

MARKER CODE			



Student Personal Identification Number (SPIN)					

TONGA GOVERNMENT
MINISTRY OF EDUCATION AND TRAINING

TONGA FORM SIX CERTIFICATE

2015

DESIGN TECHNOLOGY

QUESTION AND ANSWER BOOKLET

Time allowed: 2 ½ Hours

INSTRUCTIONS

1. Answer ALL questions.
2. This examination has **TWO** Sections. Each section is worth 50 marks

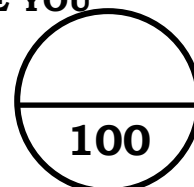
Section	Description	Marks
A	DESIGN UNDERSTANDING	Compulsory. Answer ALL questions.
B	MAJOR OUTCOMES	Choose ONE (Major 1 – Major 6)

Major	Topic	Questions	Pages
1	Wood Technology	B1-B4	9-18
2	Metal Technology	B5-B8	19-28
3	Food and Nutrition	B9-B11	29-34
4	Textiles and Garment Construction	B12-B14	35-40
5	Technical Graphics	B15-B18	41-50

3. Select only ONE major and answer all the questions in that major.
4. Write your answers in the spaces provided in this booklet.
5. Write your **Student Personal Identification Number (SPIN)** in the box at the top right hand corner of this page and on the last page of this booklet.
Check that this booklet contains 53 pages in the correct order. Page 52 - 54 has been deliberately left blank.

**YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR BEFORE YOU
LEAVE THE EXAMINATION ROOM.**

TOTAL MARKS



SECTION A: DESIGN UNDERSTANDING**(50 marks)**

Answer ALL questions in this section

Question A1: Multiple Choice**(7 marks)***Circle the letter of the BEST answer.*

1. The main stages in the designing process are

- A. problem, specification and task.
- B. designing, making and evaluating.
- C. evaluating and documenting report.
- D. investigation, processes and developing.

1 mark	
1	
0	
NR	

2. Collecting information about a process is part of

- A. devising process.
- B. evaluation process.
- C. production process.
- D. investigating process.

1 mark	
1	
0	
NR	

3. Modifying a recipe is an example of a

- A. task.
- B. problem.
- C. limitation.
- D. specification

1 mark	
1	
0	
NR	

4. Why is it important to keep records during the process of making the product?

- A. for evaluation.
- B. to calculate cost.
- C. to save energy and time.
- D. in order to see the progress made.

1 mark	
1	
0	
NR	

5. What is the sample used to test a design concept through observation?

- A. Prototype
- B. Designing
- C. Design brief
- D. Specification

1 mark	
1	
0	
NR	

6. The small arrows in the designing process diagram shows the

- A. revisiting of stages.
- B. direction of production.
- C. big picture of the process.
- D. main flow of the designing process.

1 mark	
1	
0	
NR	

7. Two activities taking place during the production process are

- A. repairing task and building a prototype.
- B. building a prototype and investigating solutions.
- C. constructing the product and collecting information.
- D. thinking about the outcome and modifying the product.

1 mark	
1	
0	
NR	

QUESTION A2**(10 marks)**

1. Define and give example of the following terms.

a. Open Design Brief

Definition _____

Example _____

2 marks	
2	
1	
0	
NR	

b. Closed Design Brief

Definition _____

Example _____

2 marks	
2	
1	
0	
NR	

c. Evaluation

Example _____

2 marks	
2	
1	
0	
NR	

2. Explain one (1) task you should perform to keep the workshop or work area in good condition.

2 marks	
2	
1	
0	
NR	

3. Name a material used in Independent project and describe one characteristic that makes it appropriate to the project made.

Name of material: _____

Characteristics: _____

2 marks	
2	
1	
0	
NR	

QUESTION A3 Independent Project**(18 marks)**

Name and use your Independent Project you did this year and answer the following questions.

1. Name the problem statement of your Independent project.

1 mark	
1	
0	
NR	

2. Name any **four (4)** likely outcomes or expectations you used in your Independent Project.

i

ii

iii

iv

4 marks	
4	
3	
2	
1	
0	
NR	

3. Name and explain four (4) sections in the design processes that likely outcomes or expectations are needed.

- i Name of design section

Explanation

2 marks	
2	
1	
0	
NR	

- ii Name of design section

Explanation

2 marks	
2	
1	
0	
NR	

iii Name of design section

Explanation

2 marks	
2	
1	
0	
NR	

iv Name of design section

Explanation

2 marks	
2	
1	
0	
NR	

4. Design Limitation.

a. Give two (2) limitations that may have occurred while undertaking your project.

i

2 marks	
2	
1	
0	
NR	

ii

2 marks	
2	
1	
0	
NR	

b. Explain one (1) limitation you have given in a. above.

1 mark	
1	
0	
NR	

QUESTION A4 Evaluative Project**(15 marks)**

1. Based on the Evaluative Project you have done this year, what comments would you have made for improvement on the product on the following:

- a. Choice of materials.

2 marks	
2	
1	
0	
NR	

- b. Choice of equipment, tools and processes used.

2 marks	
2	
1	
0	
NR	

- c. Quality of workmanship.

2 marks	
2	
1	
0	
NR	

- d. Is there a potential market for the product? Give three reasons for your answer.

3 marks	
3	
2	
1	
0	
NR	

2. Discuss THREE reasons why investigating ideas are vital to the product.

a. Reason 1:

2 marks	
2	
1	
0	
NR	

b. Reason 2:

2 marks	
2	
1	
0	
NR	

c. Reason 3:

2 marks	
2	
1	
0	
NR	

MAJOR 1: WOOD TECHNOLOGY**QUESTION B1.** Multiple Choice**(6 marks)***Circle the letter of the BEST answer.*

1. What factors affect the hardness of timber?

- A. Strength and elasticity.
- B. Toughness and durability.
- C. Colouring and shape of cells.
- D. Wall thickness and size of cells.

1 mark	
1	
0	
NR	

2. What is the main purpose of a material list?

- A. To identify the components.
- B. To assist in the assembly process.
- C. To identify the position of each components.
- D. To identify size, quantity and type of materials.

1 mark	
1	
0	
NR	

3. Which of the following manufactured materials has uniform strength in both directions?

- A. Plywood.
- B. Masonite.
- C. Hardwood.
- D. Particle board.

1 mark	
1	
0	
NR	

4. What type of screw is the most suitable to achieve a flush surface on timber?

- A. Pan head.
- B. Round head.
- C. Raised head.
- D. Countersunk head.

1 mark	
1	
0	
NR	

5. How do you prevent splitting when nailing near the ends of hardwood?

- A. Use a bradawl.
 B. Drill a pilot hole.
 C. Use a lighter hammer.
 D. Use small diameter nails.

1 mark	
1	
0	
NR	

6. In drawing a cabinet top, the length is measured 75 mm.
 If the scale is 1:20 what is the actual length of the cabinet top?

- A. 300 mm.
 B. 750 mm.
 C. 1500 mm.
 D. 3000 mm.

1 mark	
1	
0	
NR	

QUESTION B2.

(16 marks)

- a. Timber Conversion

- i) Complete the table below with the TWO advantages and TWO disadvantages of the two Timber Conversion methods.

	Conversion Method	Advantages	Disadvantages
1	Quarter Sawing (Radial)	1. 2.	1. 2.
2	Flat Sawing (Tangential)	1. 2.	1. 2.

2 marks	
2	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

- iv) Freshly converted timber generally needs to be seasoned before use. Name TWO methods of seasoning and compare them under the following headings:

	Methods of Timber Seasoning	Headings		
		1. COST 	2. DURATION 	3. MOISTURE CONTENT 
1.				
2.				

4 marks	
4	
3	
2	
1	
0	
NR	

- b. Answer the following questions about Timber Moisture Content.

