DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2012

FORM 5 **DESIGN & TECHNOLOGY** **TIME: 1h 45min**

Name: _____ Class: _____ Set: _____

---------- Note to student: ----------
You are required to answer all questions

	Areas corrected					Marks for Written Exam	Marks for Design Folio	TOTAL	**FINAL MARK**
	D	**RM**	**E**	**F**	**T**				
Max. Marks	20	20	20	20	20	100	100	200	**%**
Student's mark									

FOR TEACHERS' USE ONLY DISTRIBUTION OF MARKS

Enter student's mark obtained in every area of study in the above table.
D for Design, **RM** for Resistant Materials, **E** for Electronics, **F** for Food technology and **T** for Textiles technology

SECTION A: **DESIGN**

"ACS Airlines" is due to celebrating its fiftieth anniversary. "ACS" is asking you to design one of the following products to promote the airline's achievement:

- a textiles headrest cover for its passenger seats
- a light meal which will be distributed in-flight
- a small and simple electronic gadget for children
- a keychain for adult passengers

Before answering questions 1 – 4, choose ONE product from the above list. Underline your choice.

1. **a.** Write a design brief according to your choice of product.

_____

_____

_____

2 marks

b. Find TWO keywords from your design brief.

_____ _____

1 mark × 2 = 2 marks

2. State TWO methods by which you would complete research to prepare a design for your choice.

_____

_____

1 mark × 2 = 2 marks

3. Give THREE design specifications that you would consider for your chosen project.

_____

_____

_____

1 mark × 3 = 3 marks

4. In the boxes provided below, sketch TWO ideas for your chosen product. Add n[illegible] colour to your sketches.

IDEA 1:	IDEA 2:

4 marks × 2 = 8 marks

5. Give THREE reasons why testing is necessary in product design.

_____

_____

_____

1 mark × 3 = 3 marks

SECTION B: **RESISTANT MATERIALS** 20 marks

6. **a.** Complete the following table by mentioning the most suitable wooden manufactured board for each purpose. A material should only be mentioned once.

PURPOSE	MANUFACTURED BOARD
colourful and easily machined indoor furniture	
tabletop laminated with plastic	
cupboard thin back	
high-strength non-warping sheets for chair seats	

½ mark × 4 = 2 marks

b. Give ONE reason why a dust mask is needed when machining wooden m[illegible]d boards.

_____

1 mar[illegible]

7. A side-cutter was heat-treated and dip-coated before it is put on the market.

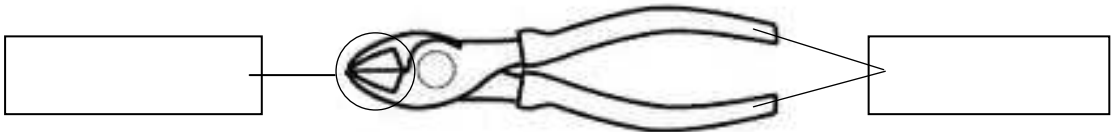


Figure A

a. Fill in the boxes provided in Figure A showing which part of the side-cutter was HEAT-TREATED and which part was DIP-COATED. **1 mark**

b. State ONE heat treatment process which is suitable for this tool. Give ONE reason for your answer.

PROCESS: _____

REASON: _____

1 mark × 2 = 2 marks

c. Give ONE reason why this tool was dip-coated.

_____

1 mark

8. Figure B shows a sketch of a magazine rack in 3D as seen from below.

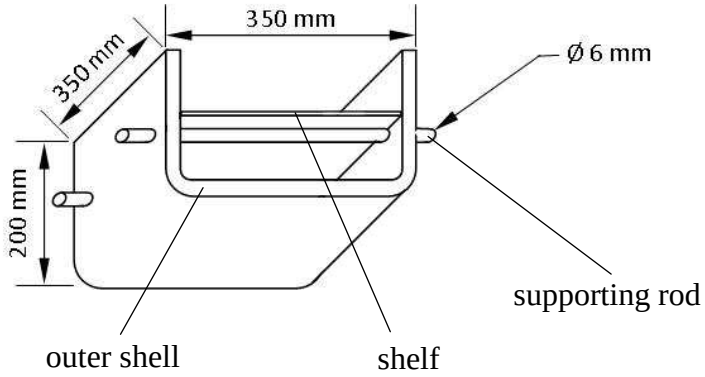


Figure B

a. Complete the following part list for the magazine holder shown in Figure B.

