

| MARKER CODE |  |  |  |  |
|-------------|--|--|--|--|
|             |  |  |  |  |



| Student Enrolment Number (SEN) |  |  |  |  |  |  |  |
|--------------------------------|--|--|--|--|--|--|--|
|                                |  |  |  |  |  |  |  |

# TONGA FORM SIX CERTIFICATE

## 2017

## DESIGN TECHNOLOGY

### QUESTION AND ANSWER BOOKLET

**Time allowed:** 3 Hours

#### INSTRUCTIONS:

1. Answer ALL questions.
2. This examination has **ONE** Section with **FIVE MAJOR AREAS**.

| Section  | Description    | Marks                                 |
|----------|----------------|---------------------------------------|
| <b>A</b> | MAJOR OUTCOMES | Choose <b>ONE</b> (Major 1 – Major 5) |

| Major    | Topic                                    | Pages        |
|----------|------------------------------------------|--------------|
| <b>1</b> | <b>Wood Technology</b>                   | <b>2-14</b>  |
| <b>2</b> | <b>Metal Technology</b>                  | <b>15-25</b> |
| <b>3</b> | <b>Food and Nutrition</b>                | <b>26-35</b> |
| <b>4</b> | <b>Textiles and Garment Construction</b> | <b>36-45</b> |
| <b>5</b> | <b>Technical Graphics</b>                | <b>46-62</b> |

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 Enrolment Number (SEN)** in the box at the top right hand corner of this page.
6. Check that this booklet contains **63** pages in the correct order and that page 63 has been deliberately left blank.

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

## MAJOR AREA 1: WOOD TECHNOLOGY

### A. Multiple Choice Questions:

**Circle the letter with the most correct answer.**

1. Which of the following hand tool is a cutting tool?

- A. Wooden Ruler
- B. Claw Hammer
- C. Wood Chisel
- D. Try Square

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

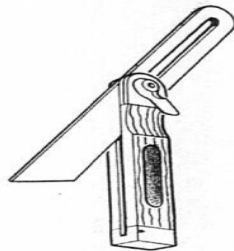
2. Which of the following hand tools is a testing tool?

- A. Wooden Ruler
- B. Claw Hammer
- C. Wood Chisel
- D. Try Square

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

3. What is the correct name for the hand tool given below?

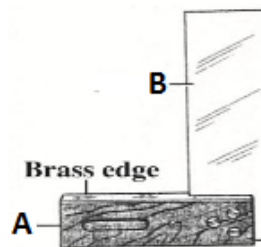
- A. Try Square.
- B. Marking Gauge.
- C. Sliding Bevel
- D. Straight Edge.



| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

4. What is the name of the part with label A of the hand tool given below?

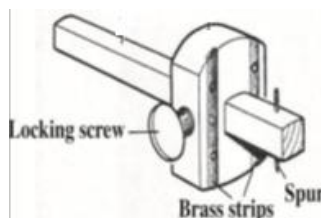
- A. Stem
- B. Stock
- C. Blade
- D. Handle



| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

5. What is the correct name for the hand tool given below?

- A. Try Square.
- B. Marking Gauge
- C. Sliding Bevel
- D. Straight Edge



| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

6. What Stage of the design process where ***“Think about the outcome”*** took place?

- A. Designing
- B. Investigating
- C. Making
- D. Evaluating

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

7. What Stage of the design process where ***“Note Expectations about the solution”*** took place?

- A. Investigating
- B. Devising
- C. Making
- D. Evaluating

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

## B. Short and Long Answer Questions.

Answer **ALL** the questions.

### 1. Design

a. Define the term *investigating*.

---

---

---

---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

b. Briefly describe the stage of **making or producing** in the design process.

---

---

---

---

---

---

---

---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

c. Evaluate the outcome of your project that you used in your Internal Assessment (IA) using your likely outcomes or expectations.

---

---

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

2. **Method of Timber drying**

a. Name **TWO** (2) common methods of drying timber.

i. Method 1

\_\_\_\_\_

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

ii. Method 2

\_\_\_\_\_

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

b. List **ONE** (1) advantage and **ONE** (1) disadvantage of method 1 named in part a. **Method 1.**

i. Advantage \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

ii. Disadvantage \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

c. List **ONE** (1) advantage and **ONE** (1) disadvantage of method 2 named in part a. **Method 2.**

i. Advantage \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

ii. Disadvantage \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

c. Explain the process of the drying timber methods named in part a.

i. Method 1

---

---

---

---

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

ii. Method 2

---

---

---

---

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

### 3. **Timber Defect & Timber Finishing**

a. Name and sketch **1** common timber defect.

- i. Timber defect 1 \_\_\_\_\_
- ii. Sketch defect 1 below

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

b. Discuss the importance of timber finishing for the project.

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

### 4. **Tools**

a. Discuss the importance of tool maintenance

---

---

---

---

---

---

---

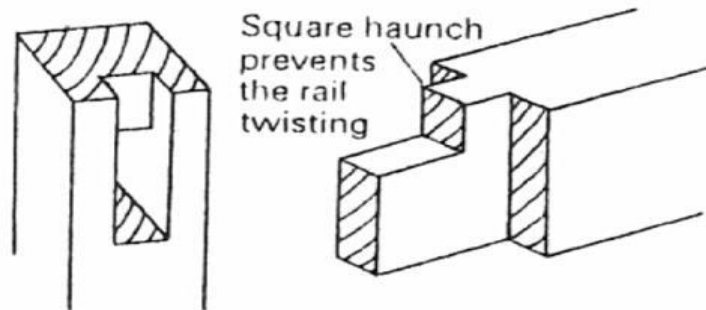
---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. Study the sketch of the Haunch Mortise and Tenon joint used between the top rail and the leg of a coffee table as given below and answer the following questions.



- i. Name all the hand tools used in construction of the Haunch Mortise and Tenon Joint above.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |



- ii. Describe **any 2** hand tools used in construction of the Haunch Mortise and Tenon Joint.

|   | Hand Tools | Description |
|---|------------|-------------|
| 1 |            |             |
| 2 |            |             |

| Skill level 2 | 1 | 2 |
|---------------|---|---|
| 2             |   |   |
| 1             |   |   |
| 0             |   |   |
| NR            |   |   |

- iii. Complete the table with the classification of the hand tools listed in part i.

|   | Group | Hand Tools |
|---|-------|------------|
| 1 |       |            |
| 2 |       |            |
| 3 |       |            |
| 4 |       |            |
| 5 |       |            |

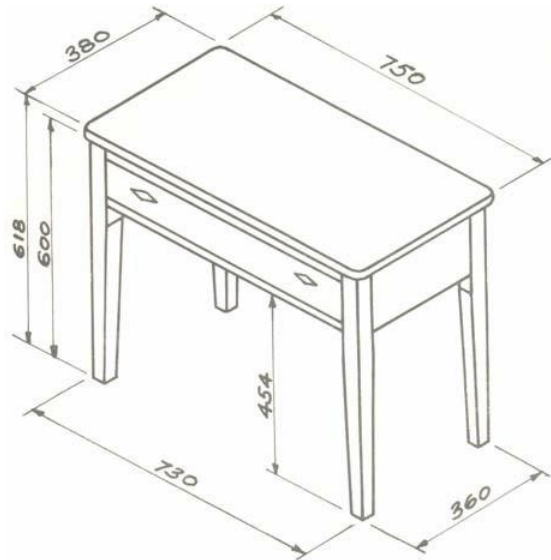
| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |



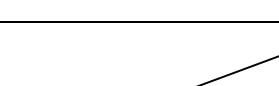


6. Project Analysis.

Given below is a Study Table as one of a Form 6 Project. Study the Coffee Table and answer the following questions.