- i) Calculate the percentage moisture content from the given information.

Wet weight of the sample = 130 grams

Dry weight of the sample = 110 grams

(Show all necessary workings)

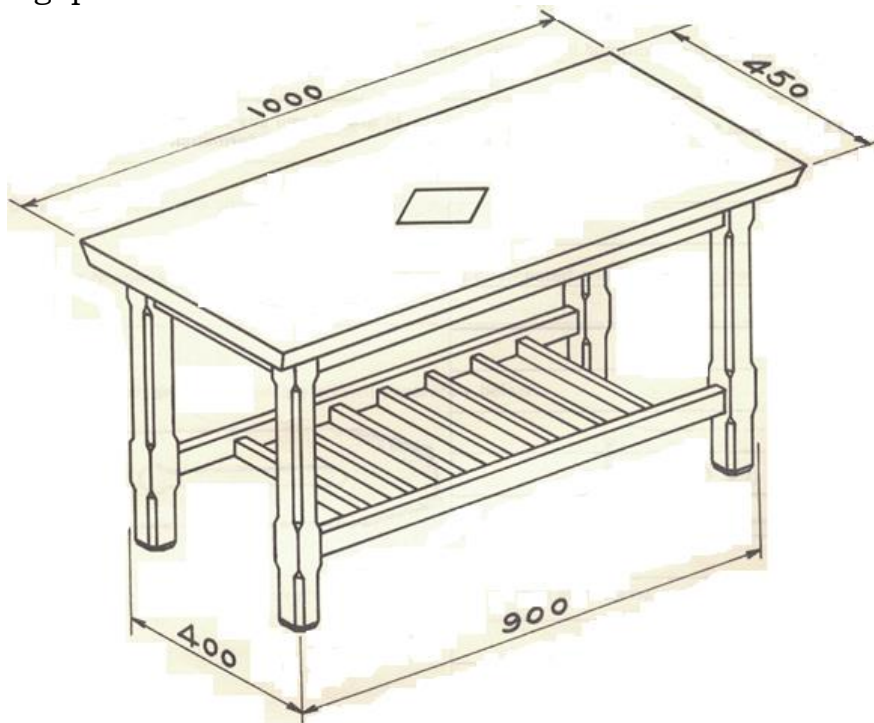
1 mark	
1	
0	
NR	

- ii) Explain the principle of the potential difference in the moisture of timber held within a kiln and the dried air circulating around it.

1 mark	
1	
0	
NR	

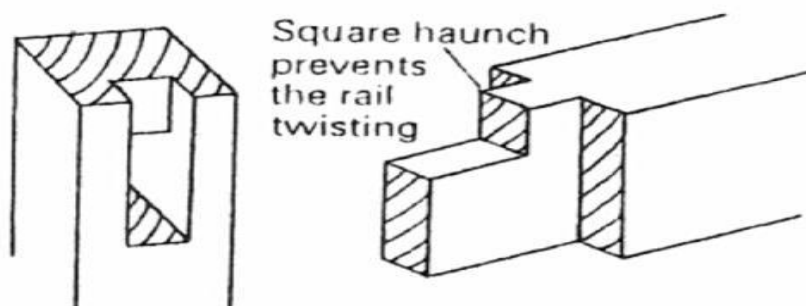
QUESTION B3.**(15 marks)**

1. Study the coffee table with the cutting list given below and answer the following questions.

**Table: Cutting List**

Parts	Quantity	Length (mm)	Width (mm)	Thickness (mm)
Legs	4	400	40	40
Top Side Rails	2	860	50	18
Top End Rails	2	360	50	18
Lower Rails	2	860	30	18
Magazine Slats	7	372	20	10
Top	1	1000	450	25

A sketch of the joint used between the top rail and the leg is given below



1 mark	
1	
0	
NR	

- a) Name the type of joint given above.

1 mark	
1	
0	
NR	

- b) Give 2 reasons why the above joint is suitable for the leg and rail.

- i) _____
- ii) _____

- c) Calculate the cost of timber for the table from the following information.

	Prices	Calculations	Cost
i.	Timber for legs is \$8.20 per metre		
ii.	Timber for top rails is \$4.45 per metre		
iii.	Timber for lower rails is \$3.50 per metre		
iv.	Timber for Magazine slats is \$2.40 per metre		
v.	Material for the top is \$18.00 per square metre		

TOTAL COST = _____

5 marks	i.	ii.	iii.	iv.	v.
1					
0					
NR					

d) Table top

- i) If the table top is made out of plywood, briefly explain how plywood is manufactured and its application.

2 marks	
2	
1	
0	
NR	

- ii) If the table top is made out of solid timber and it is needed to be joint. Name and sketch any **two** typical widening joints.

1. _____

2 marks	
2	
1	
0	
NR	

2. _____

2 marks	
2	
1	
0	
NR	

- e) List the STEPS and hand TOOLS you would use to ***make the joint between the leg and the top rail of the coffee table.*** (Use sketches where necessary.)

Steps	Tools
1.	
2.	
3.	
4.	

2 marks	
2	
1	
0	
NR	

2. Machine Operation

- a. List **four** safety rules that should be observed when operating the wood turning lathe.

- i) _____
- ii) _____
- iii) _____
- iv) _____

2 marks	
2	
1	
0	
NR	

- b. State **four** products that can be produced with the wood lathe.

- i) _____
- ii) _____
- iii) _____
- iv) _____

2 marks	
2	
1	
0	
NR	

3. Finishing

- a. List **four** types of furniture finishes.

- i) _____
- ii) _____
- iii) _____
- iv) _____

2 marks	
2	
1	
0	
NR	

- b. State **two** reasons for applying finishes to furniture.

- i) _____
- _____
- ii) _____
- _____

2 marks	
2	
1	
0	
NR	

- c. Complete the table below with the function of paint components

	Paint Ingredients/Compo nents	Function	2 marks	
1	Drier		2	
2	Pigment		1	
3	Solvent		0	
4	Binder/Vehicle		NR	

MAJOR 2**METAL TECHNOLOGY****QUESTION B5. MULTIPLE CHOICE****(6 marks)**

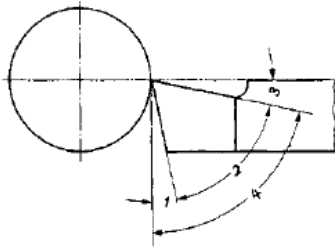
Circle the letter of the *BEST* answer.

1. Materials break under stress without stretching are:

- A. hard.
- B. brittle.
- C. ductile.
- D. malleable.

1 mark	
1	
0	
NR	

2. What is the correct name for the angle marked with “3”?



- A. Rake angle.
- B. Cutting angle.
- C. Clearance angle.
- D. Angle of inclination.

1 mark	
1	
0	
NR	

3. What is the correct name for this type of soldered joint?



- A. Lap joint.
- B. Butt joint.
- C. Face joint.
- D. Folded joint.

1 mark	
1	
0	
NR	

4. What does the expression “M22 x 2” on Nut and Bolt means Metric Thread 22 mm

- A. two starts.
- B. outside diameter, quality grade 2.
- C. outside diameter, pitch of thread 2 mm.
- D. outside diameter, depth of thread 2 mm.

1 mark	
1	
0	
NR	

5. Knurling is performed to provide a surface that is

- A. smooth.
- B. easy to grip.
- C. resistant to wear.
- D. quick to finish in a hurry.

1 mark	
1	
0	
NR	

6. What is the correct name for this tool?



- A. Stop drill.
- B. Centre drill.
- C. Double side drill.
- C. Chamfering drill.

1 mark	
1	
0	
NR	

QUESTION B6

(16 marks)

HAND TOOLS

a. Twist Drills

State TWO factors that should be considered in selecting the speed for drilling a hole with a high speed steel (HSS) twist drill.

