



MARKER CODE

STUDENT EDUCATION NUMBER



# Samoa School Leaving Certificate

## DESIGN TECHNOLOGY

### 2015

## QUESTION and ANSWER BOOKLET

Time Allowed: 3 Hours & 10 Minutes

### INSTRUCTIONS

1. You have 10 minutes to read before the exam starts. You **MUST NOT** write during the 10 minutes.
2. Write your Student Education Number (SEN) in the space provided on the top right hand corner of this page.
3. Write your answers in the spaces provided in this booklet.
4. If you need more space, ask the Supervisor for extra paper. Write your SEN on all extra sheets used and clearly number the questions. Attach the extra sheets at the appropriate places in this booklet.

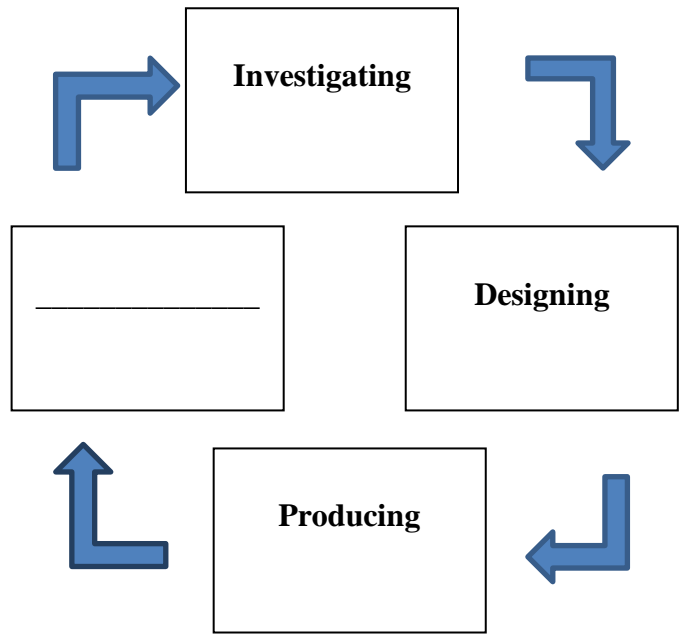
STRANDS	Pages	Time (Minutes)	Weighting
<b>STRAND 1: DRAWING &amp; DESIGNING</b>	2 – 6	45	25
<b>STRAND 2: TOOLS</b>	7 – 10	27	15
<b>STRAND 3: MATERIALS</b> Option A: Wood Materials Option B: Metal Materials	11 – 19	36	20
<b>STRAND 4: PROCESSING</b> Option A: Wood Technology Option B: Small Engine & Automotive Mechanics	20 – 32	54	30
<b>STRAND 5: TECHNOLOGY</b>	33 – 34	18	10
<b>TOTAL</b>	<b>35</b>	<b>180 mins</b>	<b>100</b>

Check that this booklet contains pages 2-35 in the correct order and that none of these pages is blank.

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

The diagram shows the design process model. Use the model and your own knowledge to answer Questions 1 to 13.

**THE DESIGN PROCESS**



1. Fill in the missing stage on the Design Process Model.

Skill level 1	
1	
0	
NR	

2. Describe the importance of this stage in the design process.

\_\_\_\_\_

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\_\_\_\_\_

Skill level 2	
2	
1	
0	
NR	

3. Define the terms “Design Brief” and “Investigating”.

a. Design brief:

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Skill level 1	
1	
0	
NR	

b. Investigating:

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Skill level 1	
1	
0	
NR	

4. At what stage of the model is the design brief developed?

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Skill level 1	
1	
0	
NR	

5. Explain what is involved in the Designing stage of the model.

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Skill level 3	
3	
2	
1	
0	
NR	

6. Identify another missing part of the model.

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Skill level 1	
1	
0	
NR	

7. Explain the importance of consulting the previous stage of the process.

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Skill level 3	
3	
2	
1	
0	
NR	

8. At what stage of the model is the problem identified?

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Skill level 1	
1	
0	
NR	

9. Write the problem statement of your school independent project.

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Skill level 1	
1	
0	
NR	

10. At what stage are drawings made?

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Skill level 1	
1	
0	
NR	

11. Sketch the side and end view to scale with dimensions of your Independent Project.



Skill level 2	
2	
1	
0	
NR	

12. Use the sketch in 11, to list and calculate the materials needed for the project.

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Skill level 3	
3	
2	
1	
0	
NR	

13. Evaluate your independent project and include what you could have done to improve its quality.

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Skill level 3	
3	
2	
1	
0	
NR	

**STRAND 2**

**TOOLS**

**Weighting 15**

Use the diagrams below to answer Questions 1 to 7.