- a. Study the study table and complete the details that are missing from the **Eight** blank spaces below numbered (**i –viii**).

| CHART SHOWING TIMBER AND COST DETAILS FOR HALL TABLE |                |                  |              |                |                                                                                      |            |
|------------------------------------------------------|----------------|------------------|--------------|----------------|--------------------------------------------------------------------------------------|------------|
| Table Part                                           | Size of Timber | Number of Pieces | Total Length | Cost per Metre | Calculations                                                                         | Cost       |
| Top                                                  | 200 x 18       | 2                | 1.5 m        | <b>i.</b>      |    | \$ 12.00   |
| <b>ii.</b>                                           | 40 x 40        | 4                | <b>iii.</b>  | \$ 4.00        |    | \$ 9.60    |
| Back Rail                                            | 146 x 18       | 1                | 650          | \$ 5.00        |   | <b>iv.</b> |
| End Rail                                             | 146 x 18       | <b>v.</b>        | 560          | \$ 5.00        |  | \$ 2.80    |
| Drawer Rail                                          | 40 x 18        | 2                | 1.4 m        | \$ 2.00        |  | <b>vi.</b> |
| Drawer Front                                         | <b>vii.</b>    | 1                | <b>viii.</b> | \$ 4.00        |  | \$ 2.60    |

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. The appearance of the study table could be improved by replacing the square tapered legs with turned legs. Sketch a suitable design for a tapered leg for the study table that could be turned in a wooden lathe machine.

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- c. Evaluate the square tapered leg and the designed turned tapered leg.

[illegible]

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

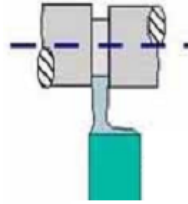
## MAJOR AREA 2: METAL TECHNOLOGY

### A. Multiple Choice Questions:

**Circle the letter with the most correct answer.**

1. Name the use of the given lathe tool.

- A. Boring.
- B. Parting-Off.
- C. Finishing.
- D. Thread Cutting.



| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

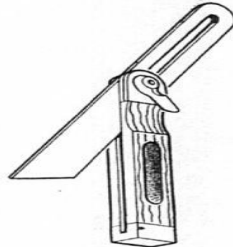
2. Identify the part of the Oxy-Acetylene plant where oxygen and acetylene mixed.

- A. Regulator.
- B. Welding Tip.
- C. Welding Hose.
- D. Blow pipe.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

3. What is the correct name for the hand tool given below?

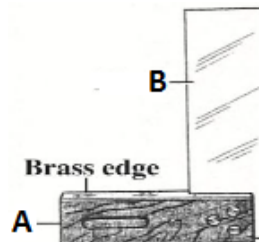
- A. Try Square.
- B. Marking Gauge.
- C. Sliding Bevel
- D. Straight Edge.



| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

4. What is the name of the part with label A of the hand tool given below?

- E. Stem.
- F. Stock.
- G. Blade.
- H. Handle.



| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

5. Name the measuring tool used to measure up to 0.1 of an mm.

- A. Steel Ruler.
- B. Vanier Calliper.
- C. Micrometer.
- D. Height Gauge.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

6. What Stage of the design process where ***“Think about the outcome”*** took place?

- A. Designing.
- B. Investigating.
- C. Making.
- D. Evaluating.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

7. What Stage of the design process where ***“Note Expectations about the solution”*** took place?

- E. Investigating.
- F. Devising.
- G. Making.
- H. Evaluating.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |



## B. Short and Long Answer Questions.

**Answer ALL the questions.**

### 1. Design

- a. Define the term ***design brief***.

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- b. Define the term ***investigating***.

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- c. Briefly describe the stage of **making or producing** in the design process.

---



---



---



---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

### 2. Metal Properties, Tools and Finishing

- a. List **TWO** (2) ferrous metals.

- i. 

---
- ii. 

---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

b. List **TWO** (2) non-ferrous metals.

- i. \_\_\_\_\_
- ii. \_\_\_\_\_

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

c. Describe Ferrous metal.

---



---



---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

d. Compare ferrous and non-ferrous metals.

| Ferrous Metal | Non-Ferrous Metal |
|---------------|-------------------|
|               |                   |

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- e. Explain the use of Soldering as one of metal fasteners.

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- f. Analyse the uses of Rivets and Bolts and Nuts as metal fasteners.

- i. Rivets

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- ii. Bolts and Nuts

---

---

---

---

---

---

---

---

---

---

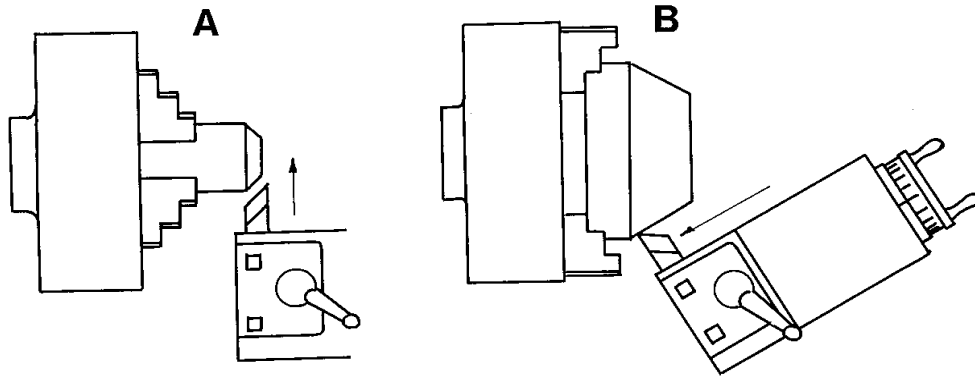
| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

g. Name any **TWO** (2) types of metal finishing.

