STUDENT EDUCATION NUMBER									

Sāmoa Secondary Leaving Certificate

DESIGN TECHNOLOGY
2016

QUESTION and ANSWER BOOKLET

Time allowed: 3 Hours and 10 minutes

INSTRUCTIONS

1. You have 10 minutes to read **before** you start writing.
2. Write your **Student Education Number (SEN)** in the space provided on the top right hand corner of this page.
3. Answer **ALL QUESTIONS**. 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	Page Number	Time (Minutes)	Weighting
1. DESIGNING AND DRAWING	2	45	25
2. TOOLS AND SAFETY	7	27	15
3. MATERIALS	11	36	20%
4. PROCESSES	17	54	30%
5. TECHNOLOGY	27	18	10%
TOTAL		180	100

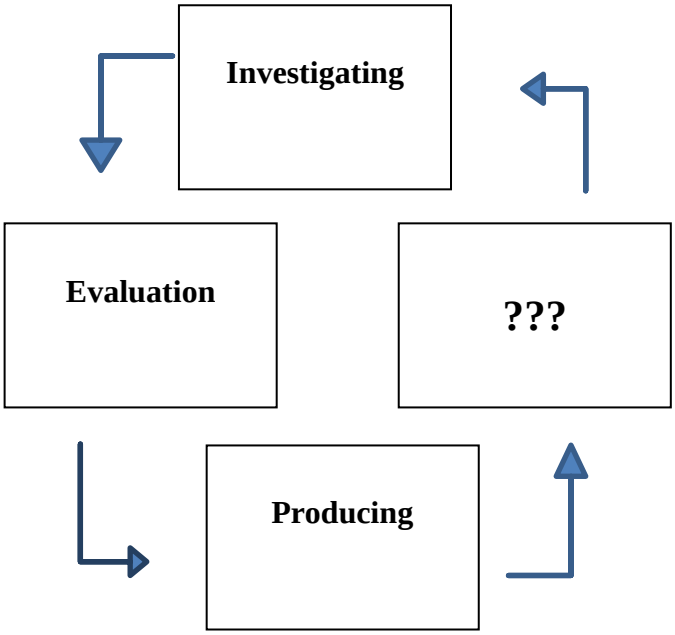
CHECK! This booklet contains pages 2-28 in the right order.

HAND THIS BOOKLET INTO THE SUPERVISOR AT THE END OF THE EXAMINATION

STRAND 1 Drawing and Designing Weighting 25

The diagram shows the design process model. Use the model and your own knowledge to answer Number 1-10.

THE DESIGN PROCESS



1.(i) What is the missing stage in the Design Process Model.

Skill level 1

_____

(ii) Describe the importance of this stage in the design process.

_____

_____

_____

_____

_____

Skill level 2

2. Define the following terms:

(i) *Evaluation*

Skill level 1

_____

_____

_____

(ii) *Producing*

Skill level 1

_____

_____

_____

3. At what stage of the Model is the project drawing developed?

Skill level 1

_____

_____

_____

4. Explain what is involved in the *Investigating* stage of the Model.

Skill level 3

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_____

_____

5. (i) Identify another part of the Model that is missing.

Skill level 1

_____

(ii) Explain the importance of the missing part in 5(i).

Skill level 3

6. At what stage of the model is the product developed?

Skill level 1

7. Write the problem statement for your Independent Project.

Skill level 1

8. At what stage is the design made?

Skill level 1

9. (i) Sketch the side and end view to scale,using the dimensions from your Independent Project.

Skill level 2

(ii) Use your sketch above to calculate and list the materials needed for the project.

Skill level 3

10. Evaluate your Independent Project and discuss how you can improve its quality.

Skill level 4

STRAND 2 Tools Weighting 15

This section contains Option A and Option B. Choose ONE Option only.

OPTION A: Wood Working Tools

Use the diagrams below to answer Number 11-17.

