

MARKER CODE



Student Personal Identification Number

# Solomon Islands National Form Six Certificate

## DESIGN TECHNOLOGY

2018

### QUESTION and ANSWER BOOKLET

Time allowed: 2 ½ hours

There are TWO sections in this paper. Each section is worth 50 marks.

You should spend about 1¼ hours on each section.

#### SECTION A: DESIGN UNDERSTANDING

Compulsory. Answer ALL questions.

<b>Questions</b>	<b>Pages</b>
A1-A5	2-9

#### SECTION B: MAJOR OUTCOMES

Choose ONE (Major 1 – Major 4)

<u>Major</u>	<u>Topic</u>	<u>Questions</u>	<u>Pages</u>
1	Wood Technology	B1 – B3	11 – 18
2	Food and Nutrition	B4 – B8	19 – 28
3	Technical Graphics	B9 – B11	29 – 37
4	Metal Technology	B12 – B14	38 – 46

Select only ONE major and answer all the questions in that major.

Write your answers in the spaces provided in this booklet.

Write your **Student Personal Identification Number (SPIN)** in the box on the top right-hand corner of this page and on the fold-out flap at the back of this booklet.

Check that this booklet contains pages 2-47 and that none of these pages are blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.**

This section is Compulsory. **Answer ALL questions (A1 – A5).**

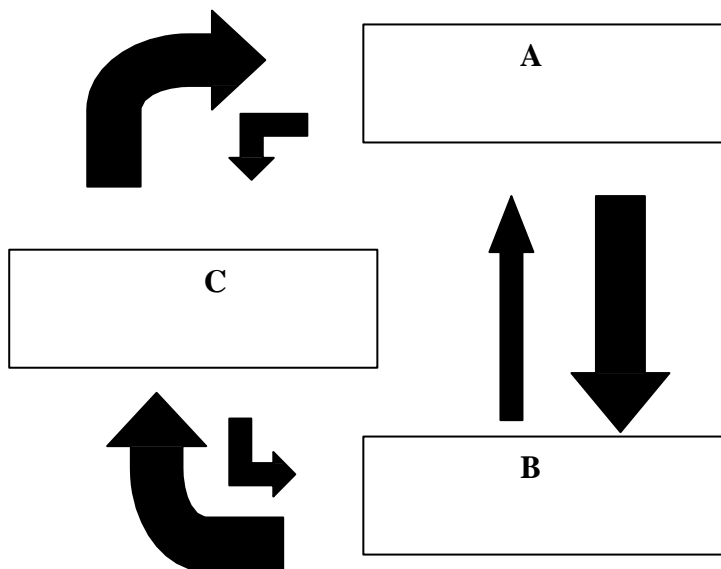
**QUESTION A1****(12 marks)**

- A) Match the statements given in Column B, with the terms given in Column A.  
Write the letter corresponding to the statement in Column B, in the box provided beside the term that it matches, in Column A.

NO.	COLUMN A	COLUMN B
1	Technology <input type="text"/>	A. A detailed description of what the client needs.
2	Design specification <input type="text"/>	B. Ability to do something well which requires special techniques and knowledge.
3	Design process <input type="text"/>	C. Factors are set beyond the designers control that place limit on the designing process.
4	Closed design brief <input type="text"/>	D. The means by which people turn ideas into reality.
		E. An approach used in technology to help students identify, manage and resolve problems.

**(4 marks)**

- B) Study the illustration given below and label the boxes marked A, B and C.

**(3 marks)**

C) List **two** advantages of an open design brief.

Advantage 1

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Advantage 2

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(2 marks)

D) Given below are two design briefs; Design Brief 1 and Design Brief 2.  
Choose **one** of them, read it through, and answer the question that follows.

**Design Brief 1:** Design a warm dish of local food for Tom and Mary's lunch who are both diabetics.

**Design Brief 2:** Design a black wooden chair, big enough for George to use when he studies at home.

(1  
mark)

Write the number of the design brief you have chosen here: \_\_\_\_\_

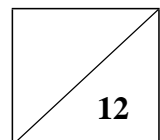
Give **three** expectations included in this design brief.

Expectation 1 \_\_\_\_\_  
\_\_\_\_\_

Expectation 2 \_\_\_\_\_  
\_\_\_\_\_

Expectation 3 \_\_\_\_\_  
\_\_\_\_\_

(3 marks)



**QUESTION A2****(11 marks)**

A) Write the terms that each of the following sentences defines in the space given below each sentence.

- i. Using the information gathered during research to select and develop an appropriate solution to the problem.

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- ii. The recording of the evaluation that is done at the end of each stage of the design process.

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- iii. Exploring information about the design problem appropriate solution to the problem.

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- iv. Factors that are set beyond the designer's control that place limits on the designing of a product.

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- v. A full-scale operational product that gives the designer a chance to check, test and modify the solution before final production.

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**(5 marks)**

B) Give a reason why the designer has to investigate ideas for a solution.

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**(1 mark)**

- C) There are **three** tasks that the designer has to carry out when investigating the design brief. List them below in the correct order in which they should be carried out.

Task 1 \_\_\_\_\_

Task 2 \_\_\_\_\_

Task 3 \_\_\_\_\_

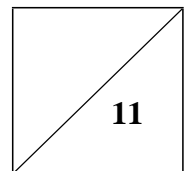
(3 marks)

- D) Your friend, Harry, has asked you how he can collect information for a design task he will work on. List **two** methods of collecting information you can suggest to him.

Method 1 \_\_\_\_\_

Method 2 \_\_\_\_\_

(2 marks)



**QUESTION A3****(11 marks)**

- A) A design journal is a folio that has all the information on the designing, making and evaluation of a design project.

State **four** sets of information that can be included in a design journal.

- i. \_\_\_\_\_
- ii. \_\_\_\_\_
- iii. \_\_\_\_\_
- iv. \_\_\_\_\_

(4 marks)

- B) Match the statements given in Column B, with the terms given in Column A.  
Write the letter corresponding to the statement in Column B, in the box provided beside the term that it matches, in Column A.

NO.	COLUMN A	COLUMN B
1	Budget <input type="text"/>	A. Helps select an appropriate solution to the problem.
2	Evaluation Criteria <input type="text"/>	B. Practices in the workshop which prevent accidents and injuries.
3	Working drawing <input type="text"/>	C. An outline of the intended spending on carrying out the design task.
4	Safety habits <input type="text"/>	D. The factors by which the assessment of a product, is determined.
		E. Contains all the information needed for the manufacture and assembly of a product.

(2 marks)

- C) Explain why it is important for the designer to analyze ideas from the research that has already been carried out, before selecting an appropriate solution to a problem:

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(3 marks)

- D) Given in the table below is the action plan you developed for a design task that you have to carry out. Study the action plan and answer the question below it.

NO.	TIME	ACTIVITY
1.	Weeks 1 and 2	Collect all information needed for the design task.
2.	Week 3	Prepare all the paperwork/plans needed to produce the solution.
3.	Week 4	Buy all that needs to be bought for the project.
4.	Weeks 5 and 6	Produce the solution.
5.	Week 7	Review and analyse the product.

Give **two** reasons why you had to develop this action plan at the beginning stages of the design task.