Factor1: _____

Factor2: _____

1 mark	
1	
0	
NR	

b. Hacksaw

i. What is '**TPI 18**' written on the hacksaw blade?

1 mark	
1	
0	
NR	

- c. Give **either** the correct full name of each of the following tools OR make a sketch of each of them.

1 mark	
1	
0	
NR	

- i. Tool use for dressing the grinding wheel.

- ii. Tool used for making the internal drilled surface smooth.

1 mark	
1	
0	
NR	

- d. **Files**

- i. State the particular feature of the hand file.

1 mark	
1	
0	
NR	

- ii. The life of files depend on how you look after them. Briefly explain how you store files properly.

1 mark	
1	
0	
NR	

- iii. Name 4 specifications of a file.

1.

2.

3.

4.

2 marks	
2	
1	
0	
NR	

- e. **Threads and Screw cutting**

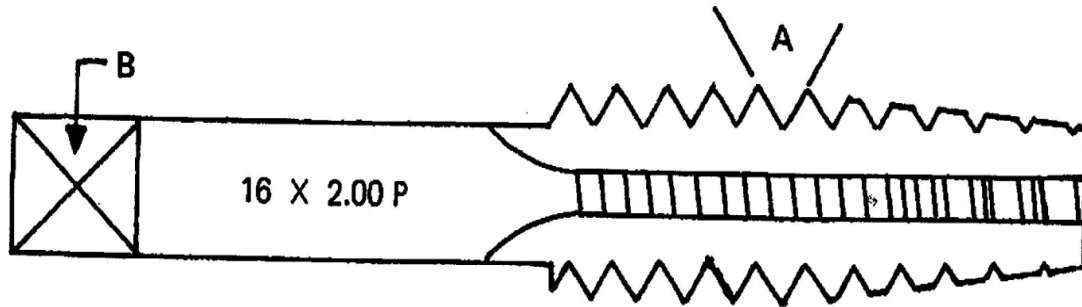
- i. **Drilling Tapping Hole**

An approximate formula for finding the size of the tapping drill is Outside Diameter – Pitch. What is the drill bit required for the 16 mm Tap with 2 mm pitch?

1 mark	
1	
0	
NR	

f. **Tapping**

The diagram shown below is a Taper Tap.



- i. Show clearly on the diagram, what the markings 16 and 2.00P means.

2 marks

2	
1	
0	
NR	

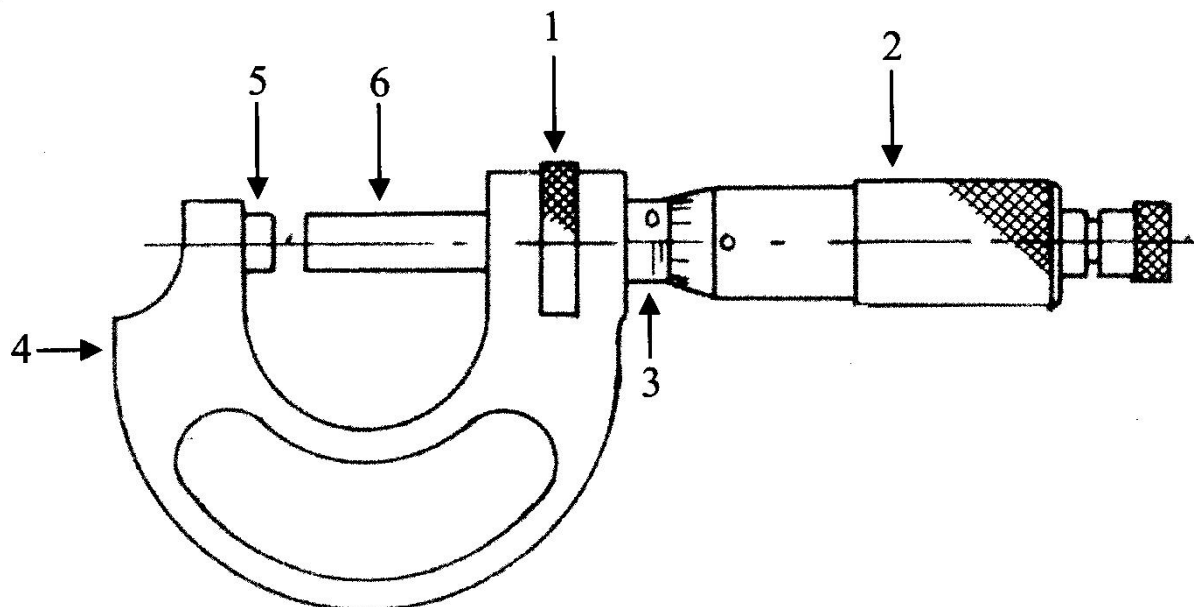
- ii. Explain how the taper tap differs from the second and intermediate tap.

2 marks

2	
1	
0	
NR	

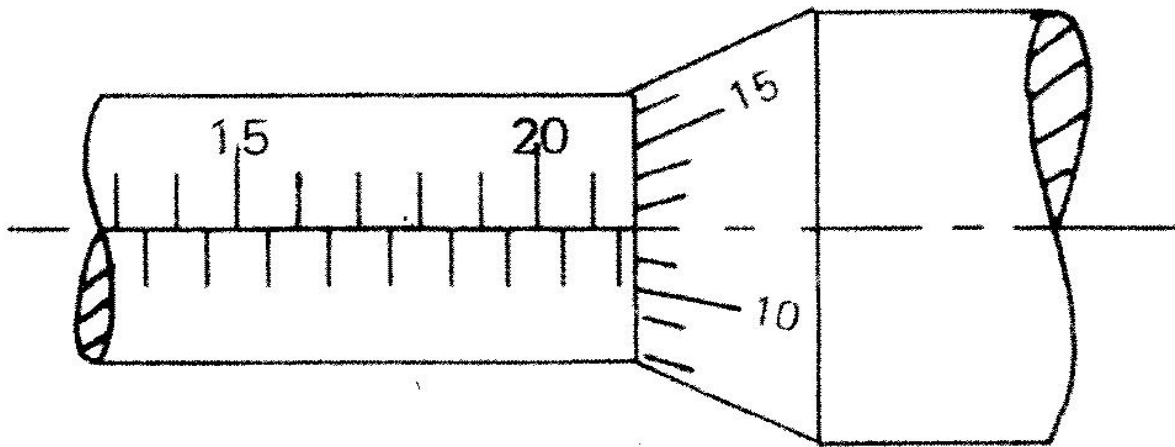
g. **Outside Micrometre**

- i) Name the corresponding numbered parts of the micrometre in the table shown below. An example is provided.