Diagram A



Diagram B



1. Name the tool in Diagram A and describe its function or use.

a. Name \_\_\_\_\_

Skill level 1	
1	
0	
NR	

b. Function

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Skill level 2	
2	
1	
0	
NR	

2. Label the cutting part of the tool in Diagram A with an **X**.

Skill level 1	
1	
0	
NR	

3. The tool in Diagram B is classified as a *(place a tick beside the correct answer)*

Power Tool

Hand Tool

Skill level 1	
1	
0	
NR	

4. Describe or draw how the tool in Diagram A should be placed on the work bench.

Skill level 2	
2	
1	
0	
NR	

5. Define the term **Hand Tool**.

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Skill level 1	
1	
0	
NR	



6. Discuss the safety precaution that must be observed when using the tool in Diagram B.

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Skill level 4	
4	
3	
2	
1	
0	
NR	

7. Explain why tools must be well maintained and stored.

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Skill level 3	
3	
2	
1	
0	
NR	

**STRAND 3 MATERIALS**

**Weighting 20**

Answer only **ONE** part for this section.  
Answer **either OPTION A - Wood Materials or OPTION B - Metal Materials.**

**Option A: Wood Materials**

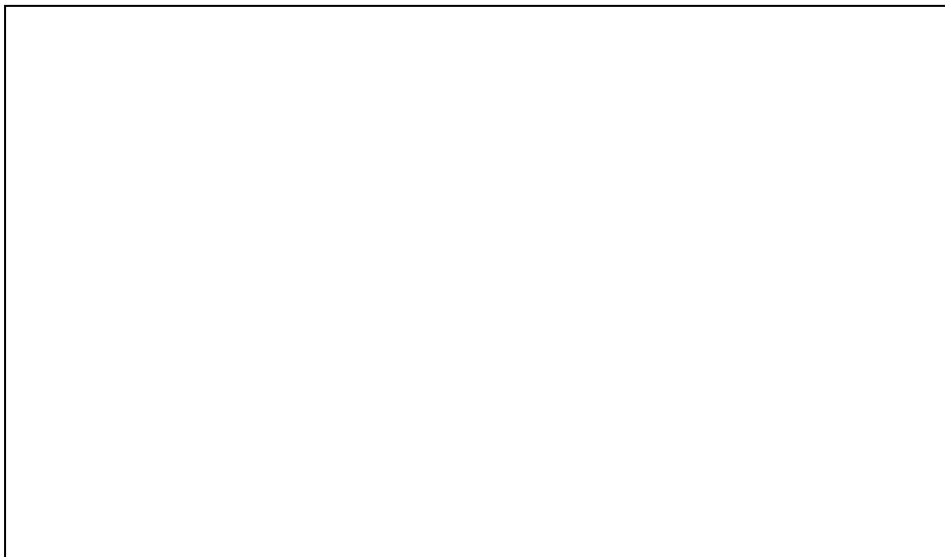
You have decided to build a coffee table for your final year project using timber from trees grown in Samoa.

1. Name a local tree you will use timber from to make your project.

\_\_\_\_\_

Skill level 1	
1	
0	
NR	

2. Draw and label a cross section of the timber from the tree you selected.



Skill level 1	
1	
0	
NR	

3. Select the finish best suited to preserve and enhance your completed project.

\_\_\_\_\_

Skill level 1	
1	
0	
NR	

4. Explain the different types of timber trees in Samoa.

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Skill level 3	
3	
2	
1	
0	
NR	

5. In the table below, name and evaluate the quality of a local and an imported timber sold in Samoa.

Name of wood	Local	Imported
Quality factors		
Defects		
Hardness		
Workability		
Presentation and finish		