- i. \_\_\_\_\_
- ii. \_\_\_\_\_

| Skill level 1 | i. | ii. |
|---------------|----|-----|
| 1             |    |     |
| 0             |    |     |
| NR            |    |     |

h. Explain one type of taper turning process from the diagram below.




---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

i. Explain the functions of the pressure gauge in the Oxy-Acetylene plant.

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- j. Complete the table with the right use of the lathe tools.

|     | Lathe Tools | Uses |
|-----|-------------|------|
| i.  | Form tool   |      |
| ii. | Boring tool |      |

| Skill level 1 | i. | ii. |
|---------------|----|-----|
| 1             |    |     |
| 0             |    |     |
| NR            |    |     |

### 3. Tools and Equipment

- a. Define Power tools.

---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- b. Define Hand tools.

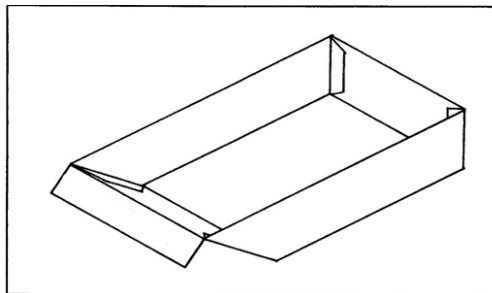
---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- c. Name any **TWO** (2) hand tools used in the construction of the sheet metal tray shown below.



- i. Hand tool 1 \_\_\_\_\_
- ii. Hand tool 2 \_\_\_\_\_

| Skill level 1 | i. | ii. |
|---------------|----|-----|
| 1             |    |     |
| 0             |    |     |
| NR            |    |     |

- d. Evaluate the importance of understanding tools and its uses.

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- e. Discuss the importance of tool maintenance.

---

---

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- f. Complete the table below with the classification of tools and one tool for each class.

|   | Classification of Tools | Tool |
|---|-------------------------|------|
| 1 |                         |      |
| 2 |                         |      |
| 3 |                         |      |
| 4 |                         |      |
| 5 |                         |      |

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- g. Analyse clearly the definitions of storage in tools.

---

---

---

---

---

---

---

---

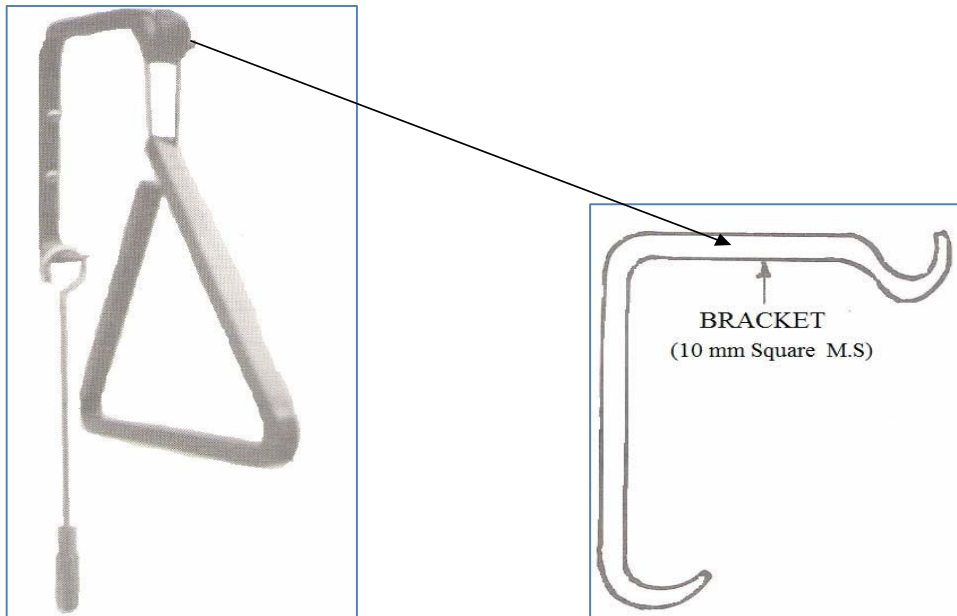
---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

#### 4. **Project Construction**

Given below is a mild steel door gong (Bell) with its hanging bracket, a project that you have been asked to manufacture at your school workshop.



- a. List the **FOUR** (4) operations in the correct order of how to manufacture the bracket. Operation 1 is done for you.

Operation 1: Cut from Stock

Operation 2: \_\_\_\_\_

Operation 3: \_\_\_\_\_

Operation 4: \_\_\_\_\_

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. Analyse each operation and list the tools required for each operation.

|   | BRACKET MANUFACTURE |       |
|---|---------------------|-------|
|   | OPERATIONS          | TOOLS |
| 1 |                     |       |
| 2 |                     |       |
| 3 |                     |       |
| 4 |                     |       |

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |



- c. Analyse each operation and briefly describe the procedure and the step of making in each operations.

### Operation One

---

---

---

---

### Operation One

---

---

---

---

### Operation One

---

---

---

---

### Operation One

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

### MAJOR AREA 3: FOOD AND NUTRITION

**Answer ALL the questions in this section**

**SECTION 1: Multiple Choice**  
**Circle the letter of the BEST answer.**

1. Foods that are particularly high in Vitamin C include

A. Carrot, tomato and yam.  
 B. Pawpaw, orange and broccoli.  
 C. Orange, taro and cabbage.  
 D. Tomato, yam and lettuce.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

2. Non Communicable Diseases (NCDs) is also referred to as

A. Life style diseases.  
 B. Diseases of old people.  
 C. School Children diseases.  
 D. Uncured diseases.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

3. Every food we eat must be broken down into nutrients

A. so it can produce energy.  
 B. to make it easy to release.  
 C. so it can be absorbed by the body.  
 D. to make the body healthy.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

4. Freezing food is a method of

A. Digesting food.  
 B. High risk food.  
 C. Contaminating food.  
 D. Preserving food.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

5. The 6 essential nutrients including Vitamins, Minerals, Proteins, Carbohydrates, Fats and Water are

A. Necessary for the body to function properly.  
 B. Needed in the body for growth.  
 C. Required for sick people.  
 D. The best nutrients for the body.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

6. Modifying a recipe is an example of a

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

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

7. 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.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

8. To avoid cross-contamination during food preparation, you must

- A. Keep raw meat and their juices away from other food.
- B. Cook meat thoroughly.
- C. Always put food in the refrigerator.
- D. Read and understand the recipe.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

9. When planning a meal for your family, which of the following factors are most appropriate for you to consider?

- A. Number of sick people and time available.
- B. The guest and cooking equipment.
- C. Number of people and budget available.
- D. The current weather and how many kids.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

