flux; 85; same; grey; opposite; swaging; reduce; slag; 95

1.5.1 … cast iron is very hard and wear resistant.

1.5.2 … is a metal-forming technique in which the metal is formed into an off-set shape to be reinforced.

1.5.3 One function of a regulator is to … the pressure of the welding gasses from the cylinders to the torch.

1.5.4 No … is created during a GTAW process.

1.5.5 Workers working in an environment where the sound levels are higher than … decibels must wear hearing protection.

1.5.6 With ordinary lay steel ropes, the wires lay in a certain direction and the strands in the … direction.

(6 × 1) (6)

[30]

TOTAL SECTION A: 30

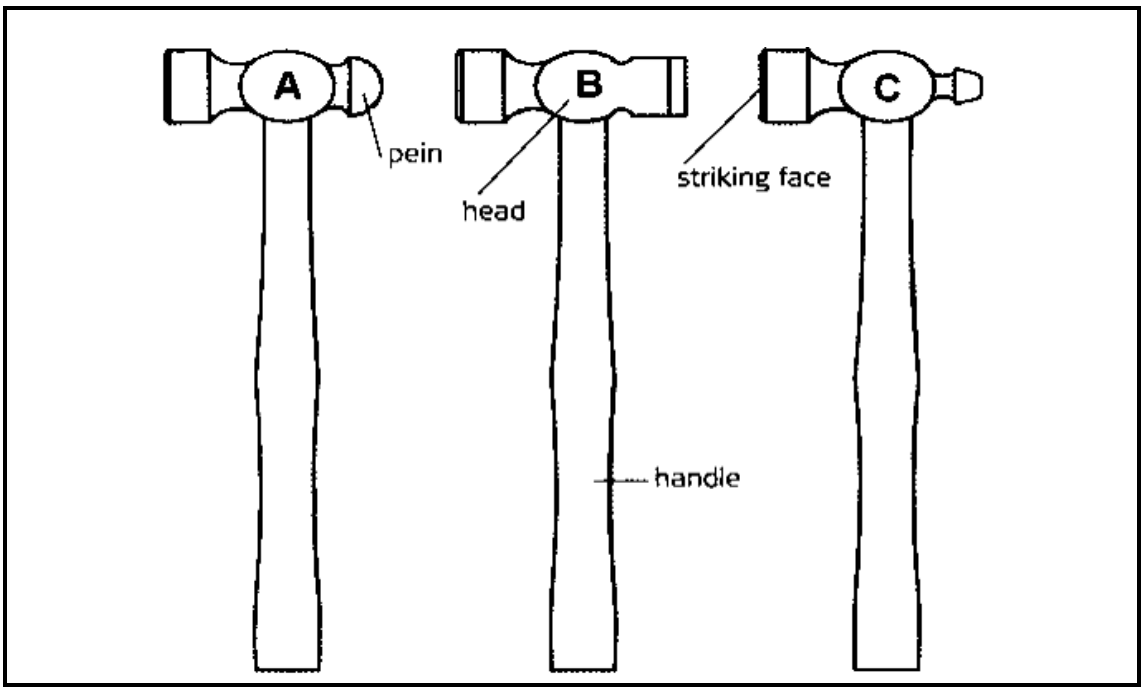
SECTION B

QUESTION 2

2.1 Name ONE property of iron that changes when carbon is added to it. (1)

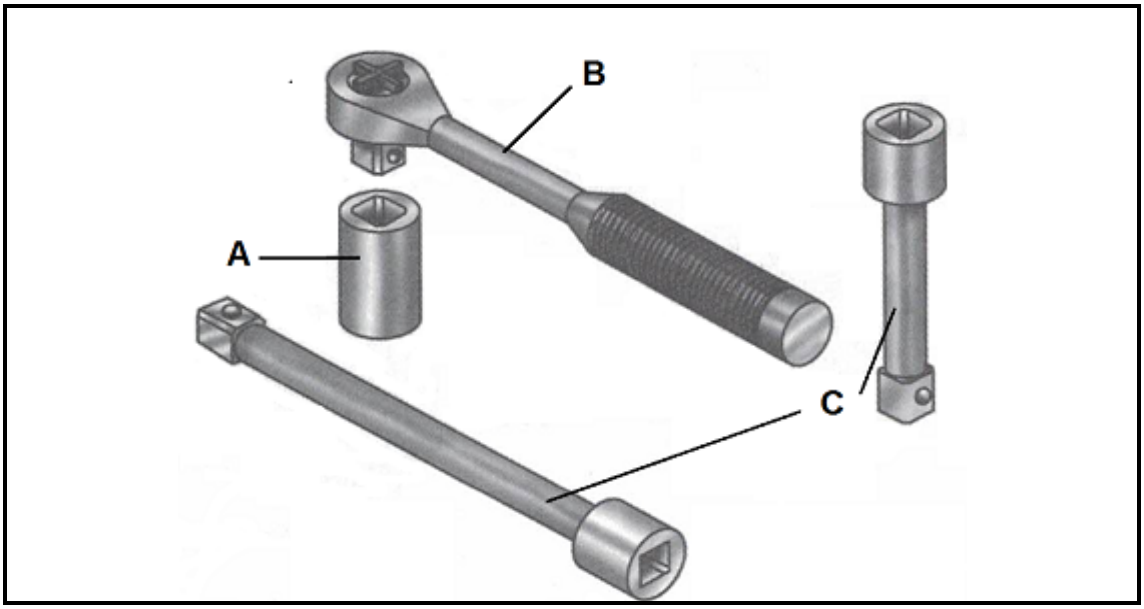
2.2 Name THREE types of alloy steel. (Any 3 × 1) (3)

2.3 Name the THREE types of hammers that are shown below by writing only the name next to the letter (A–C) in the ANSWER BOOK.



(3 × 1) (3)

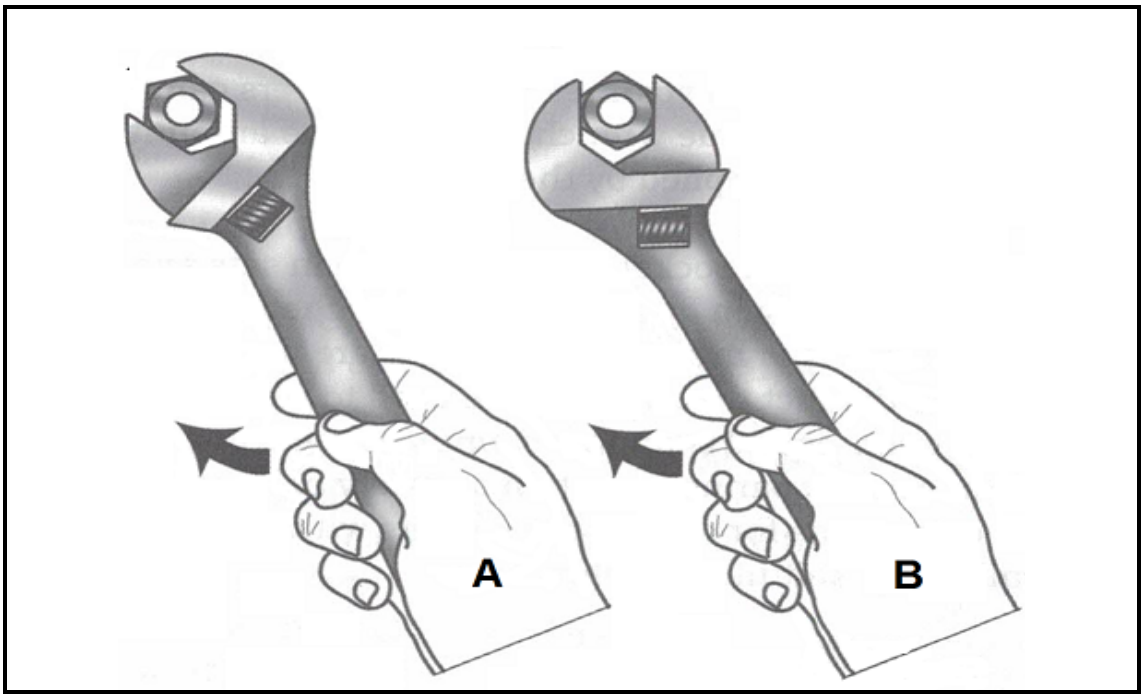
2.4 Name the tool and components indicated in the sketches below by writing only the answer next to the letter (A–C) in the ANSWER BOOK.