Skill level 4	
4	
3	
2	
1	
0	
NR	

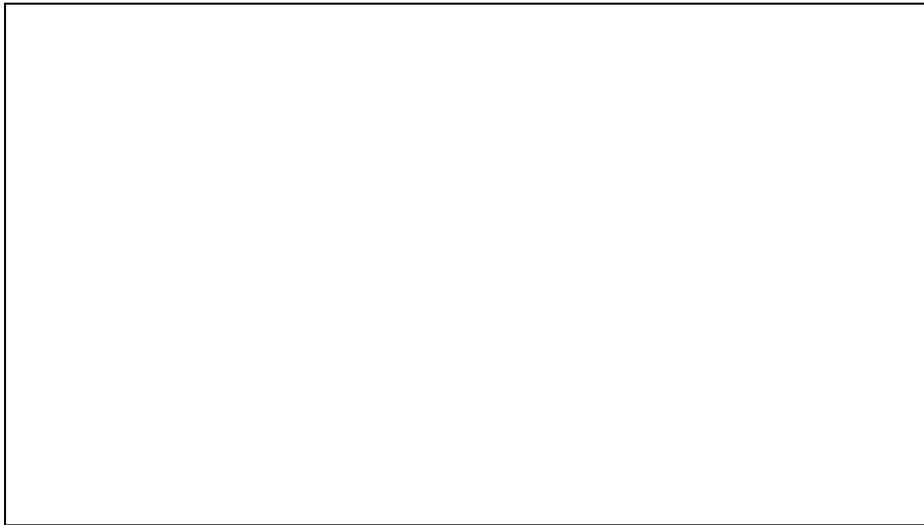
**Timber quality is an important part in the process of producing wood materials for joinery and construction.**

6. Name a common timber defect.

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Skill level 1	
1	
0	
NR	

7. Sketch the timber defect you named in 6.



Skill level 1	
1	
0	
NR	

8. Name a method of drying timber.

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Skill level 1	
1	
0	
NR	

9. Explain the process of the drying method of timber you named in 8.

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Skill level 3	
3	
2	
1	
0	
NR	

10. Give an advantage of the process of drying timber you named in 8.

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Skill level 2	
2	
1	
0	
NR	

11. Describe the nature of a processed wood material sold in Samoa.

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Skill level 2	
2	
1	
0	
NR	

## Option B: Metal Materials

Metal is also an important resource material used in engineering and construction.

1. There are many types of metals. Name one type.

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Skill level 1	
1	
0	
NR	

2. Give the main property of the metal you named in 1.

Property of metal

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Skill level 1	
1	
0	
NR	

3. Name a heat treatment method used in metals.

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Skill level 1	
1	
0	
NR	

4. Explain why heat treatment is used in working metal.

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Skill level 3	
3	
2	
1	
0	
NR	



5. Evaluate the properties of metal and wood in term of durability, brittleness and stress.

Properties	Metal	Wood
Durability		
Brittleness		
Stress		

Skill level 4	
4	
3	
2	
1	
0	
NR	

6. Sketch to scale a diagram of a coffee table frame made of metal. The frame has four legs 35cm high, 40cm wide by 90cm long.



Skill level 2	
2	
1	
0	
NR	

7. Select and name a suitable size metal you will use for the coffee table.

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Skill level 1	
1	
0	
NR	

8. Describe the properties of the metal you selected in 7.

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Skill level 2	
2	
1	
0	
NR	

9. How will you join the parts of the coffee table?

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Skill level 1	
1	
0	
NR	

10. Select the best finish for this project.

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Skill level 1	
1	
0	
NR	

11. Explain the most suitable material for the top of the coffee table, describing how it will be fixed onto the frame.

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Skill level 3	
3	
2	
1	
0	
NR	

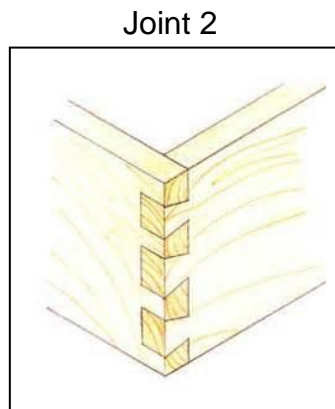
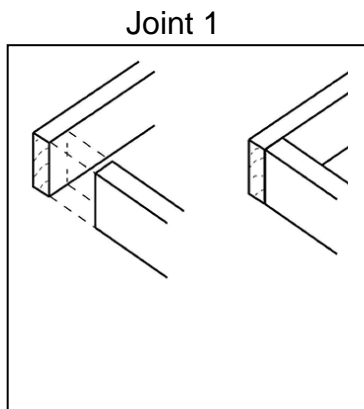
**STRAND 4: PROCESSING**

**Weighting 30**

Answer **only ONE** part for this section.  
Answer either **OPTION A - Wood Technology** OR **OPTION B - Small Engine and Automotive Mechanics**.

**Option A: Wood Technology**

Use the diagram below and your own knowledge to answer Questions 1 to 5.



