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.

<table>
<thead>
<tr>
<th>Major</th>
<th>Topic</th>
<th>Pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>MAJOR OUTCOMES</td>
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<tr>
<td>1</td>
<td>Wood Technology</td>
<td>2-14</td>
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<tr>
<td>2</td>
<td>Metal Technology</td>
<td>15-25</td>
</tr>
<tr>
<td>3</td>
<td>Food and Nutrition</td>
<td>26-35</td>
</tr>
<tr>
<td>4</td>
<td>Textiles and Garment Construction</td>
<td>36-45</td>
</tr>
<tr>
<td>5</td>
<td>Technical Graphics</td>
<td>46-62</td>
</tr>
</tbody>
</table>

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

2. Which of the following hand tools is a testing tool?
   A. Wooden Ruler
   B. Claw Hammer
   C. Wood Chisel
   D. Try Square

3. What is the correct name for the hand tool given below?
   A. Try Square.
   B. Marking Gauge.
   C. Sliding Bevel
   D. Straight Edge.

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

5. What is the correct name for the hand tool given below?
   A. Try Square.
   B. Marking Gauge
   C. Sliding Bevel
   D. Straight Edge
6. What Stage of the design process where “Think about the outcome” took place?

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

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

A. Investigating  
B. Devising  
C. Making  
D. Evaluating
B. Short and Long Answer Questions.

Answer ALL the questions.

1. **Design**

   a. Define the term *investigating*.

   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

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

   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________
   _____________________________________________________________

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

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   _____________________________________________________________
2. **Method of Timber drying**

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

   i. Method 1

   __________________________________________

   ii. Method 2

   __________________________________________

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

   i. Advantage __________________________________________

       __________________________________________

       __________________________________________

   ii. Disadvantage __________________________________________

       __________________________________________

       __________________________________________

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

   i. Advantage __________________________________________

       __________________________________________

       __________________________________________

   ii. Disadvantage __________________________________________

       __________________________________________

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

i. Method 1

ii. Method 2

<table>
<thead>
<tr>
<th>Skill level 3</th>
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</thead>
<tbody>
<tr>
<td>3</td>
</tr>
</tbody>
</table>
3. **Timber Defect & Timber Finishing**

   a. Name and sketch 1 common timber defect.

      i. Timber defect 1________________________

      ii. Sketch defect 1 below

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

      __________________________________________

      __________________________________________

      __________________________________________

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      __________________________________________

4. **Tools**

   a. Discuss the importance of tool maintenance

      __________________________________________

      __________________________________________

      __________________________________________

      __________________________________________

      __________________________________________

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

<table>
<thead>
<tr>
<th>Hand Tools</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
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</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Group</th>
<th>Hand Tools</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
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</tbody>
</table>
iv. Analyse the importance of understanding tools and its uses.

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5. **Timber Properties & Preparation**

a. Complete the table by comparing the properties of metal and wood.

<table>
<thead>
<tr>
<th>Properties</th>
<th>Wood</th>
<th>Metal</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Ductility</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ii. Brittleness</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skill level 4</th>
</tr>
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<tbody>
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<thead>
<tr>
<th>Skill level 3</th>
<th>i.</th>
<th>ii.</th>
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<tbody>
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</table>
b. Explain the procedures of timber preparation.

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Skill level 3

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Skill level 4

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| 3 | |
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c. Discuss the importance of timber preparation to the whole project.

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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).

<table>
<thead>
<tr>
<th>Table Part</th>
<th>Size of Timber</th>
<th>Number of Pieces</th>
<th>Total Length</th>
<th>Cost per Metre</th>
<th>Calculations</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top</td>
<td>200 x 18</td>
<td>2</td>
<td>1.5 m</td>
<td>$12.00</td>
<td>i.</td>
<td>$ 12.00</td>
</tr>
<tr>
<td>ii.</td>
<td>40 x 40</td>
<td>4</td>
<td></td>
<td>$4.00</td>
<td></td>
<td>$ 9.60</td>
</tr>
<tr>
<td>Back Rail</td>
<td>146 x 18</td>
<td>1</td>
<td>650</td>
<td>$5.00</td>
<td>iv.</td>
<td></td>
</tr>
<tr>
<td>End Rail</td>
<td>146 x 18</td>
<td>v.</td>
<td>560</td>
<td>$5.00</td>
<td></td>
<td>$ 2.80</td>
</tr>
<tr>
<td>Drawer Rail</td>
<td>40 x 18</td>
<td>2</td>
<td>1.4 m</td>
<td>$2.00</td>
<td>vi.</td>
<td></td>
</tr>
<tr>
<td>Drawer Front</td>
<td><strong>vii.</strong></td>
<td>1</td>
<td><strong>viii.</strong></td>
<td>$4.00</td>
<td></td>
<td>$ 2.60</td>
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</table>