PART NAME	MATERIAL	SIZE (mm)	NO. OF ITEMS
outer shell	acrylic		1
shelf			1
supporting rod		Ø 6 × 380	2

1 mark × 4 = 4 marks

b. Illustrate TWO methods by which the 6 mm Ø supporting rods can be held in place without slipping out of the outer shell.

METHOD 1:	METHOD 2:

1 mark × 2 = 2 marks

9. Sarah is designing an etching tank which will help her produce PCBs at home. In order to obtain better etching results, she included an agitator inside the tank to stir up the acid. Figure C shows a sketch of one of her ideas for the agitator.

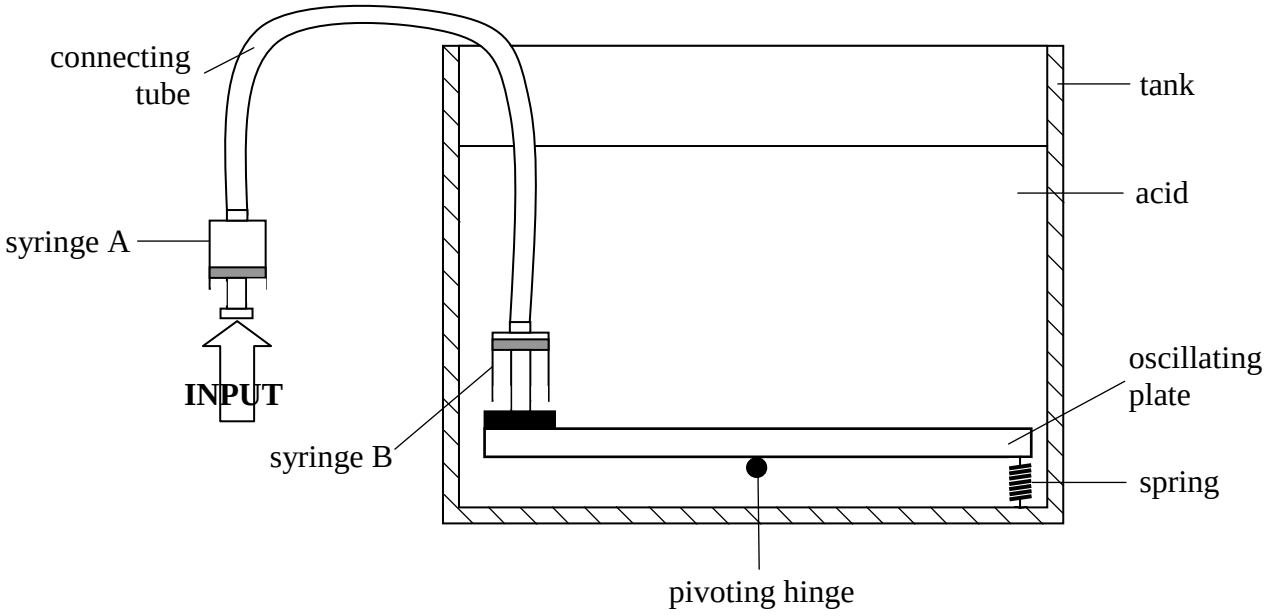


Figure C

a. Draw an arrow on Figure C to describe what happens at the OUTPUT of the system when syringe A is held pushed. **1 mark**

b. Name the TWO types of mechanical systems used to obtain the oscillating movement of the plate.

_____ _____

1 mark × 2 = 2 marks

c. What is the function of the spring?

_____

1 mark

d. Suggest, by means of a sketch, ONE other mechanism by which Sarah ca... same output movement.