1. Name the two joints in the diagrams.

a. Joint 1 \_\_\_\_\_

Skill level 1	
1	
0	
NR	

b. Joint 2 \_\_\_\_\_

Skill level 1	
1	
0	
NR	

2. Name two wood materials with dimensions best suited to make Joint 2 in the diagram.

a. Material 1 \_\_\_\_\_

Skill level 1	
1	
0	
NR	

b. Material 2 \_\_\_\_\_

Skill level 1	
1	
0	
NR	

3. Identify a project or part of a furniture where Joint 2 is most suitable.

\_\_\_\_\_

Skill level 1	
1	
0	
NR	

4. Explain the process or steps used for making Joint 2.

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

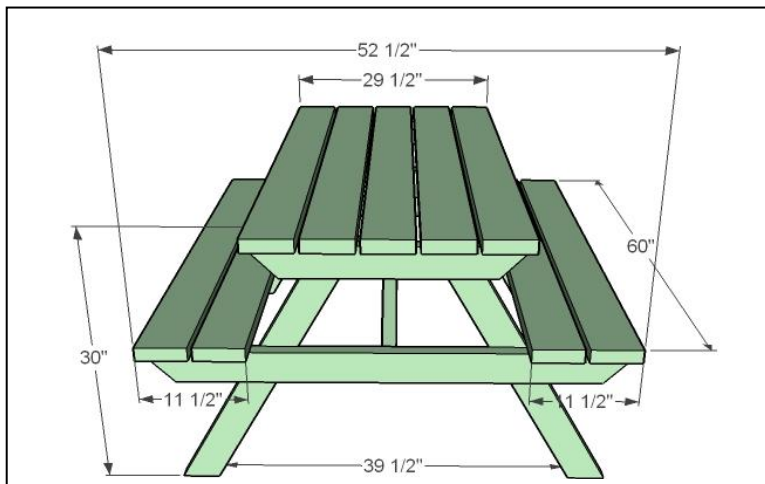
Skill level 3	
3	
2	
1	
0	
NR	

5. Name the tool used for checking squareness in Joint 2.

\_\_\_\_\_

Skill level 1	
1	
0	
NR	

Use the diagram below and your own knowledge to answer Questions 6 to 10.



6. Name the type of drawing shown in the diagram.

\_\_\_\_\_

Skill level 1	
1	
0	
NR	

7. Determine the height of the project.

\_\_\_\_\_

Skill level 1	
1	
0	
NR	

8. Explain why drawings are important in the project design, planning and building process.

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Skill level 3	
3	
2	
1	
0	
NR	

9. Discuss the materials needed for this project.

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Skill level 3	
3	
2	
1	
0	
NR	

10. Given these estimated prices below, calculate the total cost of materials needed for the project.

Timber/Materials	Price in Samoan Tala	Costs
2x6x10	\$10.00 per feet	
2x4x10	\$15.00 per feet	
3 inch nails	\$3.50 per pound	
5 inch bolt	\$5.00 per bolt	

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Skill level 2	
2	
1	
0	
NR	



You are requested by your mother to make a lavalava box for her. She buys a  $\frac{3}{4}$  inch marine ply, size 4x8 feet and says to use all the material and not leave any waste.

11. Draw with dimensions the top, bottom, two sides and two ends of the lavalava box. There should not be any waste.

Skill level 2	
2	
1	
0	
NR	

12. What type of joint would be best suited for the lavalava box in terms of strength and quality?

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Skill level 1	
1	
0	
NR	

13. Name one other material you would need to complete the lavalava box.

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Skill level 1	
1	
0	
NR	

14. List the tools you will need to make the lavalava box.

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Skill level 2	
2	
1	
0	
NR	

15. Discuss the process and materials you will use to finish a high quality job.

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Skill level 4	
4	
3	
2	
1	
0	
NR	

**Option B: Small Engine and Automotive Mechanics**

1. Describe the order of the 4-stroke-cycle engine.

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Skill level 2	
2	
1	
0	
NR	

2. How many valves are there on a six cylinder four stroke cycle engine?

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Skill level 1	
1	
0	
NR	

3. Explain what causes the excessive black smoke that comes out of the engine exhaust.

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Skill level 3	
3	
2	
1	
0	
NR	

4. Explain how the main components of a 2-stroke engine work together.

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Skill level 3	
3	
2	
1	
0	
NR	