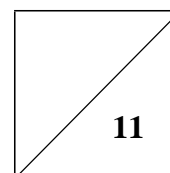
Reason 1 \_\_\_\_\_

\_\_\_\_\_

Reason 2 \_\_\_\_\_

\_\_\_\_\_

(2 marks)



**QUESTION A4**

**(8 marks)**

A) State the importance of observing the following safety rules in the workshop:

i. Wipe spills immediately.

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ii. Use dry hands when handling electrical appliances and tools.

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**(2 marks)**

B) In design technology, a resource is something that is available for use, or that can be used to carry out a design task.

Identify **three** resources that should be available to the designer, to help him carry out a design task.

Resource 1 \_\_\_\_\_

Resource 2 \_\_\_\_\_

Resource 3 \_\_\_\_\_

**(3 marks)**

C) Your group has to clean the workshop at the end of the class this week.

Give **three** activities your group can perform to clean the workshop.

Activity 1 \_\_\_\_\_

\_\_\_\_\_

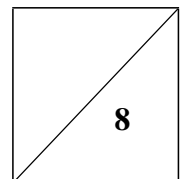
Activity 2 \_\_\_\_\_

\_\_\_\_\_

Activity 3 \_\_\_\_\_

\_\_\_\_\_

**(3 marks)**





**QUESTION A5**

**(8 marks)**

A) List **two** questions to ask when evaluating a product.

Question 1 \_\_\_\_\_

\_\_\_\_\_

Question 2 \_\_\_\_\_

\_\_\_\_\_

(2 marks)

B) George has finished producing the outcome to a design problem. Now he has to analyse the production of this outcome.

Explain to George why he has to use the following factors, in his analysis:

i. the option chosen \_\_\_\_\_

\_\_\_\_\_

ii. the use of materials \_\_\_\_\_

\_\_\_\_\_

iii. cost effectiveness \_\_\_\_\_

\_\_\_\_\_

(3 marks)

C) It is important to evaluate at the end of each stage in the design process.  
Give **three** reasons to justify the statement above.

Reason 1 \_\_\_\_\_

\_\_\_\_\_

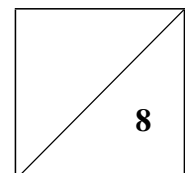
Reason 2 \_\_\_\_\_

\_\_\_\_\_

Reason 3 \_\_\_\_\_

\_\_\_\_\_

(3 marks)



## **SECTION B      MAJOR OUTCOMES**

There are six questions in this section: Major 1 – Major 4. Choose only ONE Major and answer ALL the questions in your chosen Major.

<b><u>Major</u></b>	<b><u>Topic</u></b>	<b><u>Questions</u></b>	<b><u>Pages</u></b>
<b>Major 1</b>	<b>Wood Technology</b>	<b>B1 – B3</b>	<b>11 – 18</b>
<b>Major 2</b>	<b>Food and Nutrition</b>	<b>B4 – B8</b>	<b>19 – 28</b>
<b>Major 3</b>	<b>Technical Graphics</b>	<b>B9 – B11</b>	<b>29 – 37</b>
<b>Major 4</b>	<b>Metal Technology</b>	<b>B12 – B14</b>	<b>38 – 46</b>

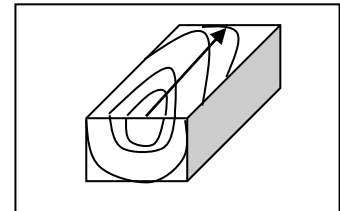
Answer ALL questions (B1 – B3).

**QUESTION B1****MULTIPLE-CHOICE QUESTIONS****(10 marks)**

Circle the letter that corresponds to the **best** answer.

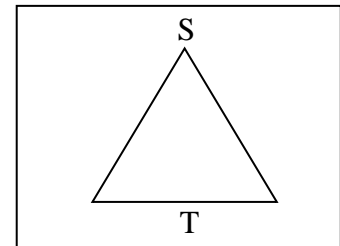
1. Which direction of the grain is indicated by the arrow in the diagram given below?

- A. After the grain
- B. Along the grain
- C. Before the grain
- D. Across the grain



2. Which type of line would be appropriately drawn from S to T as shown in the diagram on the right?

- A. Centre line
- B. Hidden line
- C. Folded line
- D. Visible outline

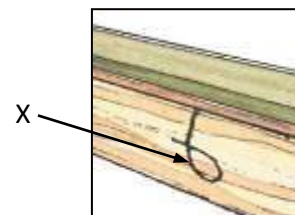


3. The process of drying timber using sunlight energy is \_\_\_\_\_ seasoning.

- A. air
- B. kiln
- C. humid
- D. combined

4. The part labeled X in the diagram shown on the right signifies a

- A. straight edge.
- B. rough surface.
- C. face side mark.
- D. face edge mark.



5. The tool shown in the diagram on the right is known as

- A. try square.
- B. spirit level.
- C. sliding bevel.
- D. combination square.



6. The **best** material used for the production of electrical wires is

- A. zinc.
- B. copper.
- C. mercury.
- D. aluminium.

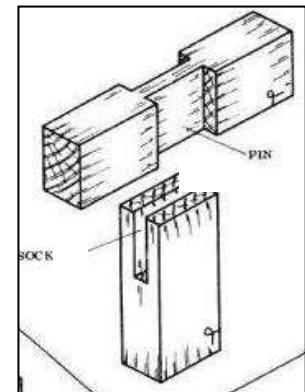
7. Which class does the tool shown on the right belong to?

- A. Testing
- B. Cutting
- C. Holding
- D. Marking



8. The diagram of a woodwork joint shown is a \_\_\_\_\_ joint.

- A. mitre
- B. bridle
- C. rebated
- D. dovetail

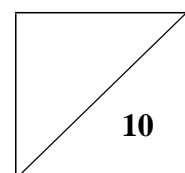
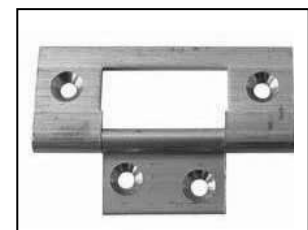


9. Which part of the work bench should tools be kept when not in use?

- A. vice
- B. well
- C. bench top
- D. bench stop

10. The type of hinge shown on the right is a \_\_\_\_\_ hinge.

- A. tee
- B. butt
- C. flush
- D. dovetail



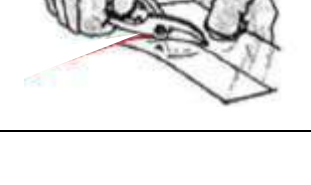


**QUESTION B2**                      **SHORT ANSWER QUESTIONS**

**QUESTION B2**                      **SHORT ANSWER QUESTIONS**

**(30 marks)**

A) Describe the process been carried out in each of the diagrams below.

DIAGRAM	DESCRIPTION OF PROCESS
<p>(i)</p> 	<hr/> <hr/> <hr/> <hr/> <hr/> <p>(2 marks)</p>
<p>(ii)</p> 	<hr/> <hr/> <hr/> <hr/> <hr/> <p>(2 marks)</p>
<p>(iii)</p> 	<hr/> <hr/> <hr/> <hr/> <hr/> <p>(2 marks)</p>

B) Describe **one** safety rule of using hand tools.

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(2 marks)

C) Describe **one** of the steps in manufacturing laminates.

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(2 marks)

D) Name **one** manufacturing material used in furniture making.

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 (1 mark)

E) Differentiate between **hardwood** and **softwood**.