Diagram A

Diagram B

11. Name the tool in Diagram B and describe what it is used for.

Skill level 1

(i) Name:

_____

(ii) Use:

Skill level 2

_____

_____

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

Skill level 1

13. The tool in Diagram A is classified as a (*tick the correct answer*)

Skill level 1

Power Tool	Hand Tool

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

Skill level 2

15. Define the term *Power Tool.*

Skill level 1

16. Discuss the safety precaution that must be observed when using the tool in Diagram A.

Skill level 4

17. Explain why tools must be recorded and safely stored.

Skill level 3

OPTION B **Engineering Tools.**

Use the diagrams below to answer Number 18-24.

Diagram A

Diagram B

18. Name the tool in Diagram A and describe what it is used for.

(i) Name:

_____

Skill level 1

(ii) Use:

_____

_____

_____

Skill level 2

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

Skill level 1

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

Marking Tool	Measuring Tool

Skill level 1

21. Describe how the tool in Diagram B is used.

_____

_____

_____

_____

Skill level 2

22. Define the term *Power Tools*.

Skill level 1

23. Discuss the safety precaution that must be observed when using power tools.

Skill level 4

24. Explain why tools must be recorded and safely stored.

Skill level 3

STRAND 3 Materials Weighting 20

This section contains Option A and Option B. Choose ONE Option only.

OPTION A: Wood Materials

You have decided to build a single bed for your final year project.

25. Name a timber you will use for the project.

Skill level 1

_____

26. Draw and label the cross section of the timber you selected.

Skill level 1

27. Select a finish best suited to preserve and enhance your finished project.

Skill level 1

_____

_____

28. Explain the differences between local and imported timber.

Skill level 3

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29. In the table below evaluate the quality of Pine and Mahogany timber using the quality factors provided.

Quality factors	TIMBER	
	Pine	Mahogany
Straightness		
Defects		
Workability		
Presentation and finish		

Skill level 4

Processed wood materials are commonly used for construction and joinery.

30. Name a processed wood material, that is available locally.

_____

_____

Skill level 1

31. Explain the process of making the wood material you named in Question 30.

_____

_____

_____

_____

_____

_____

Skill level 3

32. Sketch the processed material you named in Question 31.

Skill level 1

Quality finish is an important factor in product development.

33. Name a local timber that will give you a quality appearance.

_____

Skill level 1

34. Describe the timber appearance you named above.

_____

_____

_____

_____

_____

Skill level 2

35. Describe the process you can use to get a quality finished product.

_____

_____

_____

_____

_____

Skill level 2

OPTION B: Metal Materials

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

36. Name ONE type of metal.

Skill level 1

_____

37. Identify ONE property of the metal named above.

Skill level 1

_____

_____

38. Select a suitable finish to preserve this metal.

Skill level 1

_____

_____

39. Describe the process you will use to best preserve this metal.

Skill level 3

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40. Evaluate the quality of this metal in terms of strength, durability, hardness and ability to withstand stress.

Skill level 4

41. Select and name suitable size metal(s) you can use to make a TV stand.

Skill level 1

42. Sketch to scale the diagram of your TV stand. The frame has four legs 60cm high, 40cm wide by 100cm long.

Skill level 2

43. Describe the nature of the metal you selected for the TV stand.

Skill level 2

_____

_____

_____

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_____

44. How will you join the parts of the TV stand?

Skill level 1

_____

_____

45. Select the best finish for this project.

Skill level 1

_____

46. Select a suitable material for the top of the TV stand and describe how it will be fixed to the frame.

Skill level 3

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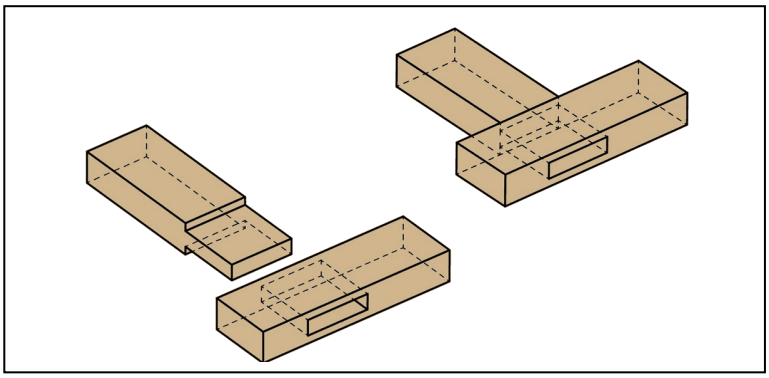
STRAND 4 Processing Weighting 30

This section contains Option A and Option B. Choose ONE Option only.