3 marks

SECTION C: **ELECTRONICS** 20 marks

10. Figure D shows an incomplete timing circuit which Sarah used for her etching tank.

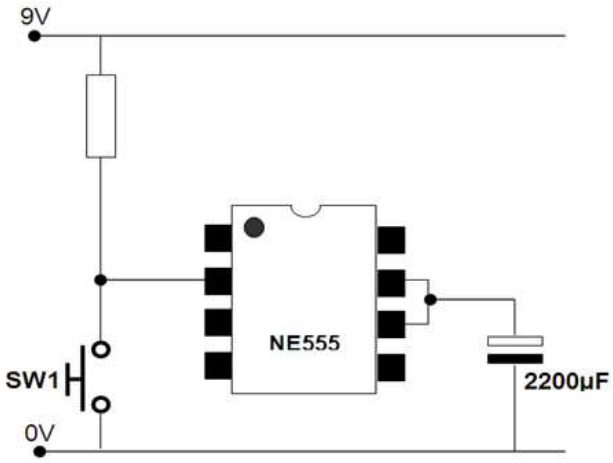


Figure D

a. What type of capacitor is used in the electronic circuit shown in Figure D?

_____

1 mark

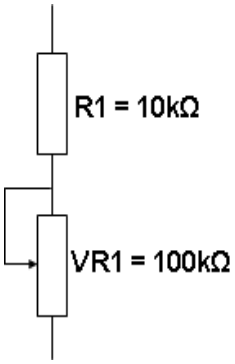


Figure E

b. Connect the two resistors shown in Figure E to complete the timing circuit shown in Figure D.

2 marks

c. Give the name of the component VR1 in Figure E.

_____

1 mark

d. Calculate the minimum timing using the data given on the completed circuit.

_____

_____

_____

1 mark

e. Calculate the maximum timing of the completed circuit.

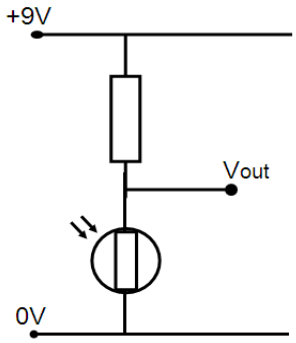
_____

_____

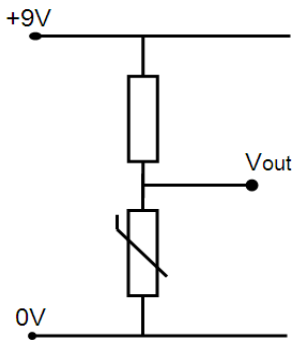
_____

2 marks

11. Circuit A and B are two potential divider circuits. Circuit A uses an LDR while Circuit B uses a thermistor.



Circuit A



Circuit B

Using the datasheets for the LDR and thermistor, a student collected the following information:

LDR	
Low resistance	Light
High resistance	Dark

Thermistor	
Low resistance	High Temperature
High resistance	Low temperature

a. Using the above information, briefly describe the function of the two circuits.

i. Function of circuit A:

_____

_____

1 mark

ii. Function of circuit B:

_____

_____

1 mark

b. Show how a voltmeter is to be connected to check the output voltage V_{out} on circuit A.

1 mark

12. **a.** Indicate whether the given components are used as INPUT, PROCESS or OUT
Mark ✓ under the correct heading. (Note that two are given).

Component	INPUT	PROCESS	OUTPUT
Battery	✓		
Push-to-make switch			
NOT GATE			
AND GATE			
Resistor		✓	
LED			

½ mark × 4 = 2 marks

b. Figure F shows an electronic circuit with two push-to-make switches connected to a logic system together with its corresponding truth table.

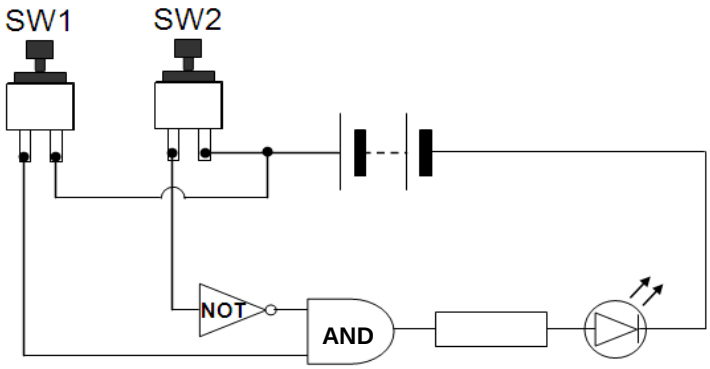


Figure F

Truth Table

INPUT		OUTPUT
SW1	SW2	LED
0	0	0
0	1	0
1	0	1
1	1	0

In the space provided design a circuit to satisfy the logic in the new truth table shown below.