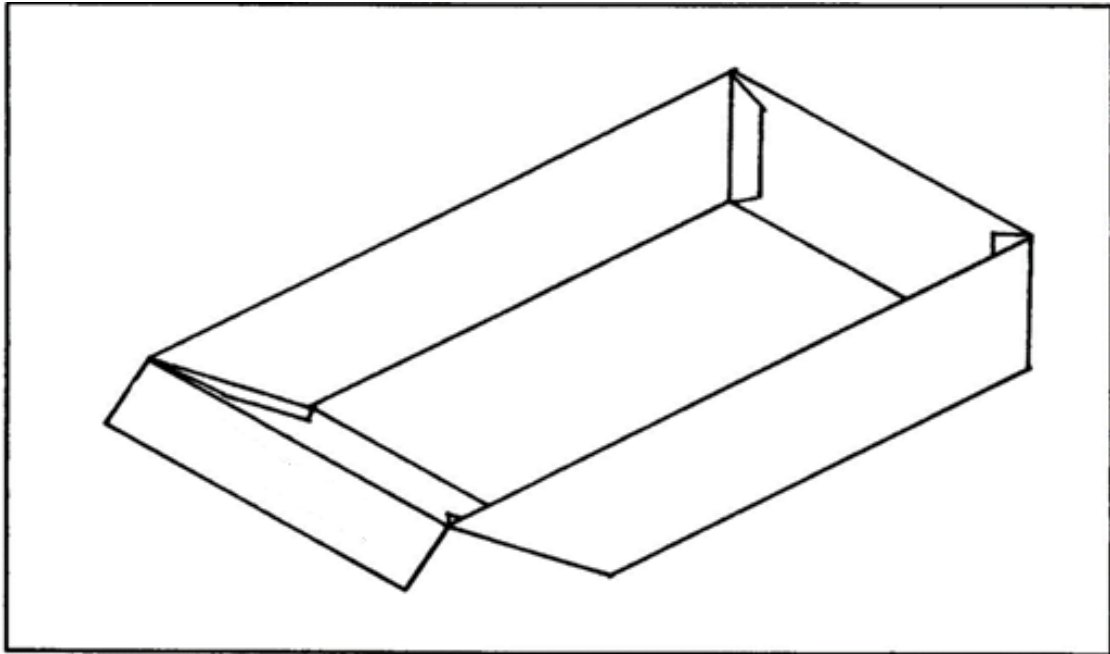
Number	Part
1	Locking Ring
2	Barrel
3	Thimble
4	
5	
6	
7	

2 marks	
2	
1	
0	
NR	



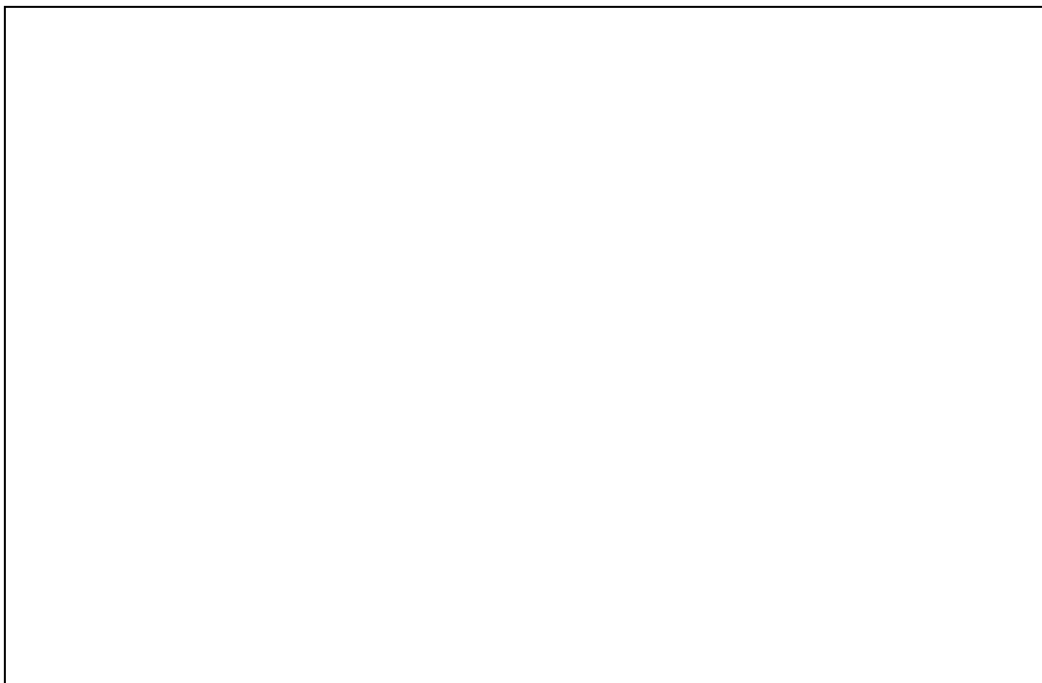
- ii) The reading on the enlarged sketch of the thimble and the barrel above is _____ mm.

1 mark	
1	
0	
NR	

QUESTION B7**(18 marks)****Sheet Metal Working: "TRAY"****a. Development**

Make a suitable freehand sketch to show a one piece layout development for the **ODDS & ENDS** as shown above.

Show all necessary joining laps for making the laps joints prior to soldering.
No dimensions are required. Keep the shape in proportion.



3 marks	
3	
2	
1	
0	
NR	

b. **Soft Soldering**

Because all necessary equipment is available it is decided to soft solder the joints of the Tray

- i. The soft solder used is 50/50. Briefly explain what 50/50 soft solder means.

- ii. When a soldered joint is to be made as strong as possible the laps are “tinned” first. Explain step by step how the tinning process is carried out.

Step1. _____

Step2. _____

Step3. _____

1 mark

1

0

NR

3 marks

3

2

1

0

NR

c. **Oxy-Acetylene Welding**

- i. The oxy-acetylene equipment in most schools is fitted with flash-back arrestors. Explain their purpose.

1 mark

1

0

NR

- ii. Name the correct tool used to clean a blocked welding torch tip.

1 mark

1

0

NR

- iii. A partly blocked welding torch may occasionally ‘pop’ or backfire. Name 2 other causes of ‘popping’ or ‘back firing’.

1. _____

2. _____

2 marks

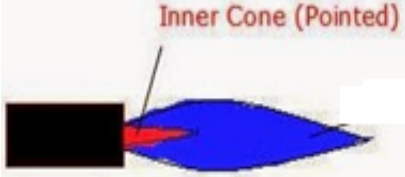
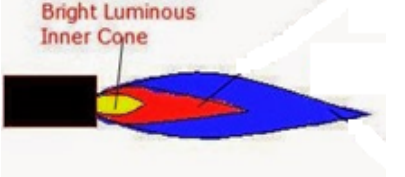
2

1

0

NR

- iv. Complete the table below with the correct name and **one** use of the oxy-acetylene flames.

	Types of Flame	Name of Flame	Use of Flame
1			
2			
3			

3 marks	
3	
2	
1	
0	
NR	

d. Electric Welding

- i. Briefly explain why oxy-acetylene welding goggles are not adequate protection for electric welding.

1 mark	
1	
0	
NR	

- ii. “Suitable safety clothing must be worn when welding”. Apart from a face mask, give 2 other items of safety wear that would be necessary.

1.

2.

1 mark	
1	
0	
NR	

- iii. List 2 functions of the flux used in Electric arc welding.

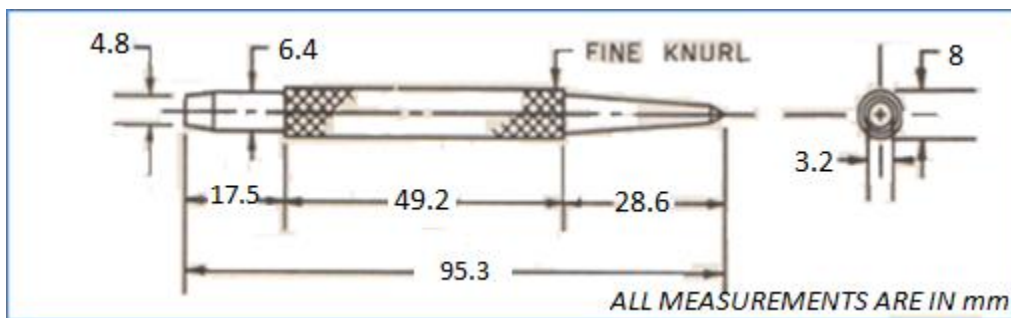
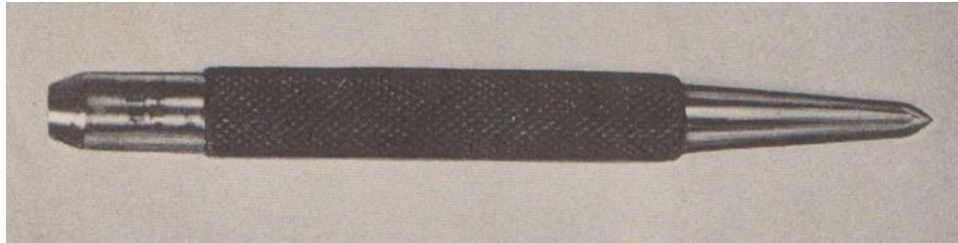
1.