OPTION A: Wood Technology

Use the diagram below and your own knowledge to answer Questions 47 – 52.



47. Name the joint in the diagram.

_____

Skill level 1

48. Estimate the size of the material used for the joint in the diagram.

_____

Skill level 1

49. Label on the diagram the two main parts of the joint.

(i) Part 1

_____

Skill level 1

(ii) Part 2

_____

Skill level 1

50. Identify a part of the furniture where the joint is most suitable.

_____

Skill level 1

51. Explain the process or steps used for making the joint.

Skill level 3

_____

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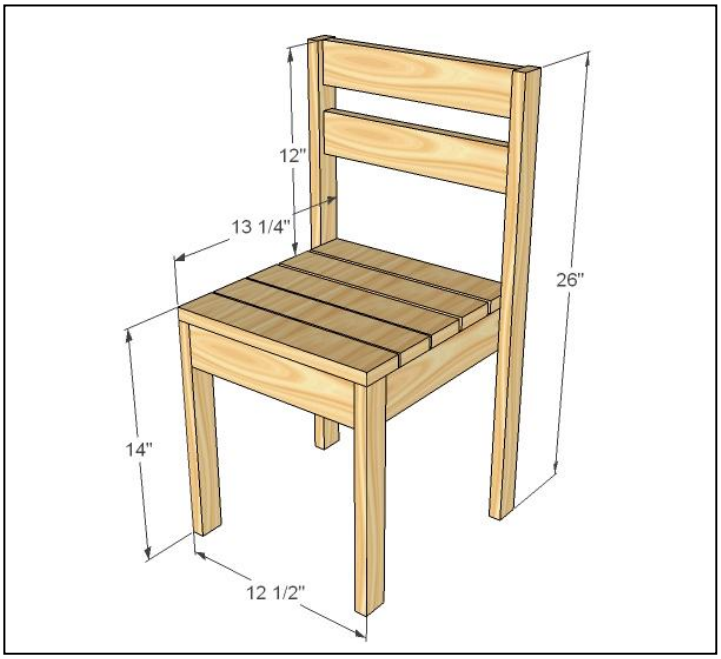
52. Name the tool used for checking squareness of the joint.

Skill level 1

_____

Use the diagram to answer Number 53 to 55.



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

Skill level 1

_____

54. Determine the height of the seat.

Skill level 1

_____

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

Skill level 3

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56. Discuss the materials needed for this project.

Skill level 4

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

Skill level 2

Materials	Price (Samoan Tala)
1x3x10	$12.50 per feet
Dowels	$2.00 each
PVA glue	$30.00 per 1 litre bottle
Stain	$35.00 per 1 litre can
Clear vanish	$30.00 per 1 litre can
Smooth sand paper	$3.00 per sheet
Wood screws (1 inch long)	50cents each

_____

_____

_____

_____

You are requested by your father to make a tool box for him. He buys a one inch thick marine ply, size 4x8 feet and says to use all the material and not leave any waste.

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

Skill level 2

59. What type of joint would be best suited for the tool box?

Skill level 1

_____

_____

60. Name THREE other materials you would need to complete the tool box.

Skill level 1

_____

_____

_____

61. Describe the tools you will need to make the tool box.

Skill level 2

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_____

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_____

62. Discuss the process you will use to produce a good quality tool box.

Skill level 4

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

63. Describe the order of the 2-stroke-cycle engine.

Skill level 2

_____

_____

_____

_____

_____

64. How many valves are there on an eight cylinder engine?

Skill level 1

_____

65. Explain how you can solve excessive black smoke from engine exhaust.

Skill level 3

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66. Explain the main components of a 4-stroke engine?

Skill level 3

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67. Name a common tool used in servicing an engine.