(3 × 1) (3)

2.5 The following sketches show a wrong way and a right way of handling an adjustable spanner to tighten a nut.

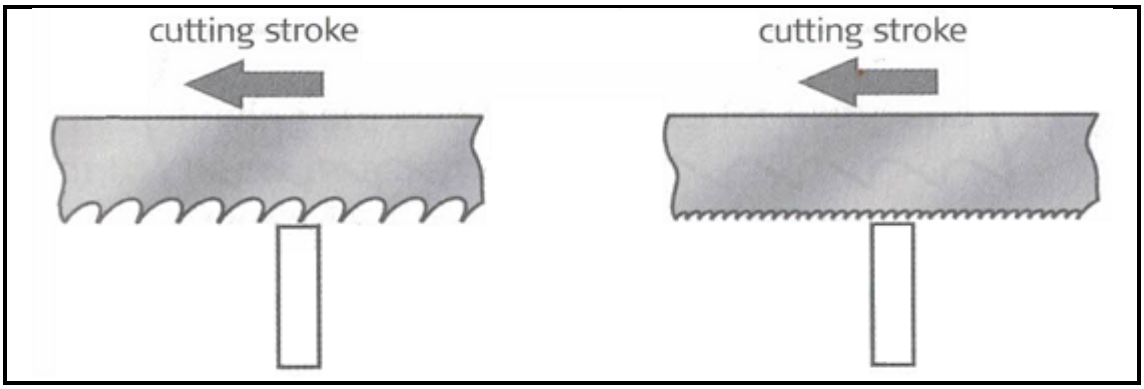
Which one is the right way? Only write 'A' or 'B'.



(2 × 1) (2)

2.6 Two different hacksaw blades are shown in the sketches below. The cutting stroke indicated is correct according to the direction of the teeth.

State the factor related to the number of teeth to be kept in mind when choosing the correct blade for a specific task.

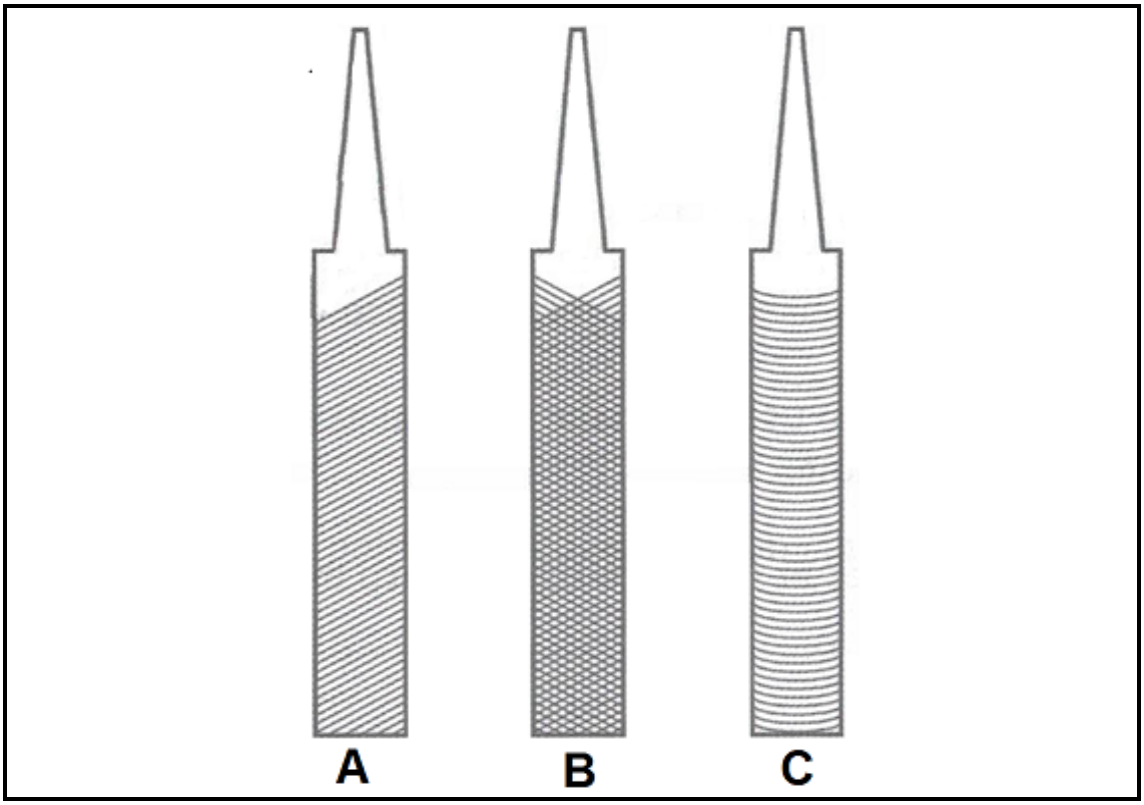


(2 × 2) (4)