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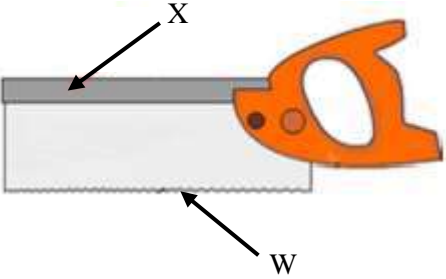
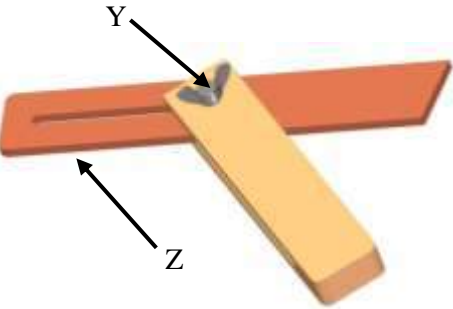
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(3 marks)

F) Name the parts of the tools given below and state their uses.

DIAGRAM OF TOOL	NAME OF PARTS/USES
<p>(i)</p> 	<p>W: _____</p> <p>X: _____</p> <p>Use: _____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>(3 marks)</p>
<p>(ii)</p> 	<p>Y: _____</p> <p>Z: _____</p> <p>Use: _____</p> <p>_____</p> <p>_____</p> <p>(3 marks)</p>

- G) The diagram below is a **Bird Feeder**. Study the diagram and answer the questions that follow.



- i. Name a suitable joint (other than the simple butt joint shown), that can be used to join the two roof members.

\_\_\_\_\_

(1 mark)

- ii. Draw the joint in (i) above.



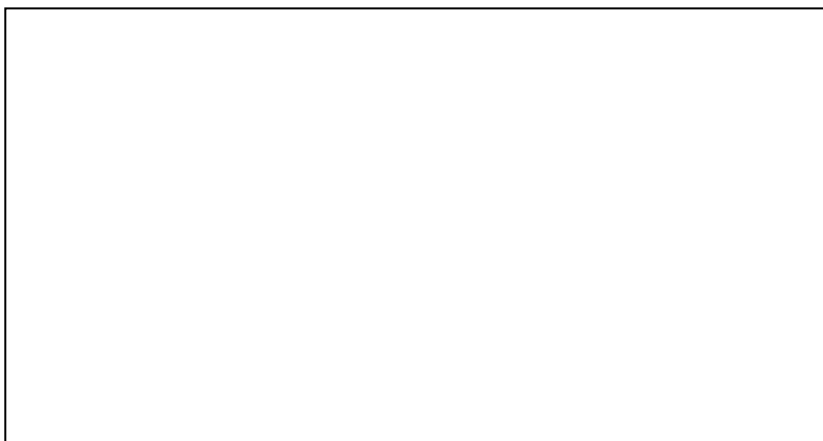
(3 marks)

- iii. Name **one** hand tool that can be used to fix the two roof members.

\_\_\_\_\_

(1 mark)

- iv. Describe with the help of a sketch, a fastening method that can be used to fix the **Bird Feeder** onto the wall.



(2 marks)

- H) A student measured the weights of a piece of timber in an experiment to determine its moisture content. The following weights were recorded by the student:

Wet Weight = 155 grams

Dry Weight = 124 grams

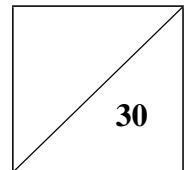
- i. State the formula for calculating the percentage moisture content of timber.

\_\_\_\_\_ (1 mark)

- ii. Calculate the percentage of moisture content of the piece of timber using the given information above.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(2 marks)





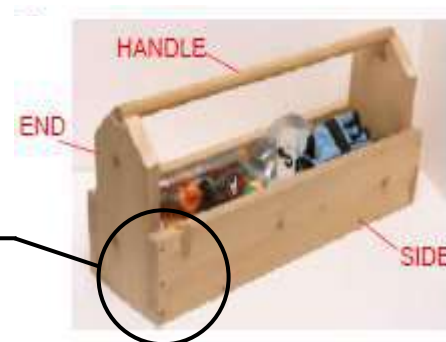
**QUESTION B3****LONG ANSWER QUESTIONS****(10 marks)**

The diagram and specifications of a **Handyman's Tool Box** are shown below. Study the diagram and answer the questions that follow.

Specifications:

Length = 600 mm  
 Width = 200 mm  
 Height of side member = 150 mm  
 Height of end member = 350 mm  
 Diameter of Handle = 20 mm  
 Thickness – All members = 20 mm

Detail A



A) Using the information given above, complete the table below.

Member	No	Material	Finished size		
			L	W	TH
Side	2	Dakua	600	150	20
End	2	Dakua	350		20
	1	Dakua	600	0	20

(2 marks)

B) Calculate the cost of the materials for the **Handyman's Tool Box**.

Prices	Calculation	Cost
Timber for Side member is \$3.00/m		
Timber for End member is \$3.00/m		
Timber for Handle is \$1.50/m		
<b>TOTAL</b>		

(3 marks)

C) Evaluate the **Handyman's Tool Box** according to the following headings:

i. Aesthetics: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

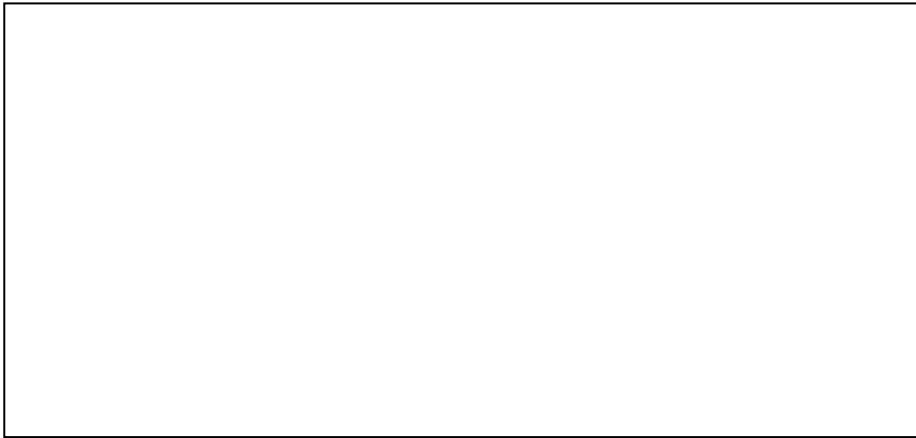
ii. Safety: \_\_\_\_\_

\_\_\_\_\_

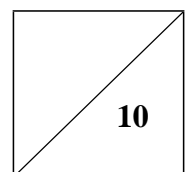
\_\_\_\_\_

(4 marks)

D) Sketch an alternative joint that can be used at **Detail A**.



(1 mark)



Answer ALL questions (B4 – B8)

**QUESTION B4**

**(10 marks)**

A) Define the term **polysaccharide** and identify one of its examples.

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Example: \_\_\_\_\_

(2 marks)

B) Describe the digestion of the following two nutrients in the stomach.

i. Protein

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Carbohydrate

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(2 marks)

ii. Why does the body digest any food that is eaten?

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(1 mark)

iii. Absorption is the process by which the products of digestion pass through the walls of the small intestine into the bloodstream.

Why do the products of digestion have to be absorbed into the bloodstream?

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(1 mark)

C) Differentiate between the main functions of protein and carbohydrate.