2.

2 marks	
2	
1	
0	
NR	

QUESTION B8:**(10 marks)****Metal Turning Processes**

Given below is the picture and a drawing of a centre or prick punch. You are asked to produce this centre punch using a centre lathe.



- a) Complete the order of how you make the centre punch on the centre lathe, first and last steps are given.

- i. ***Facing work piece held in a chuck***
- ii. _____
- iii. _____
- iv. _____
- v. _____
- vi. ***Chamfering.***

4 marks	
4	
3	
2	
1	
0	
NR	

- b) Work Piece can be held in one of the following chucks for machining in a lathe. Briefly describe how these 3 chucks works.

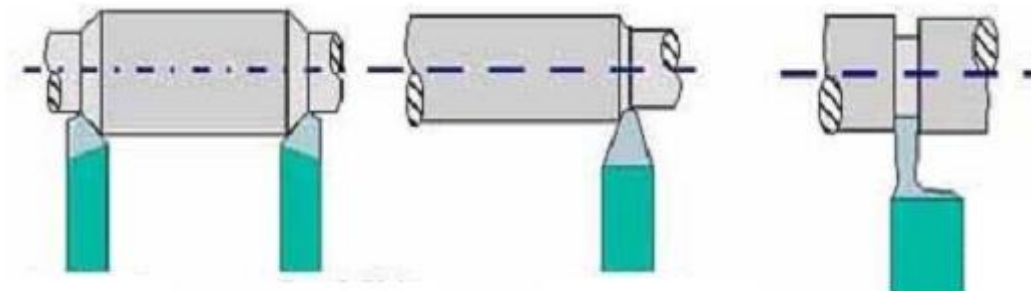
Three jaw self-centred chuck:

Four jaw independent chuck:

Collect chuck:

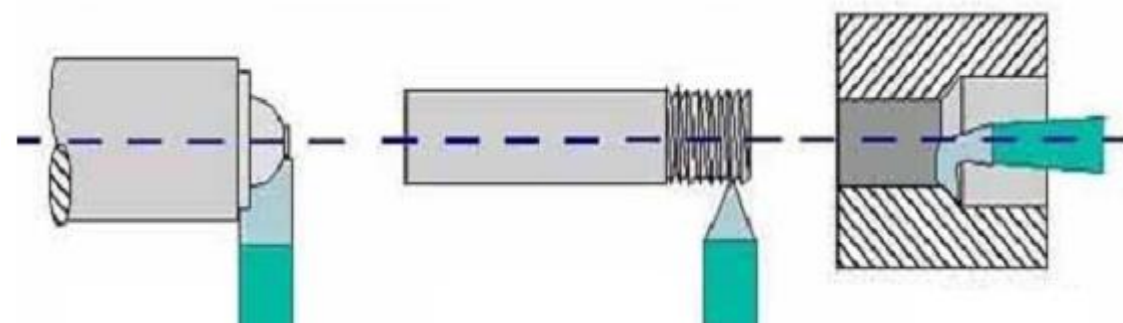
3 marks	
3	
2	
1	
0	
NR	

- c) Name the lathe cutting tool given below.



1. _____ 2. _____ 3. _____

3 marks	
3	
2	
1	
0	
NR	



4. _____ 5. _____ 6. _____

MAJOR 3 FOOD AND NUTRITION (50 MARKS)
 Answer ALL questions in this section

Question B9 Essential Nutrients (16 marks)

1. Below is a table showing Vitamins and their functions with an example of its food sources. Complete the table by filling in the blank boxes with ONE function and TWO food sources.

Vitamin	Function	Food Source	2 marks	
Vitamin A	(i)	Egg yolk, green vegetables	2	
			1	
Vitamin B1	(ii)	Beans, milk	0	
			NR	

2. Explain ONE function of each of the following minerals.

- i. Calcium:

- ii. Iron:

- iii. Water:

3 marks	
3	
2	
1	
0	
NR	

3. Match deficiency problems in **List A** with the correct explanation in **List B** by writing the letter of the correct explanation from List B in the boxes provided next to the problems in List A.

List A		List B
i.	Anaemia	a) Is a result of calcium deficiency over a long periods of time
ii.	Osteoporosis	b) A health condition caused by lack of dietary protein both quality and quantity
iii.	Tooth decay	c) A serious problem caused by lack of iron in the diet
iv.	Kwashiorkor	d) Occurs when the intake of nutrients is less than that required by the body
v.	Undernutrition	e) Caused by lack of vitamin D in the body.

5 marks	i.	ii.	iii.	iv.	v.
1					
0					
NR					

4. Explain why school age children need to have enough of the following nutrients in their daily diet?

Protein:

1 mark	
1	
0	
NR	

Carbohydrates:

1 mark	
1	
0	
NR	

5. What should a pregnant mother do if she experiencing constipation?

2 marks	
2	
1	
0	
NR	

6. Explain why it is important for elderly people to reduce intake of energy-dense foods like sweets and fatty foods?

2 marks	
2	
1	
0	
NR	

Question B10**Food Quality and Food Preparation****(19 marks)**

1. For each of the preserved food listed in the table below, i) identify the traditional method of food preservation used and ii) state the reason of preservation.

Food preserved	Traditional preservation method	Reason of preservation method
Fish		
Cassava/tabiocca		

4 marks	
4	
3	
2	
1	
0	
NR	

2. It is highly recommended to avoid thawed and refrozen any frozen foods. Give TWO reasons why?

2 marks	
2	
1	
0	
NR	

3. Many families consume a lot of processed foods such as noodles and tin fish. Complete the table below with 2 advantages and 2 disadvantages of food processing.

Advantages	Disadvantages
i.	i.
ii.	ii.

4 marks	
4	
3	
2	
1	
0	
NR	

4. Leaving the pot open while cooking vegetables is not good. Give TWO reasons why this is not a good practice?

2 marks	
2	
1	
0	
NR	

5. Discuss TWO reasons why fruits and vegetables are recommended NOT to be soaked but to be washed under clean, running tap water.

2 marks	
2	
1	
0	
NR	

6. Give ONE hygienic practice when preparing food. Explain the importance to the food product and the needs of the community.

Practice: _____

Importance: _____

3 marks	
3	
2	
1	
0	
NR	

7. To prepare a healthy meal for your family, it is important to use very little fat and salt when cooking. Explain TWO reasons for this advice.

Reason 1

Reason 2

2 marks	
2	
1	
0	
NR	

Question B11 Food related diseases and solution (15 marks)

1. Non-Communicable Diseases (NCDs) is now a national issue here in Tonga as it caused most people die at early age. Name and explain TWO risk factors associated with NCDs.

Risk factor 1: _____

Explanation

Risk factor 2: _____

Explanation

1 mark	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

1 mark	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

2. **Diabetic** is one of the most popular non communicable diseases amongst Tongan due to their eating habit.

a. Define Diabetic:

1 mark	
1	
0	
NR	

- b. Write down a lunch menu that is appropriate for a diabetic woman's diet. Explain your food choice.