New Truth Table

INPUT		OUTPUT
SW1	SW2	LED
0	0	1
0	1	1
1	0	0
1	1	1

3 marks

13. The cam shown in Figure G rotates in an anticlockwise movement. When the [illegible] lever-type SPDT micro switch, the switch is activated.

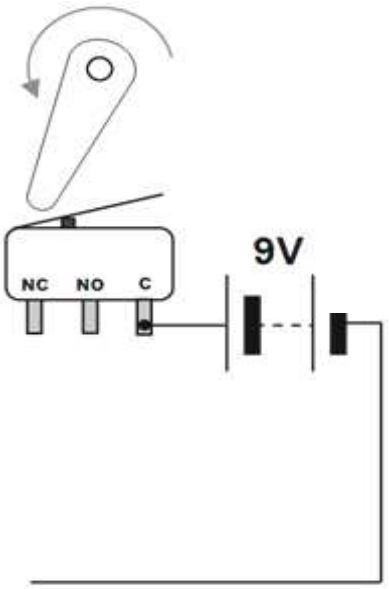


Figure G

a. What does SPDT refer to?_____

1 mark

b. Draw the electronic symbol for a SPDT switch.

1 mark

c. By completing the electronic circuit shown in Figure G, design a system that lights up a red LED when the cam hits the micro switch but lights up a green LED when the cam is not in touch with the micro switch.
Label all electronic components used in your design.

3 marks

SECTION D: **FOOD** 20 marks

14. From which food group should we eat (a) most and (b) sparingly?

a. eat most : _____

b. eat sparingly : _____

1mark × 2 = 2 marks

15. Give TWO reasons why it is important for food industries to provide good packaging for their products.

_____

_____

1 mark × 2 = 2 marks

16. State ONE safety precaution that should be observed by a food handler to prevent the following:

a. cuts _____

b. hair catching fire: _____

c. tipping over saucepans while cooking:_____

1 mark x 3 = 3 marks

17. Match the following food with the appropriate method of cooking.

	METHOD OF COOKING		FOOD COOKED BY THIS METHOD
1	Deep frying		Sausages
2	Poaching		Battered chicken
3	Shallow frying		Vegetables
4	Baking		Eggs
5	Steaming		Apple pie

1 mark × 5 = 5 marks

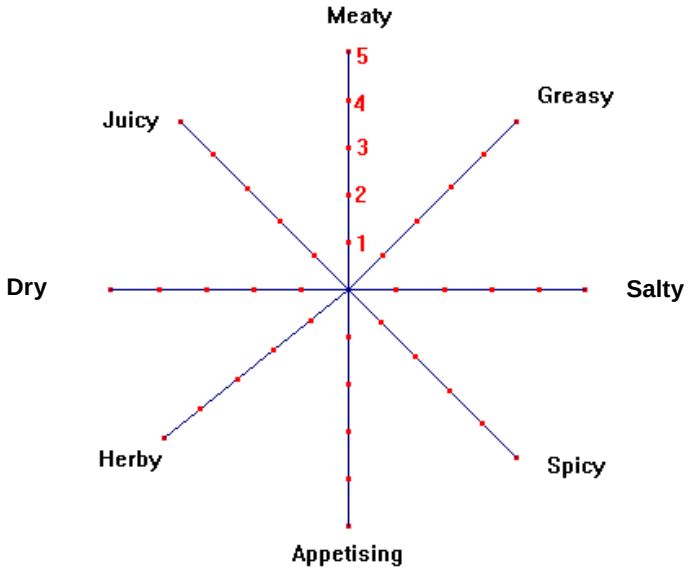
18. Suggest a healthy meal and a desert for a group of elderly people.