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(3 marks)

D) **Milk is considered a complete food for babies.**

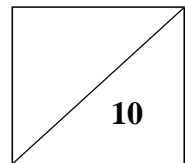
Give a reason to justify the above statement.

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(1 mark)



**QUESTION B5****(9 marks)**

- A) Match the statements given in Column B, with the terms given in Column A.  
Write the letter corresponding to the statement in Column B, in the box provided beside the term that it matches, in Column A.

NO.	COLUMN A	COLUMN B
1.	Diabetes <input type="text"/>	A. The need for energy is low
2.	Hypertension <input type="text"/>	B. Returning to good health after sickness or injury
3.	Pregnant woman <input type="text"/>	C. Needs protein to repair and maintain cells
4.	Sedentary lifestyle <input type="text"/>	D. Too much protein in the diet
5.	Goitre <input type="text"/>	E. Not enough insulin produced by the pancreas
6.	Tooth decay <input type="text"/>	F. The foetus needs protein to help it grow and develop
7.	Convalescent <input type="text"/>	G. A prolonged lack of iodine in the diet
8.	Elderly <input type="text"/>	H. Caused by a build-up of plaque
		I. Can lead to heart disease, stroke and death

**(4 marks)**

B) Define the following terms:

i. an invalid

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ii. over-nutrition

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(2 marks)

C) **The recommended Vitamin C daily intake for an adolescent girl is 30mg.**  
Calculate the amount of this vitamin that she should be consuming in one of her three main meals.

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(2 marks)

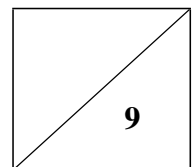
D) **An athlete needs to be ingesting a good amount of Vitamin B, daily.**  
Give a reason to justify the above statement.

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(1 mark)



**QUESTION B6****(6 marks)**

A) Define the term preservative.

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(1 mark)

B) How does **salting** prevents microorganisms and enzymes from spoiling food?

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(1 mark)

C) **Slow freezing negatively affects the quality of frozen foods.**

Give two reasons to justify the above statement.

Reason 1 \_\_\_\_\_

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Reason 2 \_\_\_\_\_

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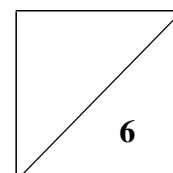
(2 marks)

D) Preservation can be done at home, and commercially.

Fill in the table below to compare the type of labour, used in these two kinds of preservation.

	Home Preservation	Commercial Preservation
Type of labour used		


(2 marks)



**QUESTION B7****(15 marks)**

A) You are the manager of a food business, and you are carrying out a spot check of the kitchen.

Below is a photograph that was taken during the spot check. Beside the photograph, identify what is wrong, and state how you would explain to your staff why it is poor practice.

PHOTOGRAPH	EXPLANATION
	What is wrong? _____
	_____
	Why is this poor practice? _____
	_____
	_____

**(2 marks)**

B) Define the following terms:

i. expiry date \_\_\_\_\_

\_\_\_\_\_

ii. rancidity \_\_\_\_\_

\_\_\_\_\_

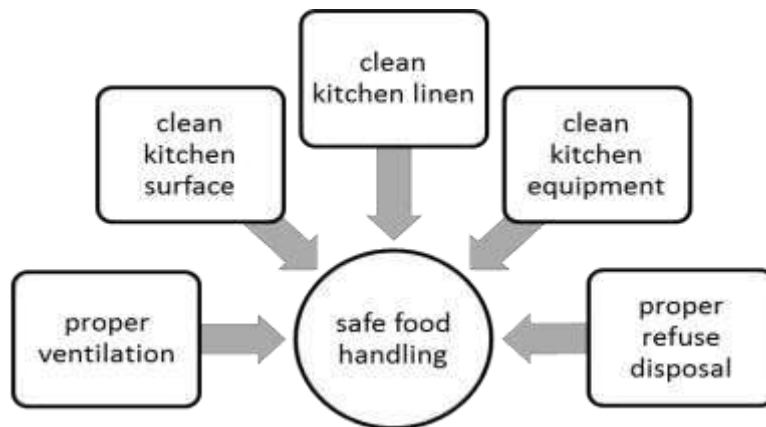
iii. enzymatic browning \_\_\_\_\_

\_\_\_\_\_

**(3 marks)**



- C) Study the illustration on kitchen hygiene given below, and answer the questions that follow.



- i. Describe how good kitchen hygiene contributes to safe food handling.

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(2 marks)

- ii. Define **proper refuse disposal**.

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(1 mark)

- D) The blender is now commonly used rather than a vegetable grater, to prepare fruits for a fruit juice.

- i. Compare the standard of hygiene practiced, in the use of a blender and a grater.

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(3 marks)

- ii. Give a reason for your answer in part (i).

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(1 mark)

E) State the importance of practicing the following measures, during food preparation:

i. Wash vegetables and fruits before using them.

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ii. Do not overcrowd food in the refrigerator.

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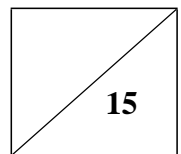
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iii. Do not soak frozen meat when thawing.

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(3 marks)



## **QUESTION B8**

**(10 marks)**

A) Identify the terms that the sentences below are defining. Write the terms in the spaces provided at the end of each definition.

i. The process of transforming raw ingredients into prepared food products.

\_\_\_\_\_

ii. Attempts to persuade consumers to think favorably about a product so that they go to the store to purchase the product.

\_\_\_\_\_

(2 marks)

B) Name **one** negative effect of deforestation on the food supply in your community.

\_\_\_\_\_

(1 mark)

C) The passage given below was extracted from “*Climate Change Makes Life Tougher for Solomon Island Farmers*”, a news article from the International Press Service (IPS) News Agency. It describes the contemporary food issues that are common in the Solomon Islands, as a result of climate change.

Read the passage and answer the question below it.

Residents of Weather Coast villages like Duidui, Reavu and Avuavu use the steep slopes above the coastline to cultivate crops, growing everything from taro, yams and sweet potatoes to cassava and bananas. This region receives heavy rainfall of 5,000 to 8,000 mm a year during two wet seasons, the first from January to April and the second from May to September.

Boku Joke, a climate change advisor working with the non-profit Kastom Gaden Association (KGA), told IPS that resulting floods and intense saturation of the soil has made life difficult for farmers and threatened food production.

Heavy rain also erodes soil nutrients and provides fertile ground for plant pests and diseases like [chuaka](#), which affects taro, to thrive.

“Rain and floods and lack of crop bulking (mass cultivation and storage of different crop varieties) by local farmers have also resulted in a loss of crop diversity,” Joke explained that since farmers plant just one crop, they are often left with nothing if extreme weather ruins the harvest.

The government now recognises the need to focus investment on developing and supporting agricultural livelihoods to ensure a secure future for people in the region.

Source: <http://www.ipsnews.net>

As an agricultural officer, you have been asked to advise the government, about methods of combatting the existing food issues discussed in the extract above.

List at least three of these methods.

Method 1 \_\_\_\_\_

Method 2 \_\_\_\_\_

Method 3 \_\_\_\_\_

(3 marks)

D) Given below are some measures that people in your community can follow, to reduce the high rate of non-communicable diseases. Write a reason to justify each of these measures:

i. Do not eat fried but boiled food.

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ii. Eat local fruits rather than cookies/sweet biscuits as snacks.

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iii. Eat well balanced meals.