**Skill level**

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<tr>
<td>NR</td>
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</tbody>
</table>
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.

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

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<thead>
<tr>
<th>Skill level 3</th>
<th>3</th>
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</table>
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.

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.

3. What is the correct name for the hand tool given below?
   A. Try Square.
   B. Marking Gauge.
   C. Sliding Bevel.
   D. Straight Edge.

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.

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.
6. What Stage of the design process where *Think about the outcome* took place?
   A. Designing.
   B. Investigating.
   C. Making.
   D. Evaluating.

7. What Stage of the design process where *Note Expectations about the solution* took place?
   E. Investigating.
   F. Devising.
   G. Making.
   H. Evaluating.
B. Short and Long Answer Questions.

Answer ALL the questions.

1. Design

a. Define the term design brief.

b. Define the term investigating.

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

2. Metal Properties, Tools and Finishing

a. List TWO (2) ferrous metals.

i. 

ii. 

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

c. Describe Ferrous metal.
   
   ________________________________________________
   
   ________________________________________________
   
   ________________________________________________
   
   ________________________________________________

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{Skill level 2} & 2 & 1 & 0 & \text{NR} \\
\hline
\end{array}
\]

d. Compare ferrous and non-ferrous metals.

\[
\begin{array}{|c|c|}
\hline
\text{Ferrous Metal} & \text{Non-Ferrous Metal} \\
\hline
\end{array}
\]

\[
\begin{array}{|c|c|c|c|c|}
\hline
\text{Skill level 3} & 3 & 2 & 1 & 0 & \text{NR} \\
\hline
\end{array}
\]
e. Explain the use of Soldering as one of metal fasteners.

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

i. Rivets

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

ii. Bolts and Nuts

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

i. ____________________________________________

ii. ____________________________________________

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

i. Explain the functions of the pressure gauge in the Oxy-Acetylene plant.
j. Complete the table with the right use of the lathe tools.

<table>
<thead>
<tr>
<th>Lathe Tools</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>i. Form tool</td>
<td></td>
</tr>
<tr>
<td>ii. Boring tool</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Skill level 1</th>
<th>i.</th>
<th>ii.</th>
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</tbody>
</table>

3. **Tools and Equipment**

a. Define Power tools.

b. Define Hand tools.

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

_______________________________________________________________________
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e. Discuss the importance of tool maintenance.

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

<table>
<thead>
<tr>
<th>Classification of Tools</th>
<th>Tool</th>
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</thead>
<tbody>
<tr>
<td>1</td>
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<td>2</td>
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</tbody>
</table>
g. Analyse clearly the definitions of storage in tools.

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: ____________________________________________________

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

<table>
<thead>
<tr>
<th>BRACKET MANUFACTURE</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPERATIONS</td>
</tr>
<tr>
<td>1</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
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</table>
c. Analyse each operation and briefly describe the procedure and the step of making in each operations.

**Operation One**

_______________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________

_______________________________________________________________________

**Operation One**

_______________________________________________________________________

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**Operation One**

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**Operation One**

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Skill level 4

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</table>
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.

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.

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.

4. Freezing food is a method of
   A. Digesting food.
   B. High risk food.
   C. Contaminating food.
   D. Preserving food.

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.
6. Modifying a recipe is an example of a
   A. task.
   B. problem.
   C. limitation.
   D. specification.

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.

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.

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.

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.
Section 2: Short Answer

Answer ALL the questions in this section.