10. A pregnant woman needs to eat foods with high calcium during pregnancy because it is necessary to

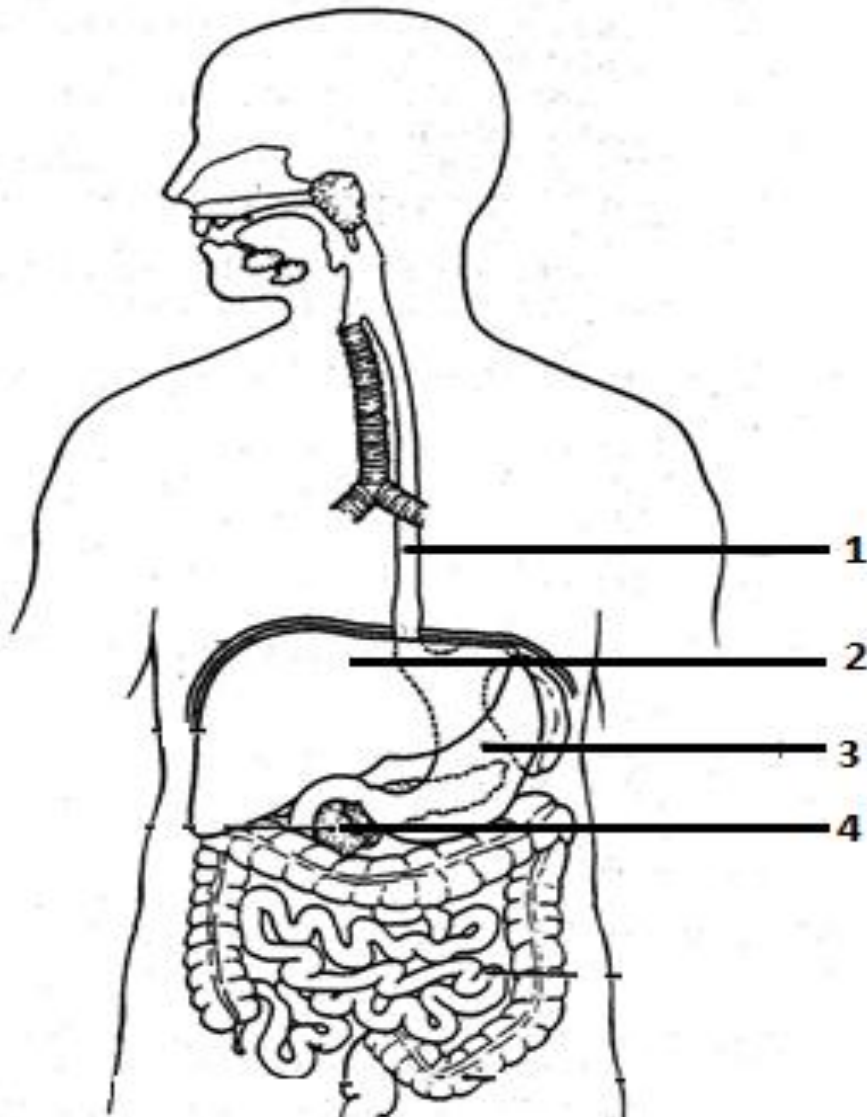
- A. carry oxygen and develop healthy teeth.
- B. build bones and help maintain healthy blood pressure.
- C. have healthy skin and good eyesight.
- D. Regulate blood and have healthy skin.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

**Section 2: Short Answer**

**Answer ALL the questions in this section.**

1. Name parts of this human digestive system beside the numbers provided.



| Skill level 1 | 1 | 2 | 3 | 4 |
|---------------|---|---|---|---|
| 1             |   |   |   |   |
| 0             |   |   |   |   |
| NR            |   |   |   |   |

2. Define the following food related terms.

a. Food contamination

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

b. Personal hygiene

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

c. Under nutrition

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

3. Describe **TWO** (2) things a pregnant mother should do if she is experiencing constipation.

- i. 

---
- ii. 

---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

4. Describe why it is important for elderly people to reduce their intake of energy-dense foods like sweets and fatty foods.

---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

5. Describe why it is highly recommended to avoid thawed and having to refrozen any frozen foods.

---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

6. To prepare a healthy meal for your family, it is important to use very little fat and salt when cooking. Describe **TWO** (2) reasons for this advice.

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

---

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

---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

7. Evaluate the following food related diseases and the type of people it affects the most.

**Anaemia Discussion**

**Tooth decay**

---



---



---



---



---



---



---



---



---



---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

8. Analyse **Personal Hygiene** and its importance during food preparation.

---

---

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

9. Fish is a common food in Tonga that most people like to eat. Evaluate nutritional value, consumption, market prices and health of fish.

---

---

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |



3. Identify the nutritional requirements for the people given and analyse why they need that particular nutrient.

**Sports people**

**Pregnant women**

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

4. Many Tongan families consume a lot of processed foods such as noodles and corned beef which affect their health. Evaluate the advantages and disadvantages of food processing.

---

---

---

---

---

---

---

---

---

---

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

5. Increase in premature death from Non-communicable diseases is an issue in Tonga. Justify this.

[illegible]

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

6. Explain the causes and effects of iron and protein deficiency.

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

7. Explain **THREE** (3) things you should do at home to prevent food spoilage and to avoid wasting your family's money.

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

8. Explain how you would promote healthy lifestyle in your community. Include healthy eating, being active and to stop smoking in your writing.

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

9. Knowing the nutrition content of food is very important when you buy them from the shop. Explain this.

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

10. Convenience food require very little time in preparation and are fast to consume. Discuss the advantages and disadvantages of convenience foods.

---

---

---

---

---

---

---

---

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

## MAJOR 4: TEXTILES AND GARMENT CONSTRUCTION

**Answer ALL the questions in this section.**

### Section 1: Multiple Choice

**Circle the letter of the BEST answer.**

1. Fabric made from a wool and cotton blend is usually

A. light and comfortable to wear.  
 B. hard and expensive to buy.  
 C. heavy and comfortable to wear.  
 D. hot in summer season.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

2. There are various elements of design that we use to sew a dress. It includes

A. texture, line, form and machine.  
 B. shape, line, form and balance  
 C. colour, texture, pattern and line.  
 D. colour, shape, pattern and fabric.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

3. The **THREE** (3) universal primary colours are

A. red, green and yellow.  
 B. black, orange and red.  
 C. blue, green and purple.  
 D. red, yellow and blue.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

4. Wearing fabric with vertical lines make the figure look

A. overweight  
 B. short.  
 C. slim  
 D. tall

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

5. Kid's clothes should be made from fabric with the following characters.

A. Resilience and strength  
 B. Strength and absorbency  
 C. Lustre and elasticity  
 D. Strength and lustre

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

6. Which of the following fibres are good conductor of heat and therefore cool to wear in summer?

A. Cotton and linen  
 B. Cotton and silk  
 C. Silk and wool  
 D. Silk and linen

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

7. Wool is often mixed with polyester or acrylic to

A. produce a comfortable fabric.  
 B. make the fabric resilient.  
 C. increase the strength of wool.  
 D. make fabric easier to launder.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