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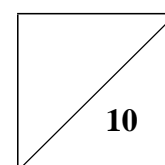
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iv. Walk rather than travel in a vehicle whenever possible.

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(4 marks)



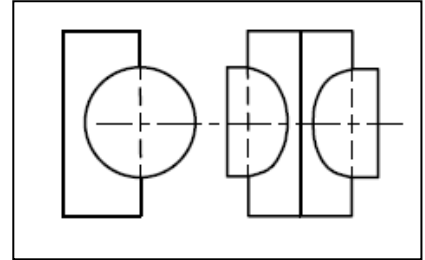
Answer ALL questions (B9 – B11)

**QUESTION B9****MULTIPLE-CHOICE QUESTIONS****(10 marks)**

Circle the letter that corresponds to the **best** answer.

1. The diagram on the right shows the intersection of a cylinder to

- A. cone.
- B. cylinder.
- C. triangular prism.
- D. rectangular pyramid.

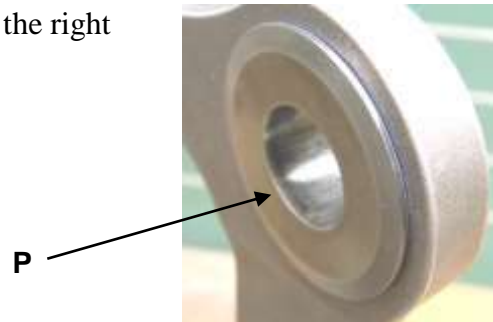


2. Which of the following methods would be most appropriate for the surface development of a truncated right pyramid?

- A. radial lines
- B. parallel lines
- C. triangulation
- D. oblique planes

3. The engineering component labeled **P** shown on the right is called

- A. rib.
- B. boss.
- C. bush.
- D. flange.

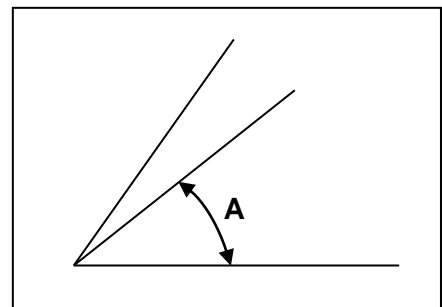


4. In the foundation of a building, the material that prevents moisture entering from the earth or lost to the atmosphere is called

- A. hardcore fill.
- B. polyvinyl chloride.
- C. damp proof course.
- D. reinforcement steel.

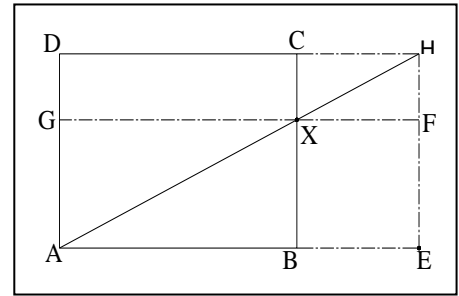
5. A method of constructing **regular polygons** is shown on the right. The angle marked **A** is

- A.  $60^\circ$ .
- B.  $45^\circ$ .
- C.  $30^\circ$ .
- D.  $15^\circ$ .



6. Which of the following is the **first step** when constructing a rectangle equal in area to a given rectangle ABCD as shown in the diagram below?

- A. Draw a parallel to the base at X
- B. Extend the base to the right at E
- C. Draw a perpendicular from E to H
- D. Draw a diagonal from point A to H



7. A view is drawn with its actual dimensions. Therefore the scale used is a/an \_\_\_\_\_ scale.

- A. full size
- B. half size
- C. reduction
- D. enlargement

8. In a **two-start** screw thread, the lead is equal to

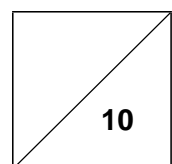
- A. the pitch.
- B. quarter pitch.
- C. half the pitch.
- D. twice the pitch.

9. Which of the forces below is equal in magnitude and direction to the **resultant** but opposite in sense?

- A. tension
- B. reaction
- C. attraction
- D. equilibrant

10. In a perspective projection, the vanishing points are located on the

- A. ground line.
- B. picture plane.
- C. eye level line.
- D. centre of vision.



**QUESTION B10****SHORT ANSWER QUESTIONS****(30 marks)**

- A) Match the terms in **List A** with the correct descriptions in **List B**. Write the letter representing the term in the box beside the matching description.  
Do not write a letter twice.

<b>List A</b>		
(A) Cabinet	(B) Layout	(C) Force
(D) Helix	(E) Dead Load	(F) Rollout
(G) Wind Load		

<b>List B</b>		<b>Answer</b>
(i)	An action which tends to cause an object to move or change its shape	
(ii)	A static force that is relatively constant for an extended time	
(iii)	A curve which revolves uniformly around a cylinder	
(iv)	A method of development for cylinders and cones	
(v)	A type of pictorial drawing with its width halved	

**(5 marks)**

- B) Differentiate between a **screw** and a **bolt**.

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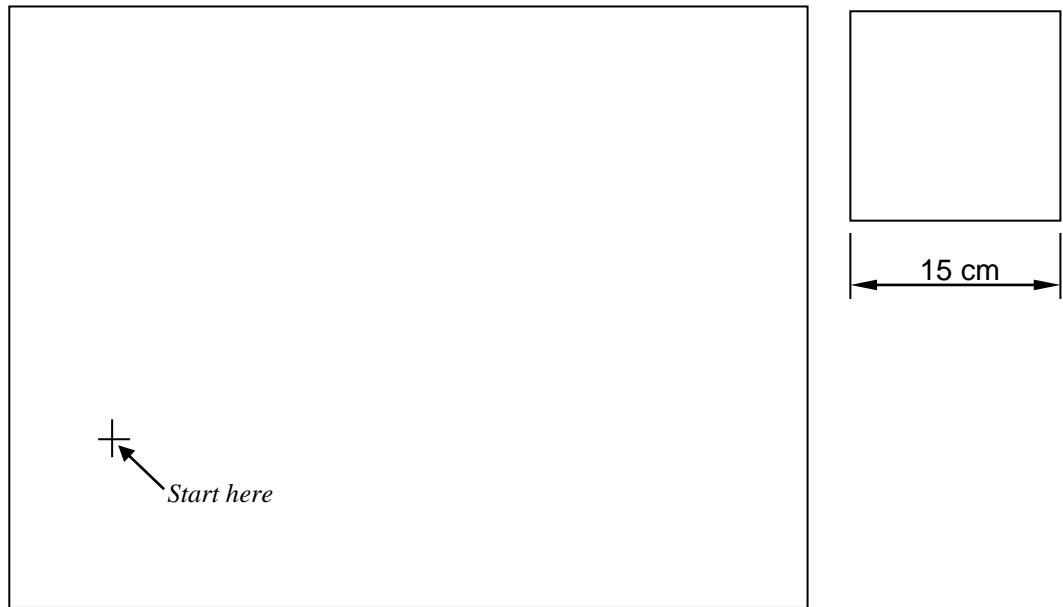
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**(3 marks)**

- C) Draw part of the foundation of a concrete building to show the **anchor bolt** and the **reinforcement wire mesh** in the space provide below.