2.7 The following information is indicated on a hacksaw blade: 18 TPI

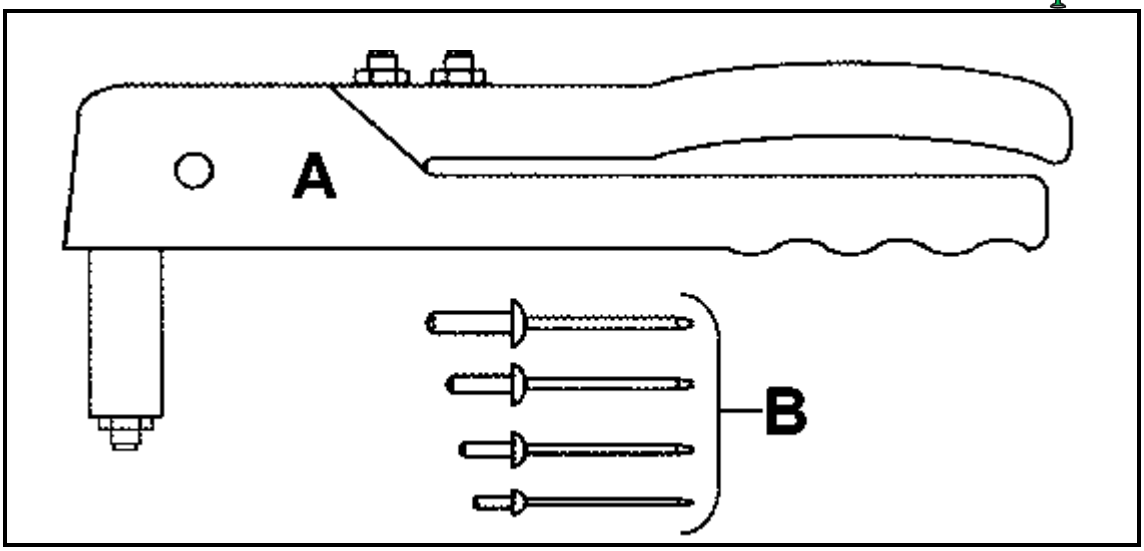
Explain what is meant by this information. (2 × 1) (2)

2.8 Files are cut in THREE different ways as shown below. Name the type of cut of each of the files by writing only the answer next to the letter (A–C) in the ANSWER BOOK.



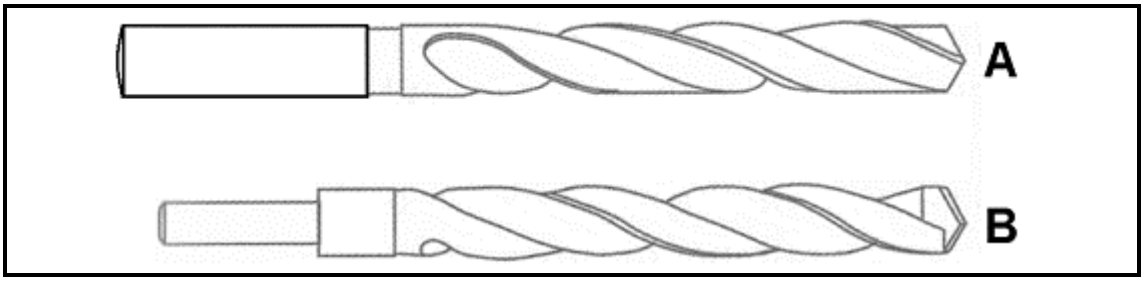
(3 × 1) (3)

2.9 Name the tool and the accessories indicated in the diagram below by writing only the answer next to the letter (A and B) in the ANSWER BOOK.



(2 × 1) (2)

2.10 The following sketches show two classifications of drills as identified by their different types of points. Name the two drills by writing the answer next to the letter (A and B) in the ANSWER BOOK.