8. The purpose of using stay stitching in garment construction is to

A. add decoration to fabric.  
 B. make cutting easier.  
 C. strengthen the fabric when sewing.  
 D. hold the fabric to its correct shape without stretching.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

9. Darts, pleats and gathers are used in garment construction to

A. make it more beautiful.  
 B. attract the people who wear it.  
 C. improve its final appearance.  
 D. suit different parts of the body.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

10. The silhouette of a garment is referred to as the

A. colour.  
 B. outline.  
 C. detail.  
 D. shape.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

## Section 2: Short Answer

**Answer ALL the questions in this section.**

1. The shape of your face dictates the style of neckline that best suits you. Name the best neckline for the face shape listed below:

a. Square shape face

---

b. Round shape face

---

c. Heart shape face

---

d. Oval shape face

---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

2. Every person has a unique body feature. Describe how you could use design to emphasize the following body features:

a. Slim waistline

---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

b. Attractive legs

---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

3. State **ONE** (1) principle of clothing design you have learnt about this year.

---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

4. Briefly define the following fibre properties:

- a. Resilience

---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- b. Absorbency

---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

5. Dress maker uses sewing techniques to improve the quality of their garments. Describe the purpose of each of the following techniques and where it is used in the garment.

- a. Basting Purpose:

---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. Stay-stitching Purpose:

---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

6. Explain why people wear clothes in relation to their Social, Physical and Environmental needs.

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

7. Explain how you will handle the skipping of stitches, breaking needle thread and needle blunt when sewing.

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

8. Explain **TWO** (2) guidelines for using the sewing machine.

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |



9. Explain the characteristics of the following fibres with examples.

a. **Natural Fibres**

|  |                      |  |
|--|----------------------|--|
|  | <b>Skill level 3</b> |  |
|  | 3                    |  |
|  | 2                    |  |
|  | 1                    |  |
|  | 0                    |  |
|  | NR                   |  |

b. **Manufactured Fibres**

|  |                      |  |
|--|----------------------|--|
|  | <b>Skill level 3</b> |  |
|  | 3                    |  |
|  | 2                    |  |
|  | 1                    |  |
|  | 0                    |  |
|  | NR                   |  |



3. Evaluate **TWO** (2) best methods of transferring pattern symbols.

[illegible]

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

4. Evaluate the characteristics of all of the fibres listed below.

**Cotton      Wool      Linen      Silk**

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

5. Analyse the importance of the switch, to the safety of operating the electrical sewing machine.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

6. Evaluate the importance of a clean workshop.

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

7. Analyse the proper way of drying the following fabrics to avoid ruining its quality in terms of colour and shape.

| Polyester | Cotton | Rayon | Wool |
|-----------|--------|-------|------|
|-----------|--------|-------|------|

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. There are no margins, text, or other markings on the paper.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

8. Several equipments were used during garment production. Discuss any **THREE** (3) that you used and their purpose in the table below.

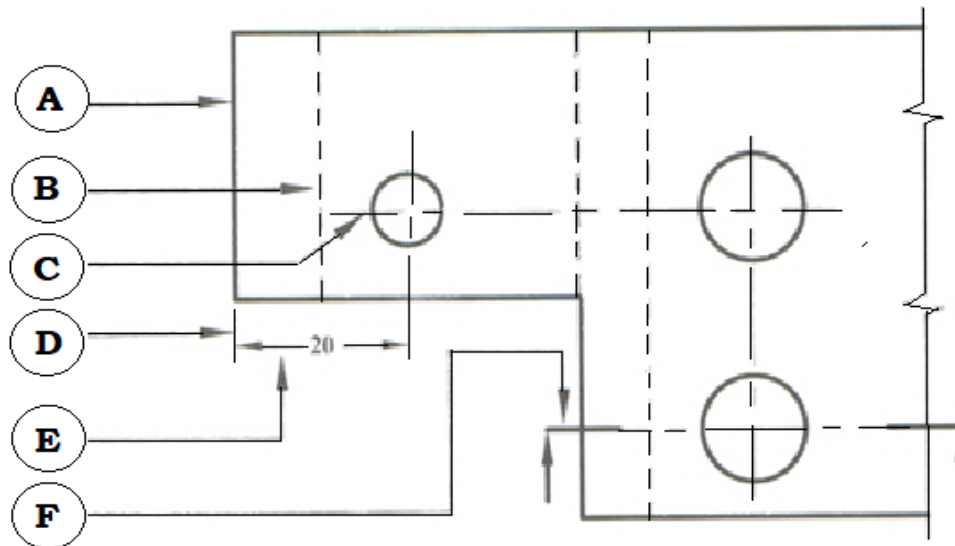
| Equipment | Purpose |
|-----------|---------|
|           |         |
|           |         |
|           |         |

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

## MAJOR 5: TECHNICAL GRAPHICS

**A. Multiple Choice Questions:**  
**Circle the letter of the BEST answer.**

Study the diagram below with line types and line applications and answer **question 1 to question 4**.



1. What is the name of the **Line Type B**?

- A. Continue thin line.
- B. Continue thick line.
- C. Thin chain line.
- D. Thin dashed line.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

2. What is the name of the **Line Type C**?

- A. Continue thin line.
- B. Continue thick line.
- C. Thin chain line.
- D. Thin dashed line.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

3. What is the application of **Line Type D**?

- A. To indicate visible outlines.
- B. To show outlines of hidden features.
- C. For dimension and projection line.
- D. To indicate a cutting plane for sectional views.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

4. What is the application of **Line Type F**?

- A. To indicate visible outlines.
- B. To show outlines of hidden features.
- C. For dimension and projection line.
- D. To indicate a cutting plane for sectional views.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

5. What pictorial drawing where  $45^\circ$  is use for projection?

- A. Perspective drawing.
- B. Orthographic drawing.
- C. Isometric drawing.
- D. Oblique drawing.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

6. What Stage of the design process where ***“Think about the outcome”*** took place?

- A. Designing.
- B. Investigating.
- C. Making.
- D. Evaluating.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

7. What Stage of the design process where ***“Note Expectations about the solution”*** took place?

- A. Investigating.
- B. Devising.
- C. Making.
- D. Evaluating.

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

## B. Short and Long Answer Questions.

### 1. Design

- a. Define the term ***design brief***.

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- b. Define the term ***investigating***.

---



---



---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- c. Briefly describe the stage of **making or producing** in the design process.