Skill level 1

_____

68. Define the following components of a small engine.

(i) Valves

Skill level 1

_____

_____

_____

(ii) Cylinder

Skill level 1

_____

_____

_____

(iii) Piston

Skill level 1

_____

_____

_____

69. Describe how you would service a small engine.

Skill level 2

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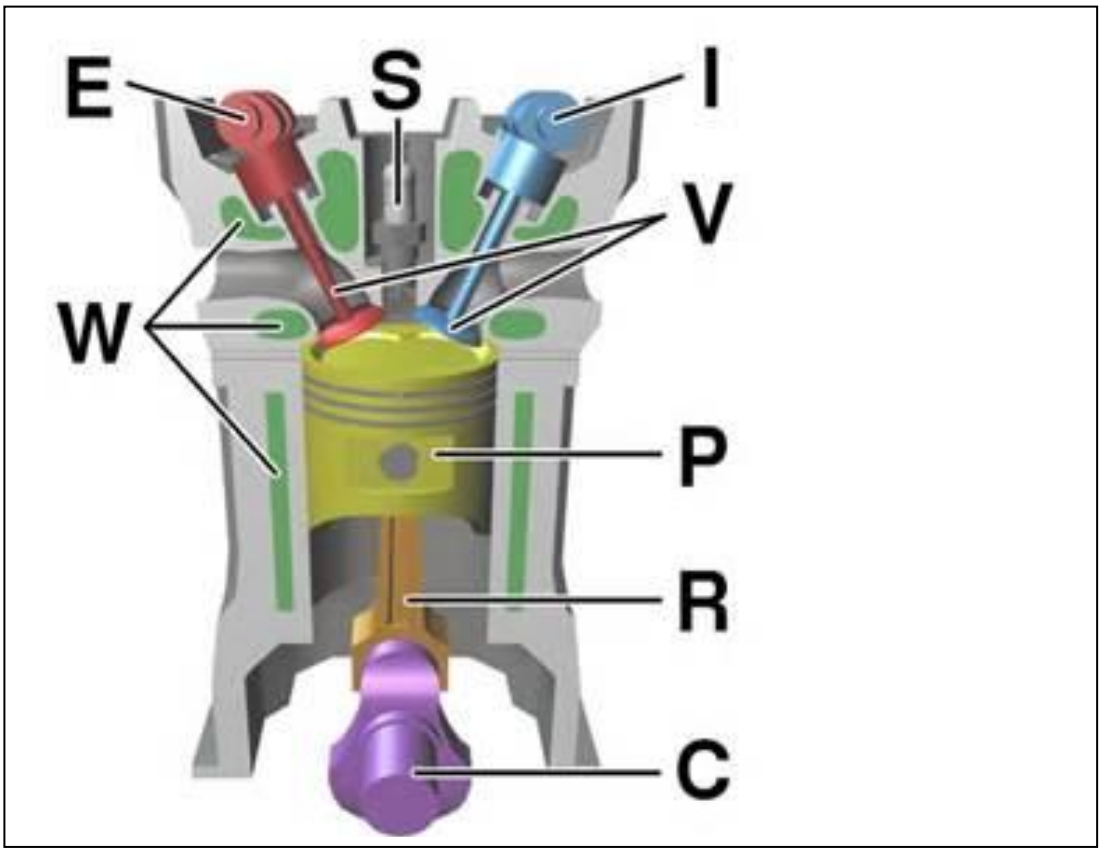
_____

The figure below is a picture of a simple engine.



70. The letters C,R,S and W in the diagram represents the:

Skill level 1	
iii	

i. C_____

Skill level 1	
iv	

ii. R_____

Skill level 1	
iii	

iii. S_____

Skill level 1	
iv	

iv. W_____

71. Select ONE engine system below and discuss how it operates.

Skill level 4

Cooling System, Ignition System, Fuel System, Brake System

72. How should tools and materials be stored?

Skill level 1

73. Discuss the environmental impact of the motor vehicle industry in Samoa.

Skill level 4

STRAND 5 Technology Weighting 10

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

74. Give ONE disadvantage of using timber or metal material.

Skill level 1

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_____

_____

75. Give ONE advantage of using timber or using metal.

Skill level 1

_____

_____

_____

76. Discuss the environmental concerns over the excessive use of timber or the excessive use metal.

Skill level 2

_____

_____

_____

_____

77. Explain the expectations of a design brief in terms of the materials needed.

Skill level 3

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78. Explain the impact of the construction industry on the environment.

Skill level 3