(2 × 2) (4)

2.11 Give TWO examples of materials for which each of the drills, mentioned in QUESTION 2.10, is used. Only write the answer next to the letter (A and B) in the ANSWER BOOK. (2 × 2) (4)

2.12 The feed of a pedestal drilling machine is activated by the feed handle, making use of a certain gear system.

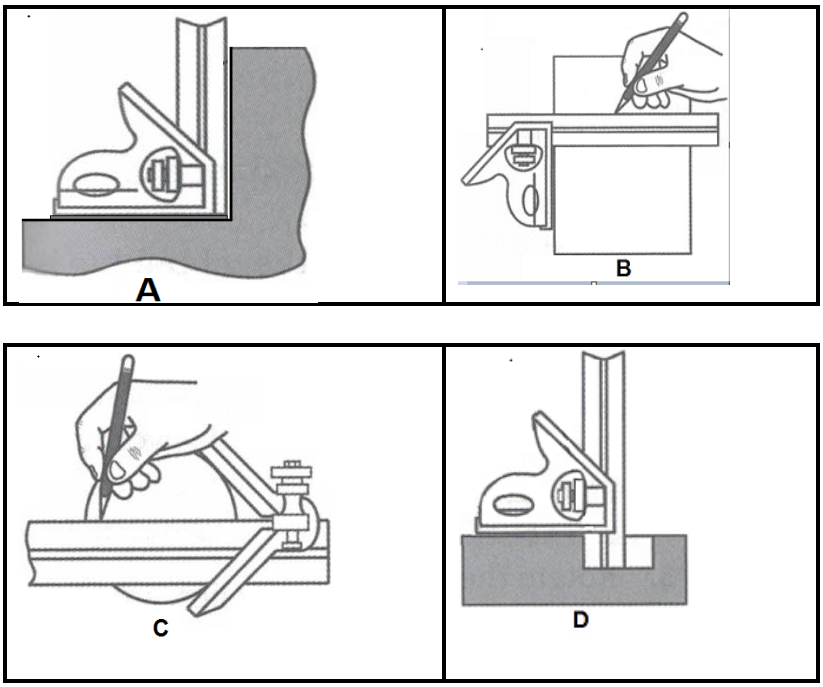
Name the gear system that is used to enable the feed. (2 × 1) (2)

2.13 Name TWO types of abrasive discs that can be used on a portable angle grinder. (2 × 1) (2)

2.14 State THREE safety precautions that should be taken when using a portable grinding machine. (3 × 1) (3)

2.15 State FOUR safety precautions that should be taken before, during or after the use of measuring instruments. (4 × 1) (4)

2.16 State the use of a combination set in each of the following sketches, by writing only the action performed next to the letter (A–D) in the ANSWER BOOK.

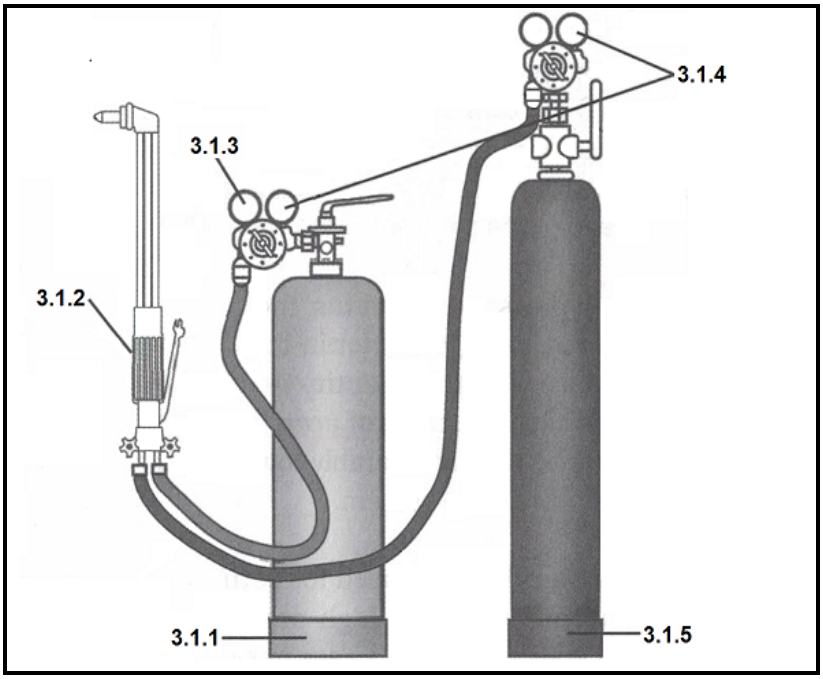


(4 × 2) (8)