---



---



---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

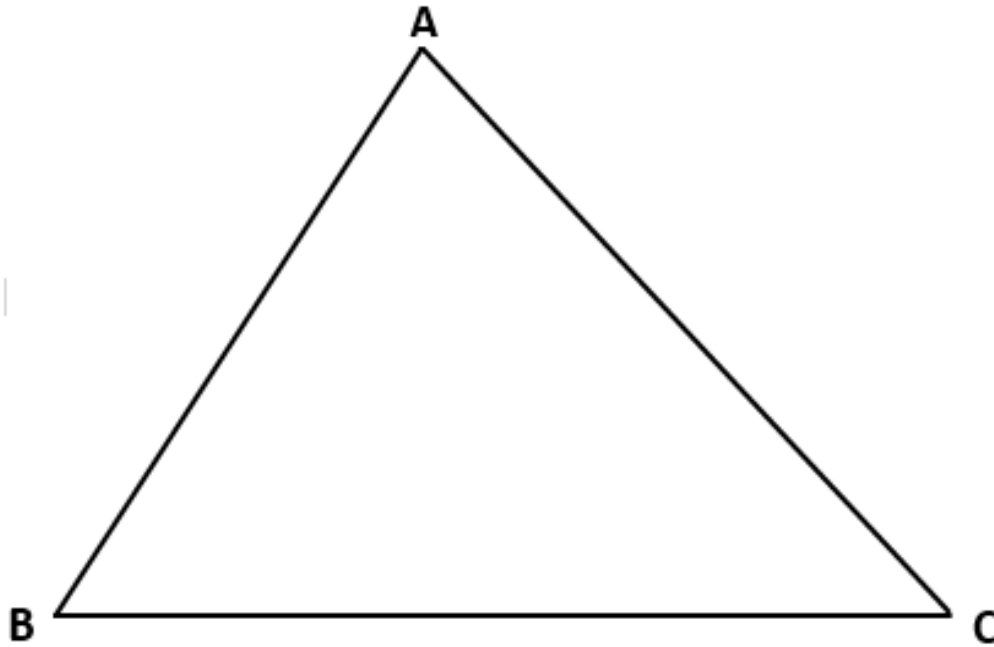


2. **Geometric Construction:**

Construct a circle inside the given triangle **ABC** to neatly touch the sides of the triangle.

- a. By bisecting interior angles of the triangle
- b. Locating the centre and complete the circle.

| Skill level 3 | a. | b. |
|---------------|----|----|
| 3             |    |    |
| 2             |    |    |
| 1             |    |    |
| 0             |    |    |
| NR            |    |    |



- c. Describe Geometrical Construction drawing with examples.

---



---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

### 3. **Interpenetration of Solids**

- a. Identify the principle of intersection.

---

---

---

---

---

---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- b. List the procedures of solving this intersection.

---

---

---

---

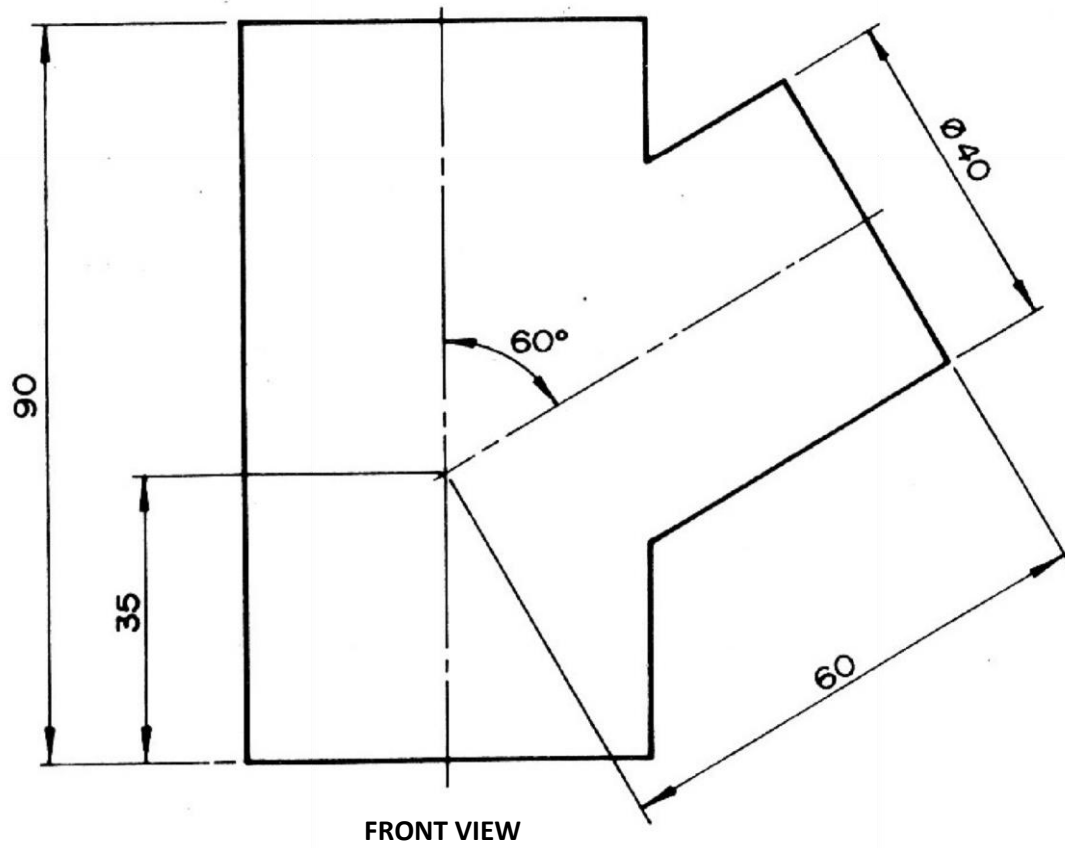
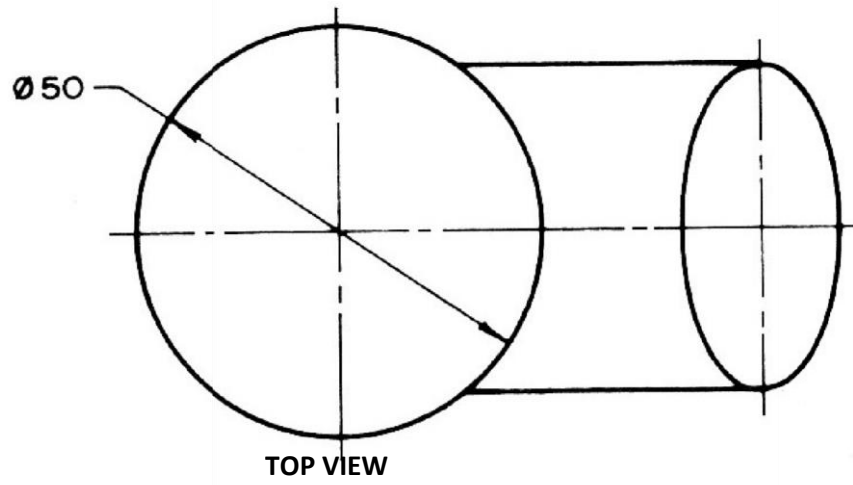
---