**(3 marks)**

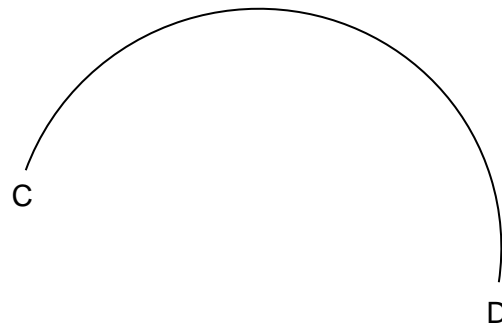
- D) A sketch of a square with sides 15 cm is given below. Apply geometrical constructions to draw the square to a scale of 1:3 in the space provided below. Use the starting point given.



(3 marks)

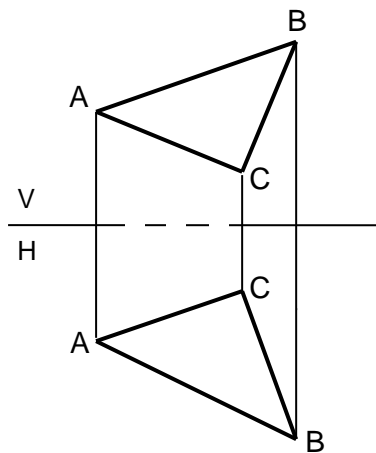


- E) Apply geometrical constructions to **quadrisection** the given arc CD.



(3 marks)

- F) Apply geometrical constructions to determine the true shape of plane ABC.

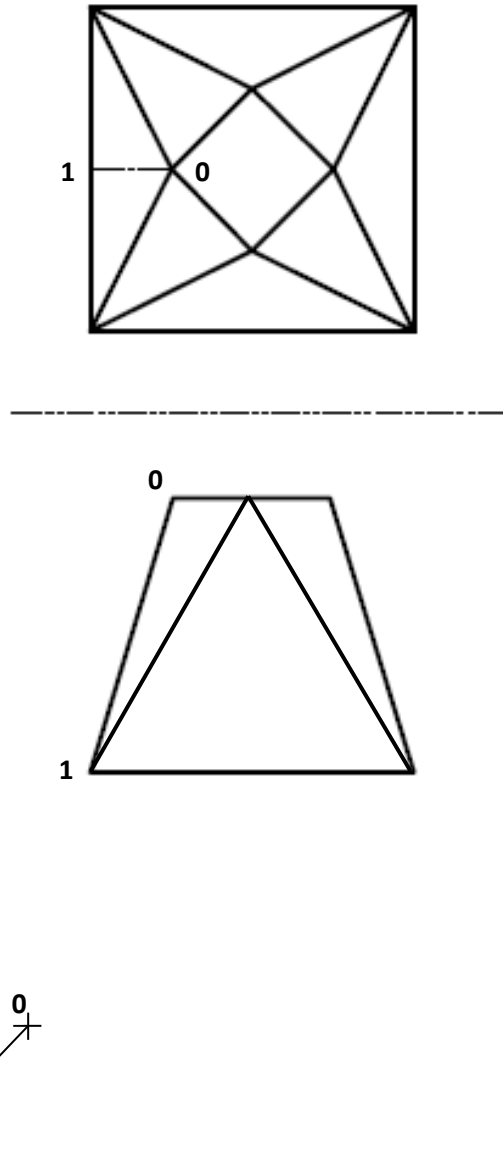


(3 marks)

G) The complete plan and elevation of a square to square transition piece is given in 3<sup>rd</sup> angle projection.

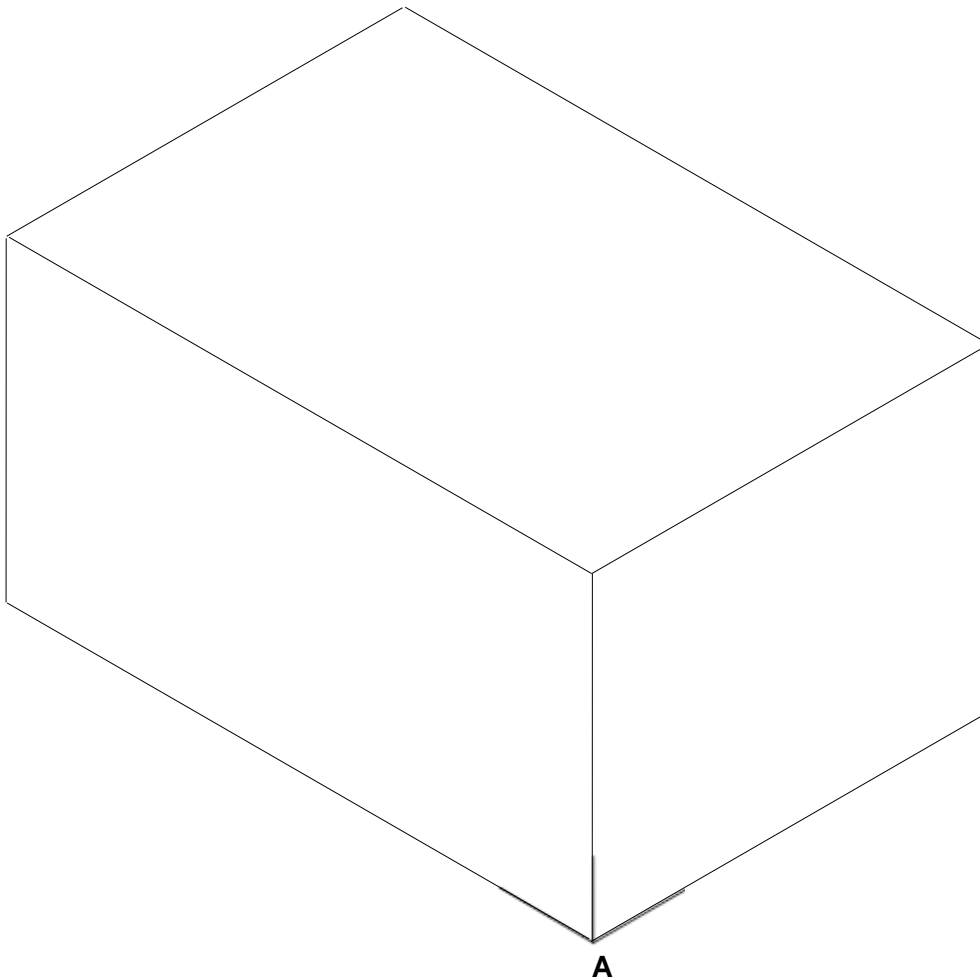
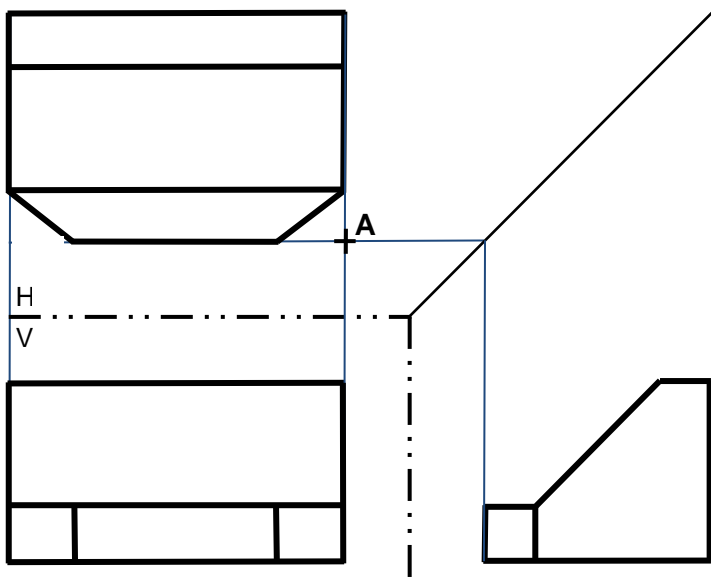
(i) Use geometrical constructions to find the true lengths. (2 marks)

(ii) Construct **half** development starting from seam **01** and using the starting line given below. (4 marks)

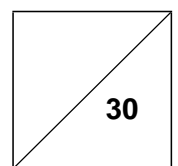


- H) A simple **Shaped Block** is drawn in 3<sup>rd</sup> angle orthographic projection to a scale of 1:1, the isometric box drawn to a scale of 2:1 and starting point **A**.