Meal: _____

Desert: _____

3 marks

19. Figure H shows the axis of the star diagram for a beef burger.



a. Plot the following information to complete the star diagram.

Meaty	Greasy	Salty	Spicy	Appetising	Herby	Dry	Juicy
5	2	5	4	5	3	2	4

1 mark

b. From the information given, suggest ONE healthy modification that could be made to the burger. Give a reason for your answer.

_____

1 mark × 2 = 2 marks

20. Biotechnology is the use of living things to create or modify food products. These can be created either by traditional or by modern biotechnology. Which of the following statements is indicating traditional biotechnology?

A: Rice with built-in Vitamin A that can help prevent blindness in people suffering from Vitamin A deficiency.

B: The selection of the best fruit to ensure good quality seeds for the future crops.

Statement: ☐

2marks

SECTION E: **TEXTILES** 20 marks

21. Give TWO reasons why manufacturers add finishes to fabrics.

_____

_____

_____

2 marks × 2 = 4 marks

22. Explain why designers sometimes use a Toile (a Mock-up model) when designing and developing a new textile product.

_____

_____

_____

4 marks

23. Give TWO reasons why the use of CAM (Computer Aided Manufacture) fa[illegible] production of textile products.

_____

_____

1 mark × 2 = 2 marks

24. Write a work plan with the five main stages for producing an appliqué design. The first stage has been done for you.

1	Cut out the fabric shapes.
2	
3	
4	
5	

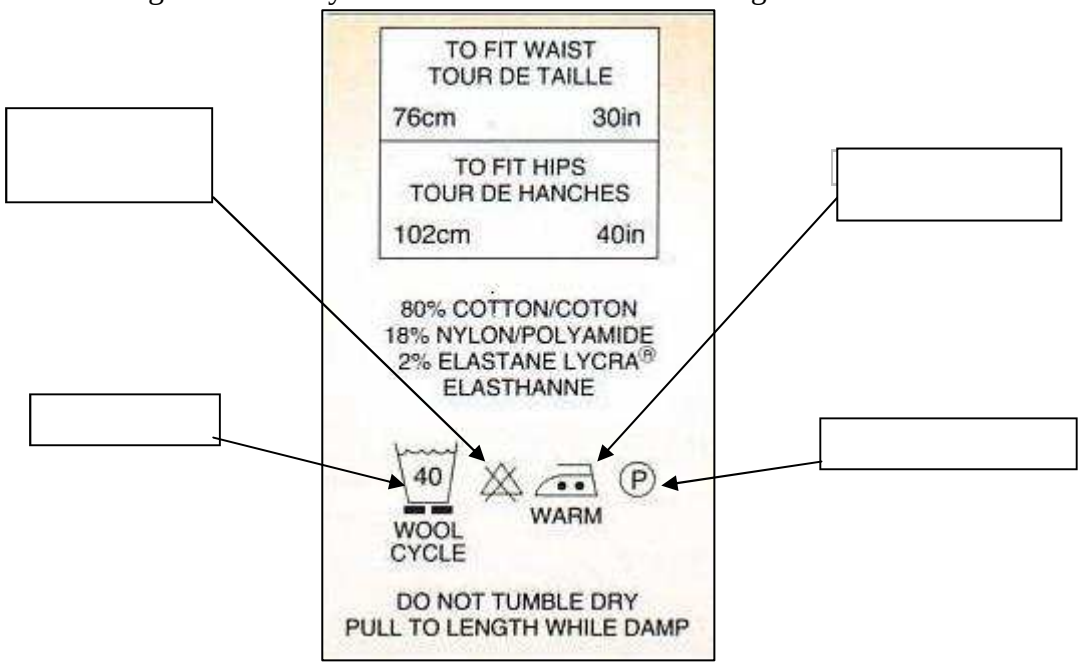
4 marks

25. Which fibres are represented by the symbols shown below?

_____ _____

1 mark × 2 = 2 marks

26. Give the meaning of the four symbols indicated on the following textiles care label.



1mark × 4 = 4 marks