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

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<tr>
<th>Skill level 1</th>
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</table>
2. Define the following food related terms.

a. Food contamination

b. Personal hygiene

c. Under nutrition

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

   i. ____________________________________________
   ii. ____________________________________________

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

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

________________________________________________________
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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: ______________________________________________
________________________________________________________
________________________________________________________

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

<table>
<thead>
<tr>
<th>Anaemia Discussion</th>
<th>Tooth decay</th>
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Skill level 4
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8. Analyse **Personal Hygiene** and its importance during food preparation.

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

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</table>
Section 3: Extended Response

Answer ALL the questions in this section.

1. Complete the table below to show ONE (1) function of nutrients and ONE (1) food source.

<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Function</th>
<th>Food source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Protein</td>
<td></td>
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<tr>
<td>Calcium</td>
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<tr>
<td>Iron</td>
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2. Explain the cause of ONE (1) nutrition-related disease and how it can be prevented.

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

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<tr>
<th>Sports people</th>
<th>Pregnant women</th>
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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.

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

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

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

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

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

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

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Skill level 3

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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.

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.

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.

4. Wearing fabric with vertical lines make the figure look
   
   A. overweight  
   B. short.  
   C. slim  
   D. tall

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
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

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.

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.

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.

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

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

   ________________________________

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

   a. Slim waistline

   __________________________________________

   __________________________________________

   b. Attractive legs

   __________________________________________

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

________________________________________________________________________

________________________________________________________________________

4. Briefly define the following fibre properties:

a. Resilience

________________________________________________________________________

________________________________________________________________________

b. Absorbency

________________________________________________________________________

________________________________________________________________________

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:

________________________________________________________________________

________________________________________________________________________

b. Stay-stitching

Purpose:

________________________________________________________________________

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

_______________________________________________________________________

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Skill level 3

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

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Skill level 3

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

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Skill level 3

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

a. **Natural Fibres**

b. **Manufactured Fibres**
Section 3: Extended Response

Answer ALL the questions in this section.

1. Explain the designing process, with regard to the Design brief, Planning and Application Stages.

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2. Garment designer used elements and principles of design to guide them in their clothing design. Evaluate how texture, shape, line and point affect their design.

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Skill level 3

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Skill level 4

| 4 | 3 | 2 | 1 | 0 | NR |
3. Evaluate **TWO** (2) best methods of transferring pattern symbols.

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

<table>
<thead>
<tr>
<th>Cotton</th>
<th>Wool</th>
<th>Linen</th>
<th>Silk</th>
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5. Analyse the importance of the switch, to the safety of operating the electrical sewing machine.

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6. Evaluate the importance of a clean workshop.

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Skill level 4

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</table>

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

<table>
<thead>
<tr>
<th>Polyester</th>
<th>Cotton</th>
<th>Rayon</th>
<th>Wool</th>
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8. Several equipments were used during garment production. Discuss any THREE (3) that you used and their purpose in the table below.

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Purpose</th>
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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.

![Diagram with line types labeled A, B, C, D, E, F.]

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.

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.

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.
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.

5. What pictorial drawing where 45° is use for projection?

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

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

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

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

A. Investigating.
B. Devising.
C. Making.
D. Evaluating.
B. Short and Long Answer Questions.

1. Design

a. Define the term design brief.

_____________________________________________________________________
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b. Define the term investigating.

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 Skill level 1

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

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</table>
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.

c. Describe Geometrical Construction drawing with examples.
3. **Interpenetration of Solids**

a. Identify the principle of intersection.

b. List the procedures of solving this intersection.

c. Complete the front view of the two intersection cylinders by drawing the lines of intersections.
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
b. Draw the development of the given Oblique Square Pyramid $OABCD$. 
c. Use the projection of the triangle ABC given below to determine the:

i. True shape of angle ABC

ii. True angle of inclination of the triangle ABC to the horizontal plane.
5. **Vector Diagrams and Force.**

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

\[
\begin{align*}
50 \text{ N} & \quad 60 \text{ N} & \quad 20 \text{ N} \\
\quad & \quad & \\
\quad & \quad & \\
RL &= \_\_\_\_ \quad RR = \_\_\_\_
\end{align*}
\]

Scale: \_\_\_\_\_
ii. Briefly describe the funicular polygon.

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iii. Describe the reaction forces.

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</table>
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.

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

---

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

---

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**
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.
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

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