---

| Skill level 1 |  |
|---------------|--|
| 1             |  |
| 0             |  |
| NR            |  |

- c. Complete the front view of the two intersection cylinders by drawing the lines of intersections.

| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |



4. **Development:**

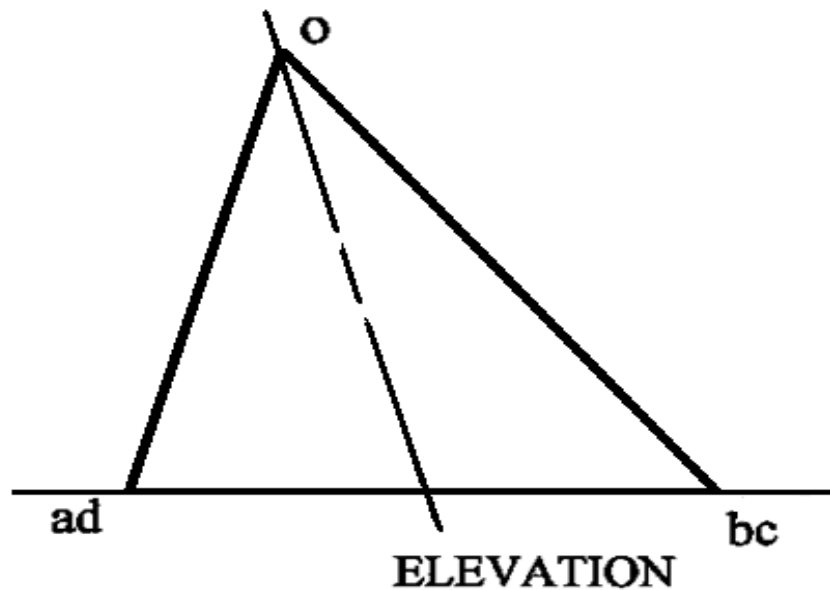
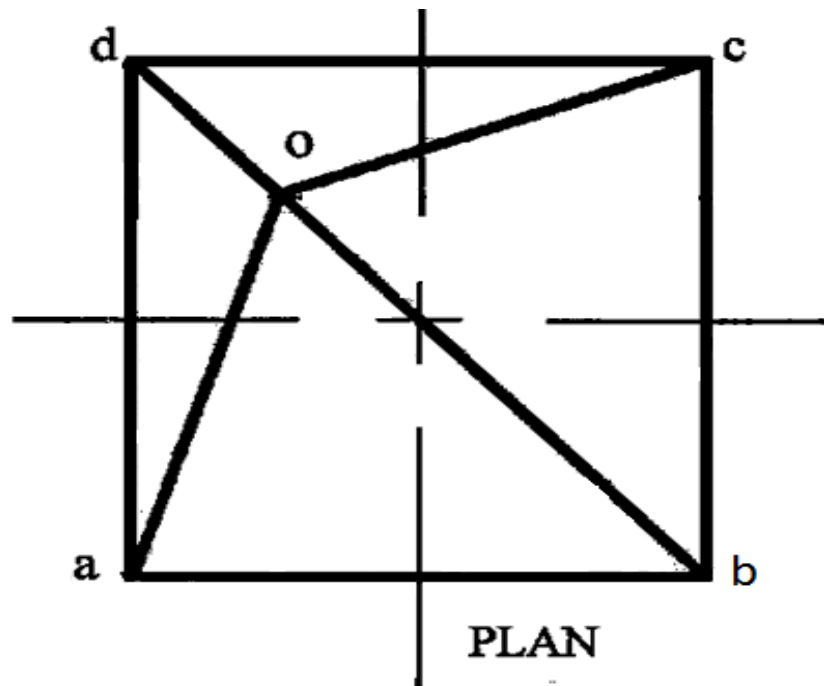
Study the given Oblique Square Pyramid **OABCD** and answer the following questions.

- a. Find the true length of line **OA**, **OB**, **OC** and **OD**.

True Length **OA** = \_\_\_\_\_ mm, True Length **OB** = \_\_\_\_\_ mm

True Length **OC** = \_\_\_\_\_ mm True Length **OD** = \_\_\_\_\_ mm

True Length **AB** = \_\_\_\_\_ mm True Length **BC** = \_\_\_\_\_ mm

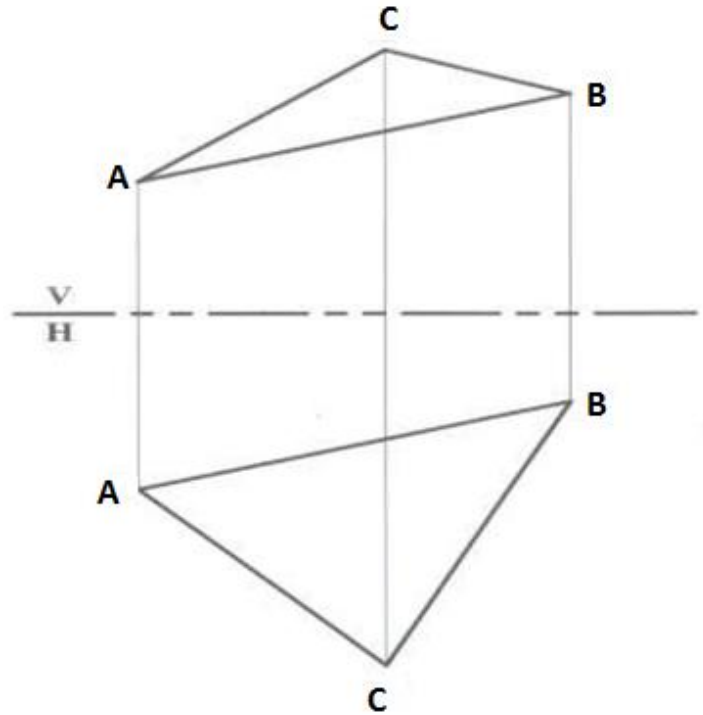


| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. Draw the development of the given Oblique Square Pyramid **OABCD**.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

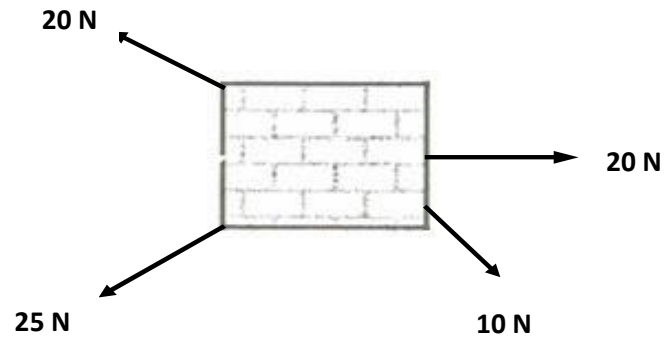
- c. Use the projection of the triangle ABC given below to determine the:
- True shape of angle ABC
  - True angle of inclination of the triangle ABC to the horizontal plane.