Menu:

2 marks	
2	
1	
0	
NR	

Reason:

2 marks	
2	
1	
0	
NR	

3. Discuss the relationship between food, food production, consumption and health using key words in the box below.

nutrients	hygiene
diseases	portion
safety	health

4 marks	
4	
3	
2	
1	
0	
NR	

MAJOR 4 TEXTILES AND GARMENT CONSTRUCTION (50 MARKS)

Answer ALL questions in this section

Question B12 Textiles Properties & Fabric Construction (11 marks)

1. Cotton fabric is mostly used here in Tonga as its characteristics fits well with our weather. Explain TWO good and TWO poor properties of cotton fibre.

Good Properties

- i. _____
- ii. _____

2 marks	
2	
1	
0	
NR	

Poor Properties

- i. _____
- ii. _____

2 marks	
2	
1	
0	
NR	

2. Complete the table below by describing each of the terms.

Term	Description
Bias	
Elasticity	
Resilience	
Absorbency	

2 marks	
2	
1	
0	
NR	

3. Fabric made from a wool and cotton blend usually light and comfortable to wear.

- a. What could you make from this fabric?

1 mark	
1	
0	
NR	

- b. How would you launder this fabric?

1 mark	
1	
0	
NR	

4. a. What would be the best fabric to use when making a pair of overalls for a 4 year old boy to wear to preschool?

1 mark	
1	
0	
NR	

- b. Give TWO reasons why you choose that fabric using its properties.

2 marks	
2	
1	
0	
NR	

Question B13

Design Principles and Elements

(18 marks)

1. Explain the terms in the box below and give examples or sketches to illustrate your answers.

Terms	Explanations	Examples
Symmetrical		
Asymmetrical		
Texture		

2 marks	
2	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

2. Describe what happens to the figure when wearing fabric with the following Prints.

a. Vertical stripes

b. Horizontal stripes

c. Large prints

3 marks	
3	
2	
1	
0	
NR	

3. Explain how could you use design to emphasise a person with the following body features:

a. Attractive faces

b. Slim waistline

c. Attractive legs

3 marks	
3	
2	
1	
0	
NR	

4. Give ONE design principle used and the purpose of using it in your garment project.

Design Principle: _____

Purpose: _____

2 marks	
2	
1	
0	
NR	

5. Describe the shape of your garment and how good it is, compared to the client's body shape.

2 marks	
2	
1	
0	
NR	

6. Give ONE decoration technique and its effect on the garment and the client.

Decoration Technique:

Effect:

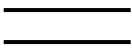
2 marks	
2	
1	
0	
NR	

Question B14 Garment Construction and Techniques (21 marks)

1. Explain ONE difference between commercial pattern and free-hand cutting pattern.

2 marks	
2	
1	
0	
NR	

2. Name the symbols in the table below and describe the purpose of the pattern symbols.

Symbols	Names	Purpose
1. 		
2. 		
3. 		

6 Marks	1.	2.	3.
2			
1			
0			
NR			

3. List THREE equipments you used during garment production and their purpose

Equipments	Purpose
1.	
2.	
3.	

3 marks	
3	
2	
1	
0	
NR	

4. Give ONE safety rule applied during garment's production and explain its importance to the production process.

Safety rule:

Importance:

1 mark	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

5. Select TWO best methods of transferring pattern symbols. Give the reason for your choices.

Method 1:_____

Reason:_____

Method 2:_____

Reason:_____

4 marks	
4	
3	
2	
1	
0	
NR	

1 mark	
1	
0	
NR	

6. State ONE reason for using interfacing in garment construction.

7. Explain how the following sewing techniques are used on a garment.

i. Overcastting:_____

ii. Slip hemming:_____

2 marks	
2	
1	
0	
NR	

MAJOR 5: TECHNICAL GRAPHICS**(50 MARKS)****Question B15****(12 marks)**

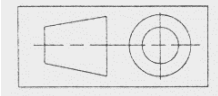
- a. Complete the Table below with ONE application of the following line types.

	Line Types	Line Application
i.	Continuous Thin Line	
ii.	Thin Dashed Line	
iii.	Thick Chain Line	
iv.	Chain Line , Thick at the ends and at change of direction but Thin elsewhere	

2 marks	
2	
1	
0	
NR	

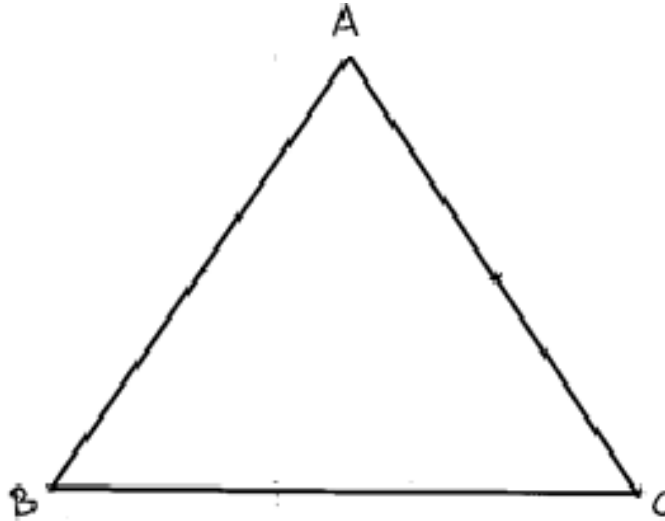
- b. Complete the table below by naming the Application of the following technical drawing symbols, and where each should be placed.

Part iii. has done for you.

	Technical Drawing Symbols	Symbol Application Name	Placement
i.	R		
ii.			
iii.		Slope	<i>Placed in front of the ratio of the slope and indicates the slope direction</i>
iv.			

3 marks	
3	
2	
1	
0	
NR	

- c. Construct a circle to neatly touch the apex of the three corners of the triangle ABC given below.



3 marks	
3	
2	
1	
0	
NR	

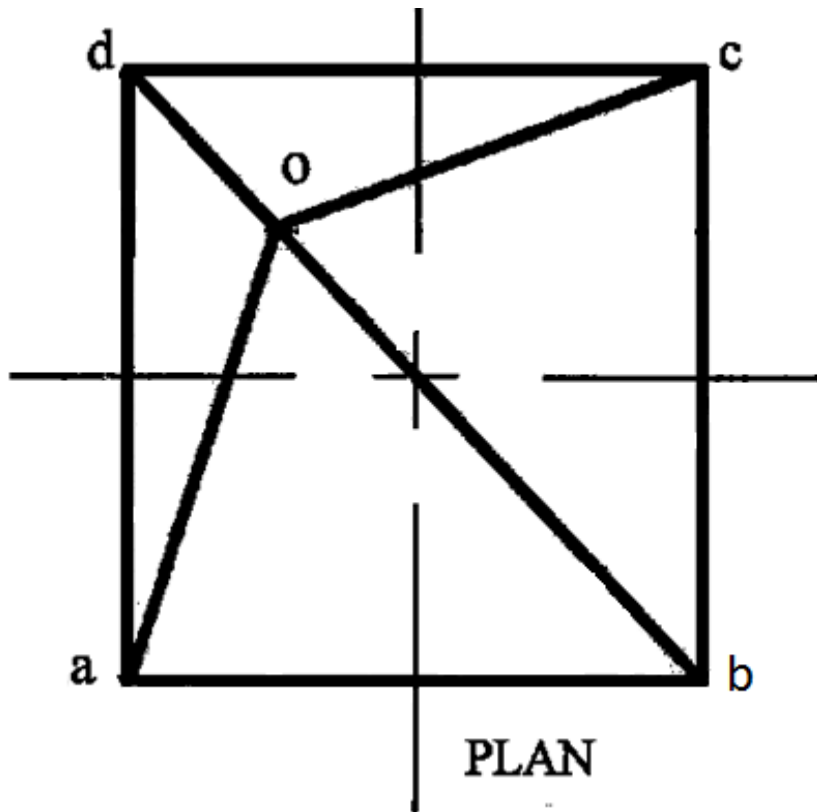
- d. Construct a regular pentagon with 35 mm each side in the space below.