5. Name the publication that contains procedures for disassembly and reassembly of vehicle systems.

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Skill level 1	
1	
0	
NR	

6. Define the following components of a small engine.

a. Spark plug

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Skill level 1	
1	
0	
NR	

b. Crankshaft

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Skill level 1	
1	
0	
NR	

c. Piston rings

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Skill level 1	
1	
0	
NR	

7. Describe how you would service an air cleaner on a small engine.

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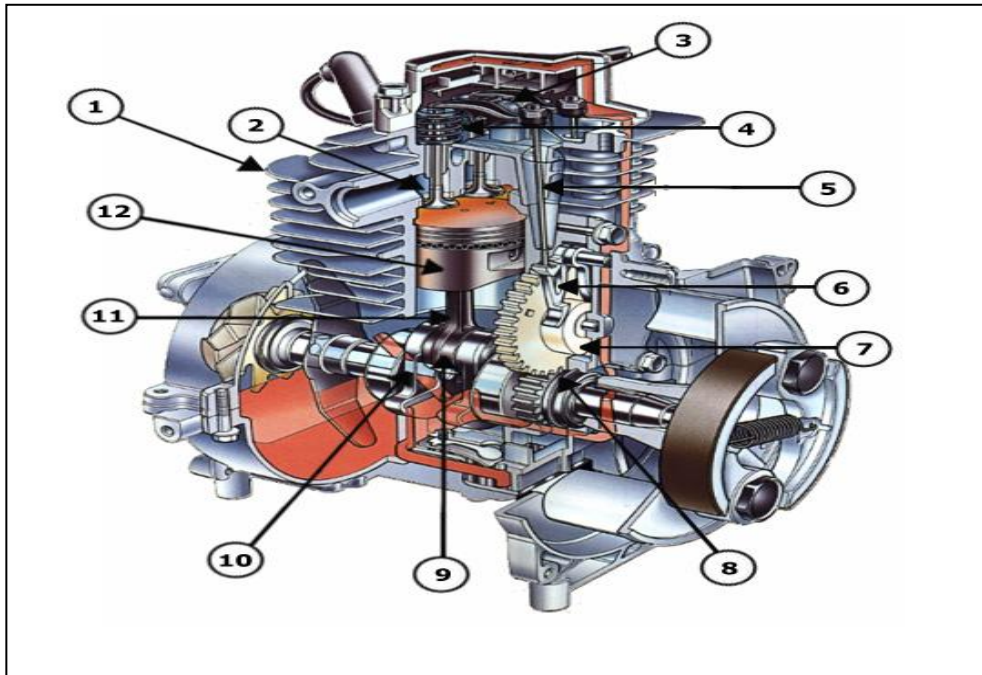
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Skill level 2	
2	
1	
0	
NR	

8. The figure below is a picture of an engine assembly.



Write the number that represents the:

a. Gears \_\_\_\_\_

Skill level 1	
1	
0	
NR	

b. Piston \_\_\_\_\_

Skill level 1	
1	
0	
NR	

c. Cylinder \_\_\_\_\_

Skill level 1	
1	
0	
NR	

d. Valve \_\_\_\_\_

Skill level 1	
1	
0	
NR	

9. Explain Bernoulli's principle by referring to a part of the engine where it is applied.

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Skill level 3	
3	
2	
1	
0	
NR	

10. Where should shop solvents and combustible materials be stored?

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Skill level 1	
1	
0	
NR	

11. Describe what should be done in the event of a significant oil spill in the garage.

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Skill level 2	
2	
1	
0	
NR	

12. In a paragraph discuss how a simple engine operates. Use specific examples

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Skill level 4	
4	
3	
2	
1	
0	
NR	



**STRAND 5      TECHNOLOGY**

**Weighting 10**

Technology is used to develop resource material used for various purposes in the building and engineering industry.

1. State an advantage of Timber.

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Skill level 1	
1	
0	
NR	

2. Name and give an advantage of an improved wood material over its traditional type.

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Skill level 1	
1	
0	
NR	

3. Describe with the aid of drawings, the cross sectional view of the material you named in 2.

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Skill level 2	
2	
1	
0	
NR	

4. Explain the process of seasoning wood material.

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Skill level 3	
3	
2	
1	
0	
NR	

5. Explain the environmental impacts of the construction and engineering industry in Samoa.

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Skill level 3	
3	
2	
1	
0	
NR	

Student Education Number

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## DESIGN TECHNOLOGY

2015

(For Markers only)

STRANDS	Weighting	Marks	Check Marker
<b>STRAND 1: DRAWING &amp; DESIGNING</b>	25		
<b>STRAND 2: TOOLS</b>	15		
<b>STRAND 3: MATERIALS</b> Option A: Wood Materials Option B: Metal Materials	20		
<b>STRAND 4: PROCESSING</b> Option A: Wood Technology Option B: Small Engine & Automotive Mechanics	30		
<b>STRAND 5: TECHNOLOGY</b>	10		
<b>TOTAL</b>	<b>100</b>		