[50]

QUESTION 3

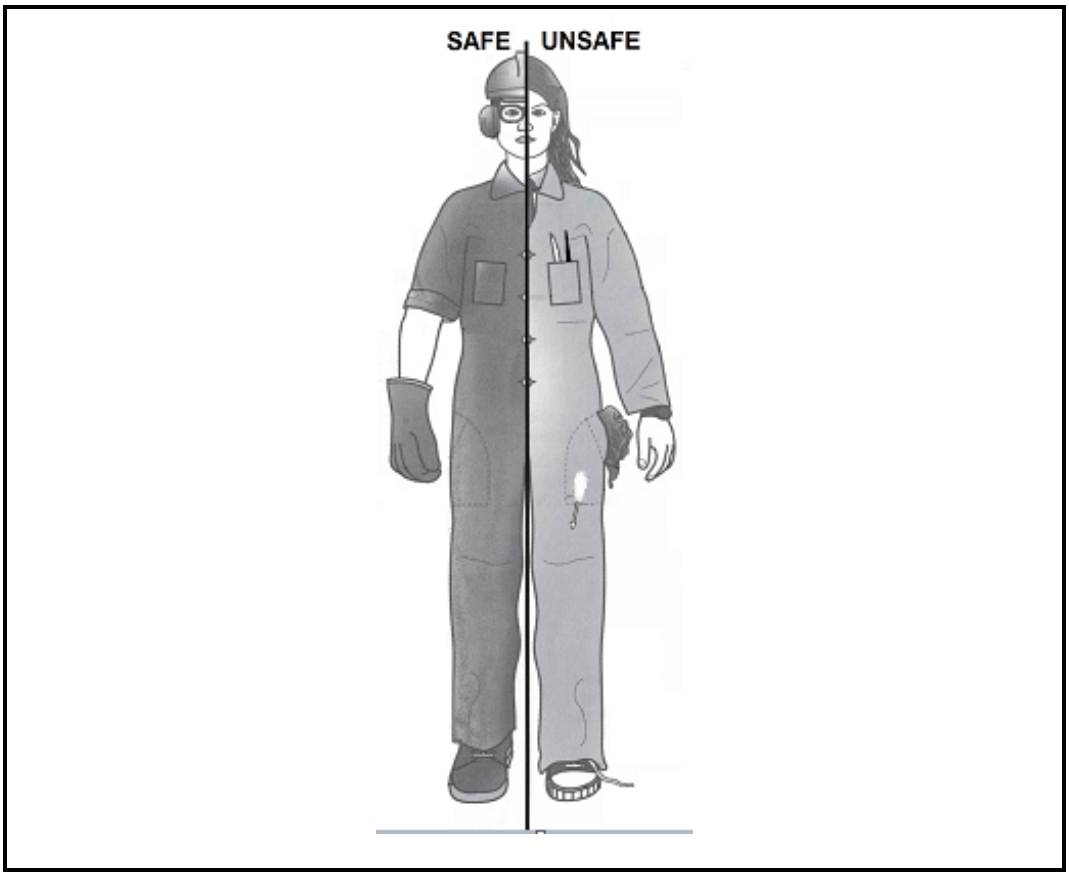
3.1 The following sketch shows an oxyacetylene gas system. Name the components indicated by writing only the answer next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.



(5 × 1) (5)

3.2 State FIVE *safe conditions* and the opposite FIVE *unsafe conditions* shown below, by giving the answer in the following table form in the ANSWER BOOK:

SAFE	UNSAFE



(5)
[10]

QUESTION 4

4.1 Name TWO types of HVAC systems used in industry.

4.2 Make a neat drawing of the symbol of a *thermostat* that would be found in an HVAC drawing.

4.3 Define the term *housekeeping*.

4.4 State TWO accidents caused by poor housekeeping in the sheet metal workshop.

4.5 Describe TWO unsafe acts in the sheet metal workshop.

(5 × 2) **[10]**

TOTAL SECTION B: 70
GRAND TOTAL: 100

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