| Skill level 3 | i. | ii. |
|---------------|----|-----|
| 3             |    |     |
| 2             |    |     |
| 1             |    |     |
| 0             |    |     |
| NR            |    |     |

5. **Vector Diagrams and Force.**

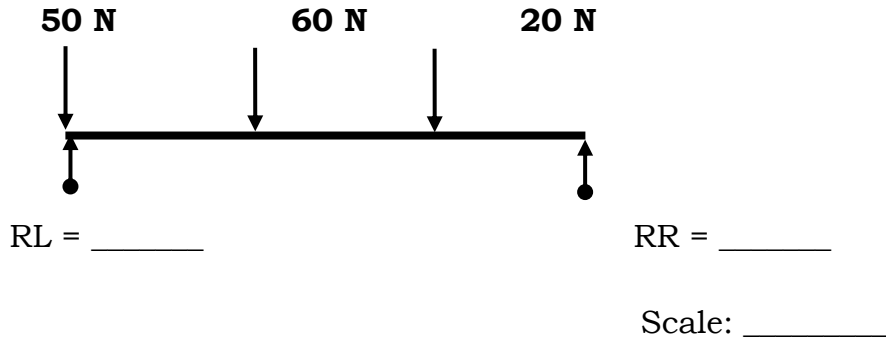
- a. Determine the resultant force and point of application of the co-planar, concurrent force system given below.



| Skill level 3 |  |
|---------------|--|
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. Study the space diagram of parallel forces acting on a beam given below and answer the following questions. Use the Line force, Funicular and Polar diagram. Use scale of your choice.

- i. The position of the resultant force and reactions RL and RR



| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |



- ii. Briefly describe the funicular polygon.

---



---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- iii. Describe the reaction forces.

---



---



---



---



---



---

| Skill level 2 |  |
|---------------|--|
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

## 6. Orthographic Projection Drawing

- a. Draw the following views of the **Support Bracket**, shown below, in Third Angle Projection on the next page:
- A** front view from **A**  
**A** side view from **B**  
**A** top view.

Give 1 dimension for each view.

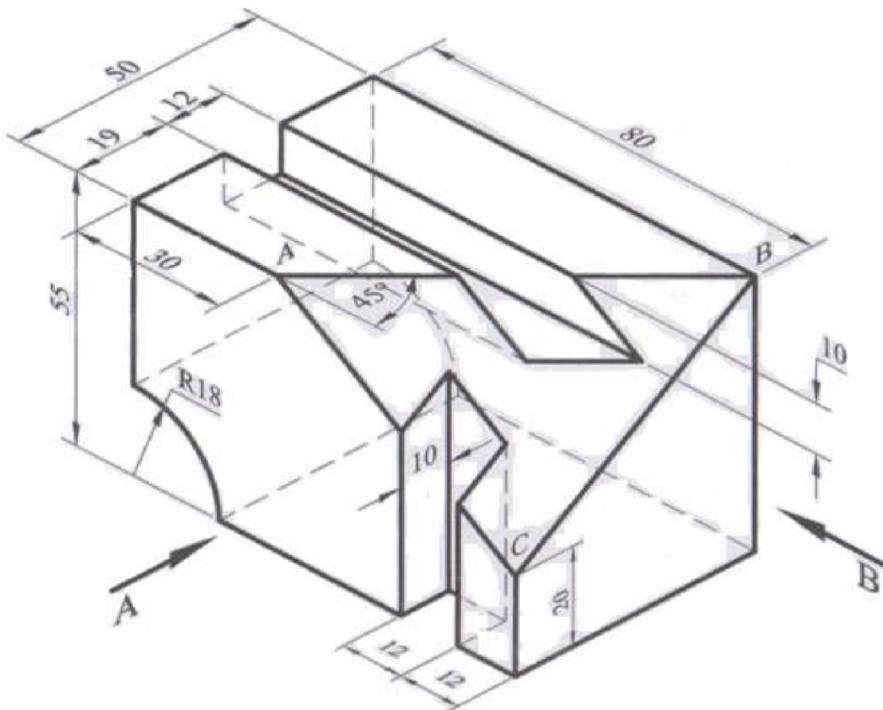
| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- b. Use the standard line in all views when drawing:
  - i. Continuous thin line
  - ii. Continuous thin line
  - iii. Continuous thick line.

| Skill level 1 | b.i. | b.ii. | b.iii. |
|---------------|------|-------|--------|
| 1             |      |       |        |
| 0             |      |       |        |
| NR            |      |       |        |

- c. If the **1 : 2** scale is to be used in drawing orthographic views of the support bracket. What is the:
- i. The total length of the scaled diagram. \_\_\_\_\_ mm
  - ii. The total width of the scaled diagram. \_\_\_\_\_ mm
  - iii. The total height of the scaled diagram. \_\_\_\_\_ mm

## SUPPORT BRACKET



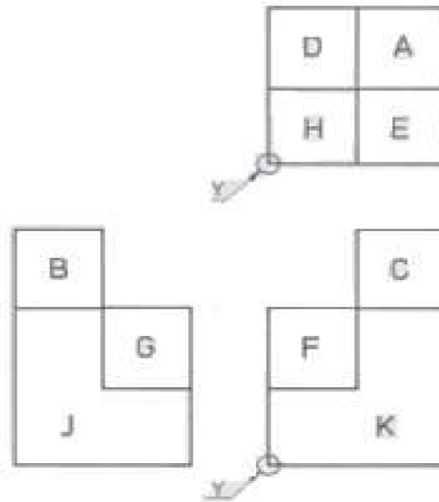
| Skill level 1 | c.i. | c.ii. | c.iii. |
|---------------|------|-------|--------|
| 1             |      |       |        |
| 0             |      |       |        |
| NR            |      |       |        |

**Answer for Question 6 in this page**

7. **Helix:**  
Draw **ONE** (1) complete turn of a right-hand helical spring, 80 mm mean diameter, 60 mm pitch, made from 16 mm diameter wire.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

8. Study the diagram below and answer the questions that follow.



Sketch:

- i. An Isometric view with corner Y nearest the viewer in the space below.  
Print the correct letter on each face

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

- ii. An Oblique view. Print the correct letter on each face.

| Skill level 4 |  |
|---------------|--|
| 4             |  |
| 3             |  |
| 2             |  |
| 1             |  |
| 0             |  |
| NR            |  |

**THIS PAGE HAS BEEN DELIBERATELY LEFT BLANK.**