4 marks	
4	
3	
2	
1	
0	
NR	

Question B16**(15 marks)**

a. Study the given Oblique Square Pyramid **Oabcd** and answer the following questions.

i. Find the true length of the given sides of the Square Pyramid.



i) True Length **Oa** = _____ mm

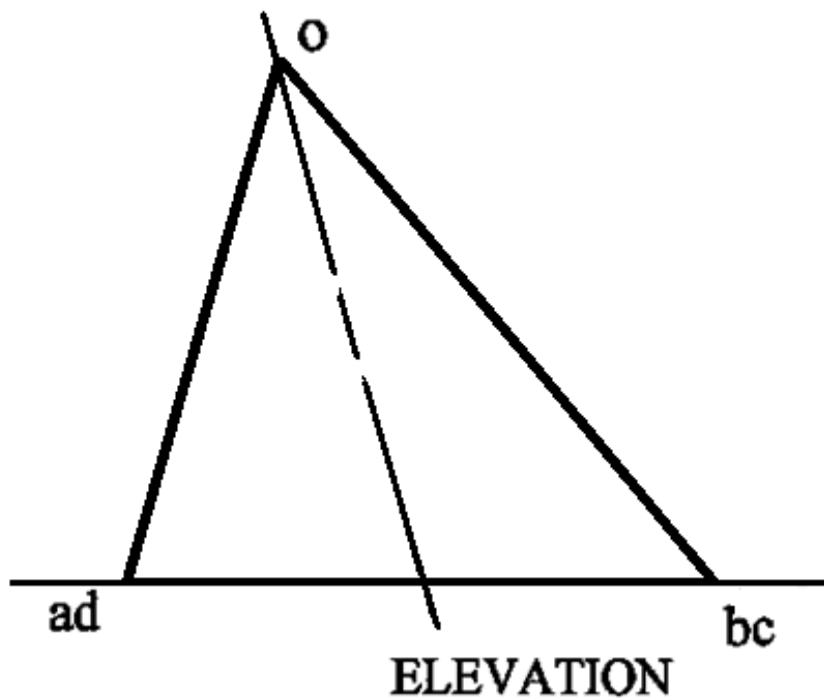
ii) True Length **Oc** = _____ mm

3 marks

3	
2	
1	
0	
NR	

2 marks

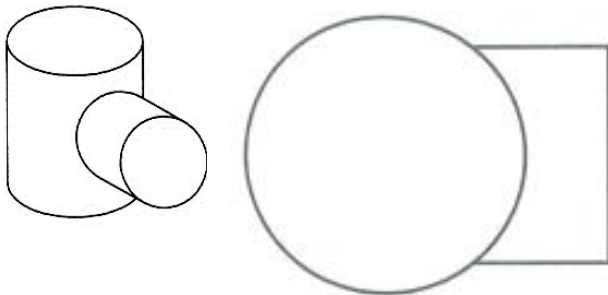
2	
1	
0	
NR	



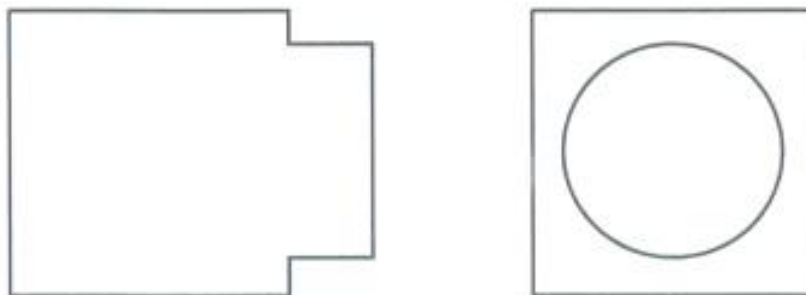
- ii. Draw the development of the given Oblique Pyramid **Oabcd**.

3 marks	
3	
2	
1	
0	
NR	

- b. Given are the plan and incomplete elevation of Interpenetration cylinders. Complete the Elevation by drawing the lines of Intersection. Show all construction lines.



3 marks	
3	
2	
1	
0	
NR	



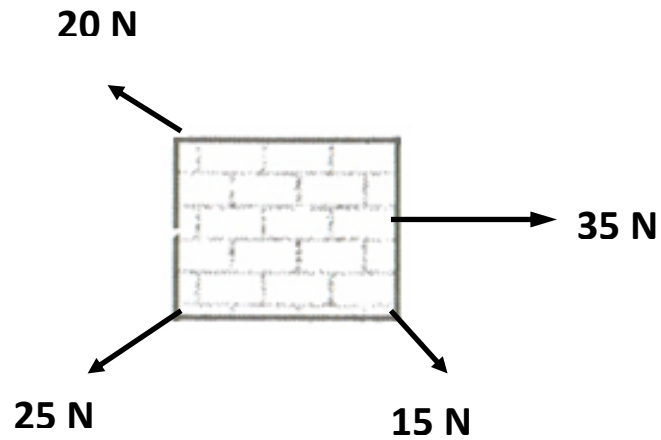
- c. Construct ONE complete turn of a left-handed square section spring, 40 mm outside diameter, 60 mm pitch and made from 5 mm square bar.

4 marks	
4	
3	
2	
1	
0	
NR	

Question B17**(11 marks)**

Vector Diagrams and Forces in Beams

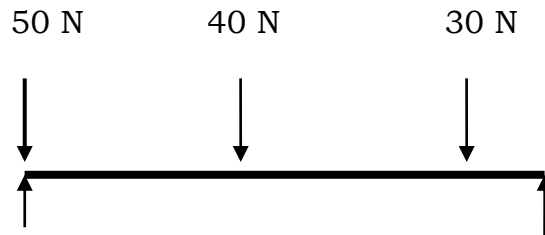
- a. Determine the resultant force, point of application and equilibrium force of the given co-planar, concurrent force system.



4 marks	
4	
3	
2	
1	
0	
NR	

- b. Given below is the Space diagram of parallel forces acting on a beam. Use the Funicular, force and Polar diagram to determine the following:

- i) the position of the resultant force.
 ii) Reaction R_L and R_R at the supports.