Interpret the orthographic views by drawing the **Shaped Block** in isometric drawing using the starting point **A** and the isometric box given below, to a scale of 2:1.



(4 marks)

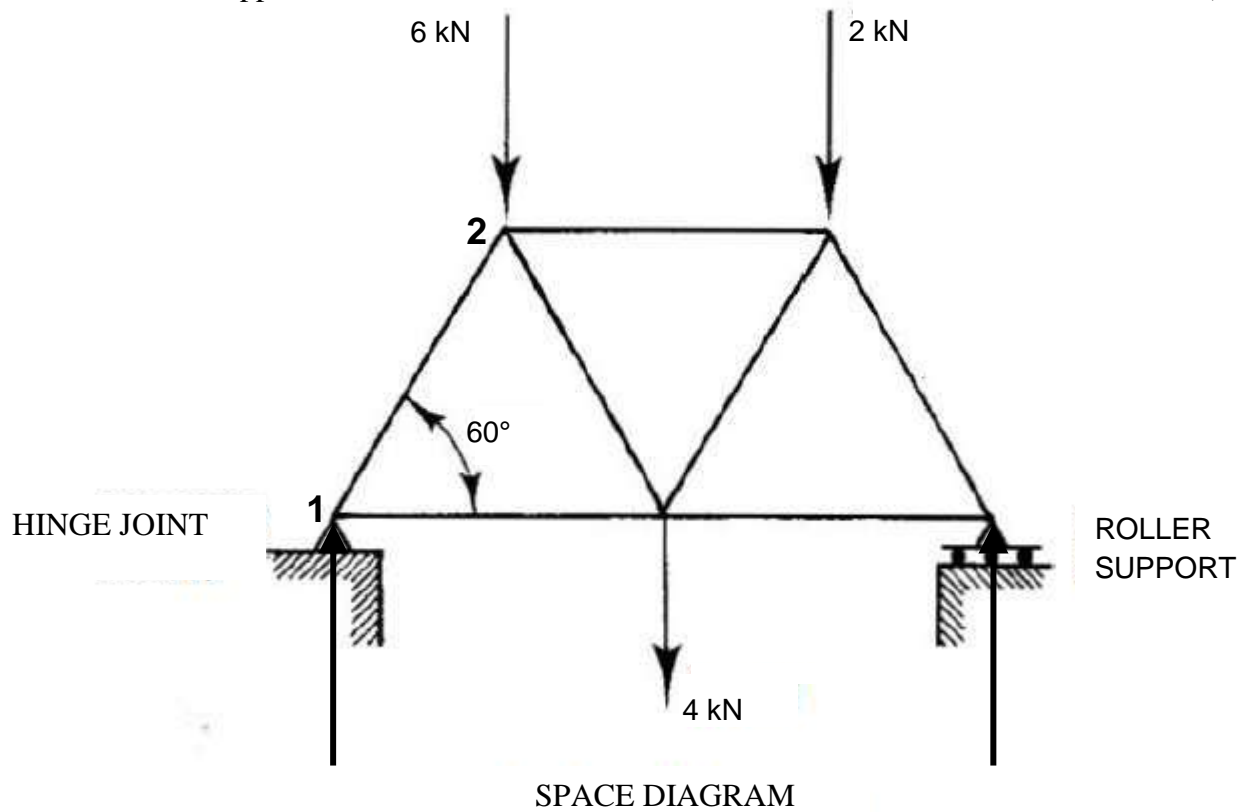


**QUESTION B11****LONG ANSWER QUESTIONS****(10 marks)**

A) The diagram given below shows a simple support truss.

i. Name the truss using Bow's Notation. (1 mark)

ii. Evaluate the magnitude of the reactions  $R_L$  and  $R_R$  at the supports. (4 marks)



$R_L =$  \_\_\_\_\_

$R_R =$  \_\_\_\_\_

Scale \_\_\_\_\_

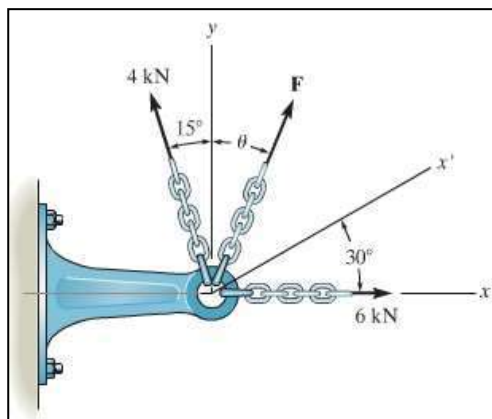
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iii. Describe the **nature** of the member marked **1, 2**.

Nature = \_\_\_\_\_

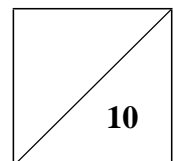
(2 marks)

- B) Three forces act on the bracket shown below. Apply graphical or analytical methods to find the magnitude of **F** so that the resultant force is directed along the positive **x'** axis and has a magnitude of 8 kN.



F = \_\_\_\_\_

(3 marks)



Answer ALL questions (B12 – B14)

**QUESTION B12****MULTIPLE-CHOICE QUESTIONS****(10 marks)**

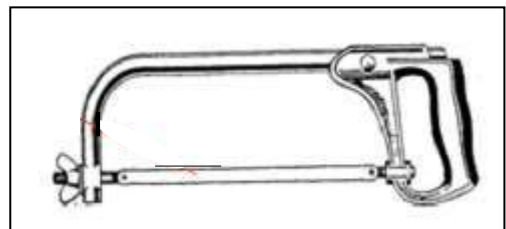
Circle the letter that corresponds to the **best** answer.

1. The safety equipment used for protection in dusty conditions is a
  - A. muff.
  - B. musk.
  - C. glove.
  - D. hard hat.
  
2. Materials that have good ductility and toughness are classified as
  - A. metals.
  - B. polymers.
  - C. ceramics.
  - D. composites.
  
3. The process that is used to soften a material by heating below its recrystallisation temperature and cooling slowly is known as
  - A. normalizing.
  - B. quenching.
  - C. tempering.
  - D. annealing.
  
4. The process of forming the machine components shown in the diagram given below is
  - A. forging.
  - B. drawing.
  - C. extrusion.
  - D. calendering.



5. Which of the following classes does the tool shown below belong to?

- A. drilling
- B. testing
- C. cutting
- D. marking



6. The picture on the right is a \_\_\_\_\_ machine.

- A. lathe
- B. press
- C. folding
- D. guillotine

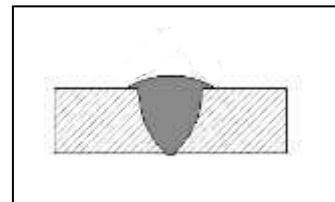


7. The method of joining metals using oxy-acetylene is called \_\_\_\_\_ welding.

- A. arc
- B. gas
- C. butt
- D. spot

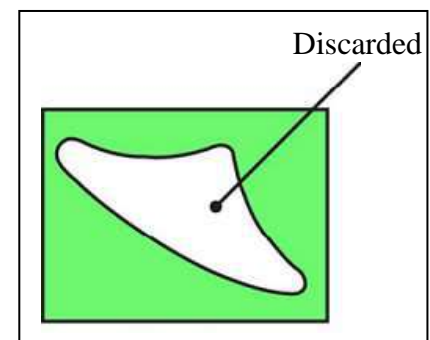
8. Which type of **weld defect** is shown on the right?

- A. crack
- B. overlap
- C. porosity
- D. undercut



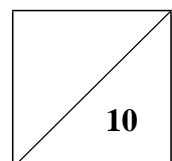
9. The sheet metal process shown on the right is known as

- A. slitting.
- B. blanking.
- C. punching.
- D. perforating.






10. The process used to perform internal threads in existing holes is

- A. grooving.
- B. reaming.
- C. tapping.
- D. boring.



**QUESTION B13****SHORT ANSWER QUESTIONS****[30 marks]**

A) Describe the process been carried in each of the diagrams below.

DIAGRAM	DESCRIPTION OF PROCESS
i. 	     (2 marks)
ii. 	     (2 marks)
iii. 	     (2 marks)

B) Give **one** reason why it is highly recommended to use a well mounted vice to grip your piece while working on it.

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(1 mark)



C) Differentiate between **ferrous** and **non-ferrous** metals.

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(3 marks)

D) Define the term **plastic deformation**.

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(1 mark)

E) Differentiate between **brittleness** and **ductility**.

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(3 marks)

F) Describe **one** effect of internal stresses on metals.

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(2 marks)

G) Name the parts of the machine given below and state its main function.



A: \_\_\_\_\_

B: \_\_\_\_\_

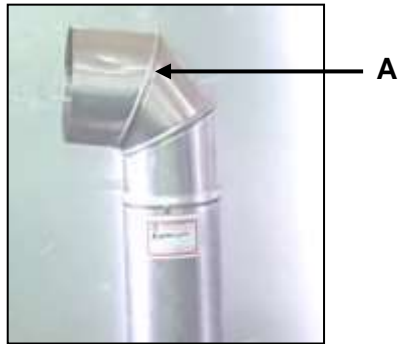
C: \_\_\_\_\_

D: \_\_\_\_\_

Main Function \_\_\_\_\_

(5 marks)

- H) Design a suitable sheet metal joint to be used at **A** including a tool and fastening method to be used in constructing the product shown.



Design of sheet metal joint	Design of tool used
Design of fastening method used	

(3 marks)

I) Porosity is a common welding problem as shown in the diagram below.



i. Analyse **one** cause of porosity.

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(3 marks)

ii. Give **one** solution that should be done to prevent or rectify the problem in (i).

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(1 mark)

J) Describe the process of applying a metal finish on the surface known as **electroplating**.

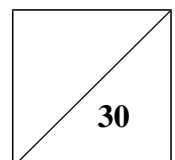
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(2 marks)



**QUESTION B14****LONG ANSWER QUESTIONS****(10 marks)**

- A) The diagram of a **dust pan** made of metal and wood with its specifications are shown below. Study the diagram and answer the questions that follow.

**Specifications:**

Sheet metal: (Aluminium)  
 Length = 300 mm  
 Width = 200 mm  
 Height = 60 mm  
 Wooden handle:  
 Length = 150 mm  
 Width = 40 mm  
 Thickness = 20 mm

- i. Using the information given above, complete the table below.

Member	No	Material	Finished size		
			L	W	TH/ H
Sheet metal	1		300	200	60
Wooden handle	1	Mahogany	150		20

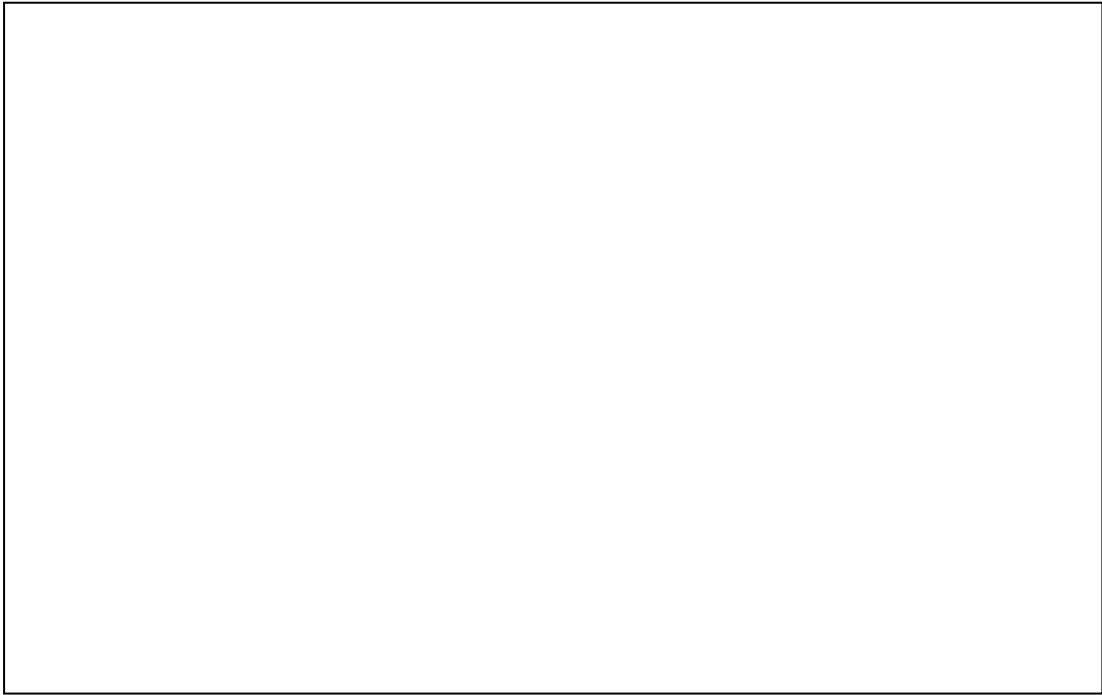
(2 marks)

- ii. Calculate the cost of the **dust pan**.

Prices	Calculation	Cost
Sheet metal is \$65.00/m <sup>2</sup>		
Wooden handle is \$10.00/m		
<b>TOTAL</b>		

(3 marks)

- iii. Interpret the **dust pan** by drawing its development including seams of 30 mm thickness to a reduction scale of 1:5.

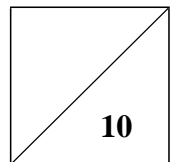


(4 marks)

- iv. State a suitable joint that can be used for the edges of the **dust pan**.

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(1 mark)



# DESIGN TECHNOLOGY

2018

*For Candidate Use*

Number of extra sheets used.  
Write NIL if there are none.

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## FOR MARKER USE ONLY

*Indicate the Major selected in Section B.*

Section		Exam Mark	Check Mark
A			
		50	
B	Major: _____		
		50	
TOTAL			