$R_L =$ _____

$R_R =$ _____

Scale: _____

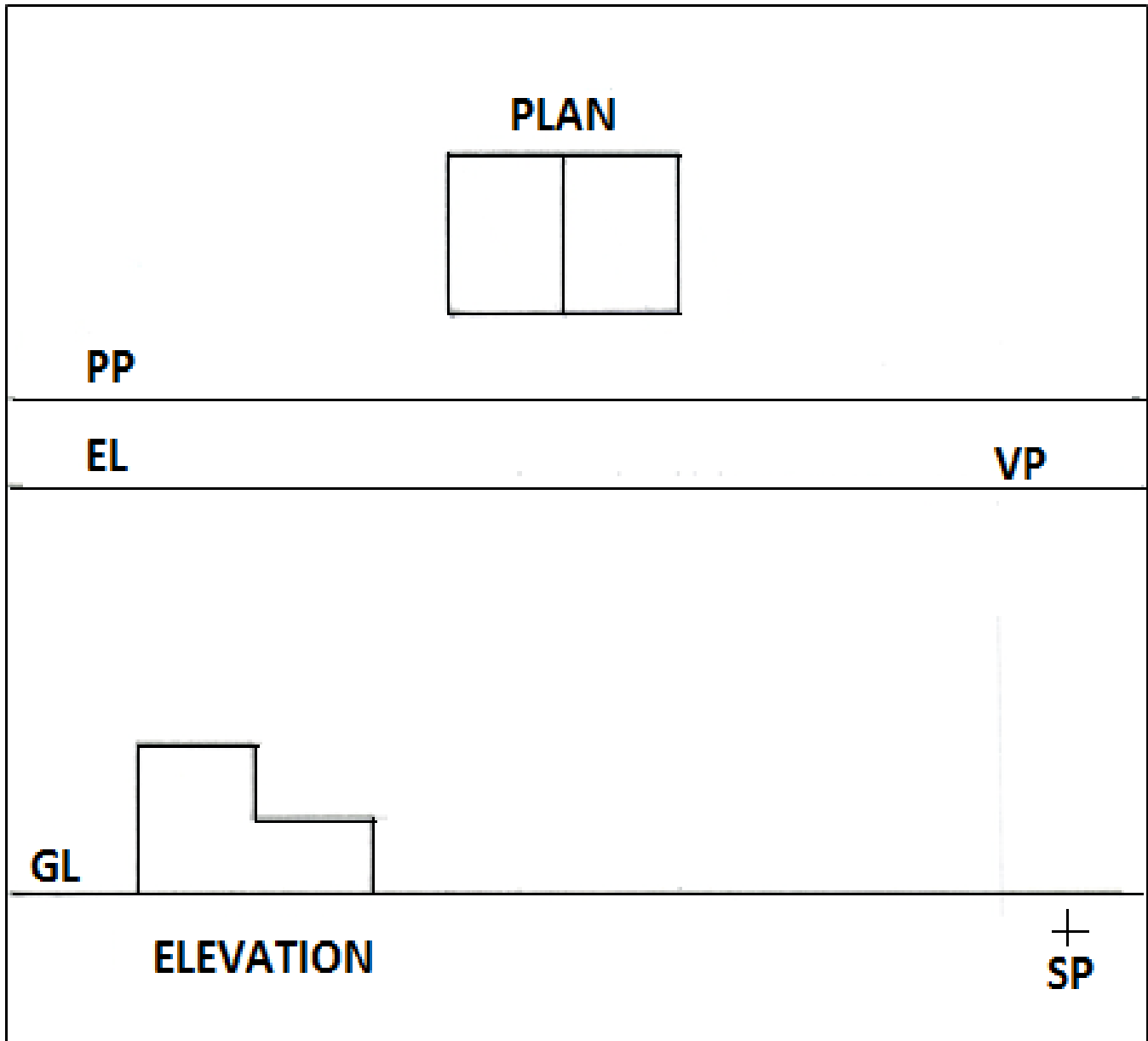
2 marks	
2	
1	
0	
NR	

3 marks	
3	
2	
1	
0	
NR	

2 marks	
2	
1	
0	
NR	

Question B18**(12 marks)**

- a. Draw the given shaped block in One-Point Perspective. Show all construction lines.

**4 marks**

4	
3	
2	
1	
0	
NR	

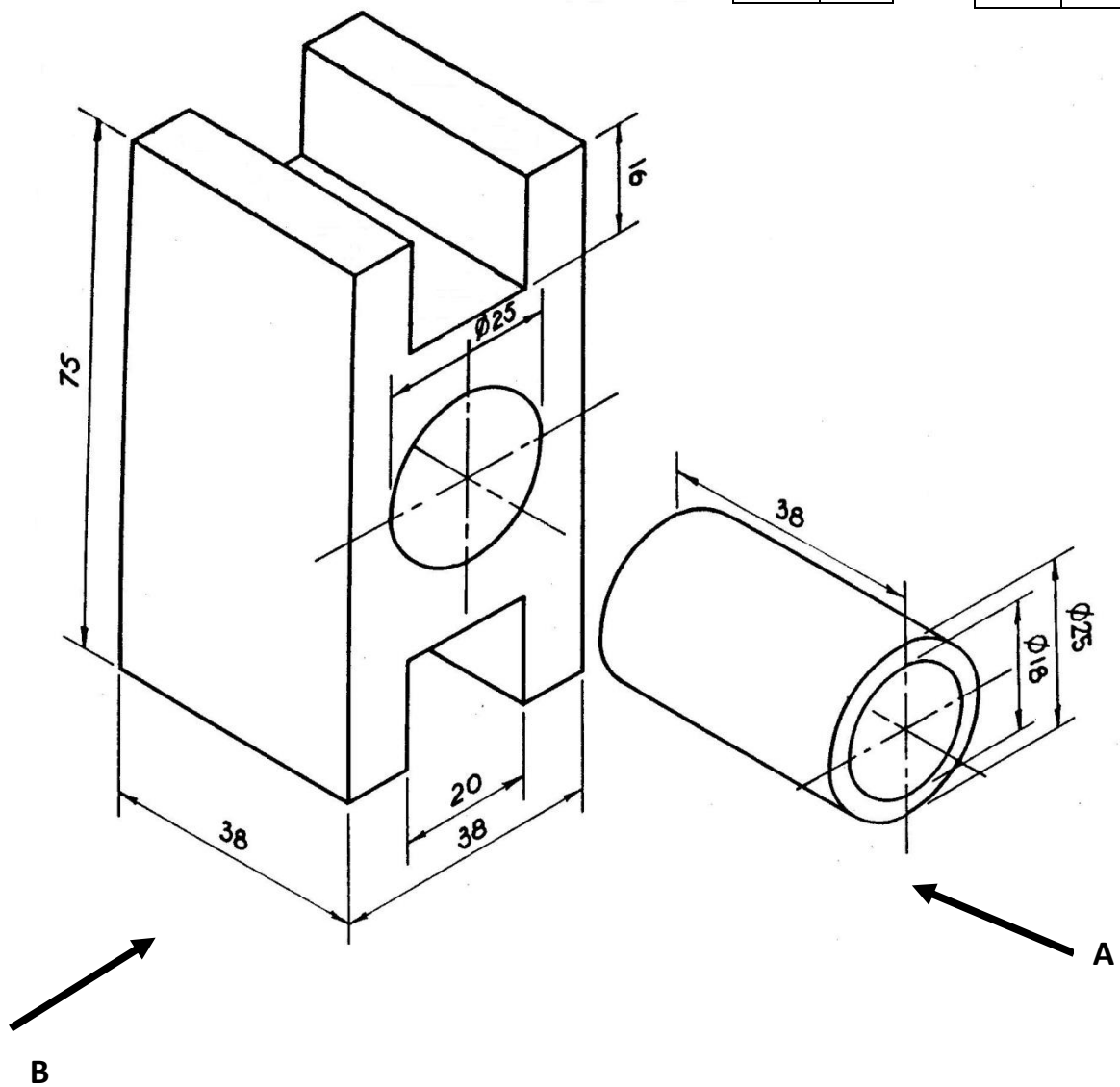
- b. Detail of the component parts of a Bushed Roller Block are given. Draw the following general assembly according to standard in Third Angle Projection:

1. A front view from B
2. A Side view from A

Give 2 dimensions for each view

4 marks	
4	
3	
2	
1	
0	
NR	

4 marks	
4	
3	
2	
1	
0	
NR	



Do Question B13 b) here

THIS PAGE HAS BEEN DELIBERATELY LEFT BLANK.

THIS PAGE HAS BEEN DELIBERATELY LEFT BLANK.

THIS PAGE HAS BEEN DELIBERATELY LEFT BLANK.

Student Personal Identification Number (SPIN)

--	--	--	--	--	--

TONGA FORM SIX CERTIFICATE**2015****DESIGN TECHNOLOGY**

(FOR MARKERS USE ONLY)

SECTIONS		MARK	CHECK MARKER	TOTAL
A				50
B				50
Major 1				50
Major 2				50
Major 3				50
Major 4				50
Major 5				50
TOTAL MARKS				100