

**FORM 3 (year 3)**

**DESIGN & TECHNOLOGY**

**TIME: 2 hours**

**Name:** \_\_\_\_\_ **Class:** \_\_\_\_\_ **Set:** \_\_\_\_\_

----- **Note to student:** -----  
**You are required to answer all questions**  
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	Areas corrected					Marks for Written Exam.	Marks for Design Folio	TOTAL	<b>FINAL MARK</b>
	<b>D</b>	<b>RM</b>	<b>E</b>	<b>T</b>	<b>F</b>				
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, **T** for Textiles technology and **F** for Food technology

## SECTION A: DESIGN

Read carefully the situation given below before answering questions 1 to 5.

### SITUATION:

When students go on an educational outing they do not bring their usual school bag. The school wishes that all students will be identified not only by their uniform but also by the bag that they are carrying. The school has asked you to design a student's bag to be used during school outings.

1. What problem is being presented in the above situation?

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**2 marks**

2. Write down a Design Brief for the given situation.

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**3 marks**

3. For your design ideas to be satisfactory and acceptable, first you need to do research. You therefore decided to conduct some interviews related to the above situation.

a. Write down THREE questions you would ask to students.

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**1 mark x 3 = 3 marks**

**b.** Write down THREE questions you would ask to the Head of school.

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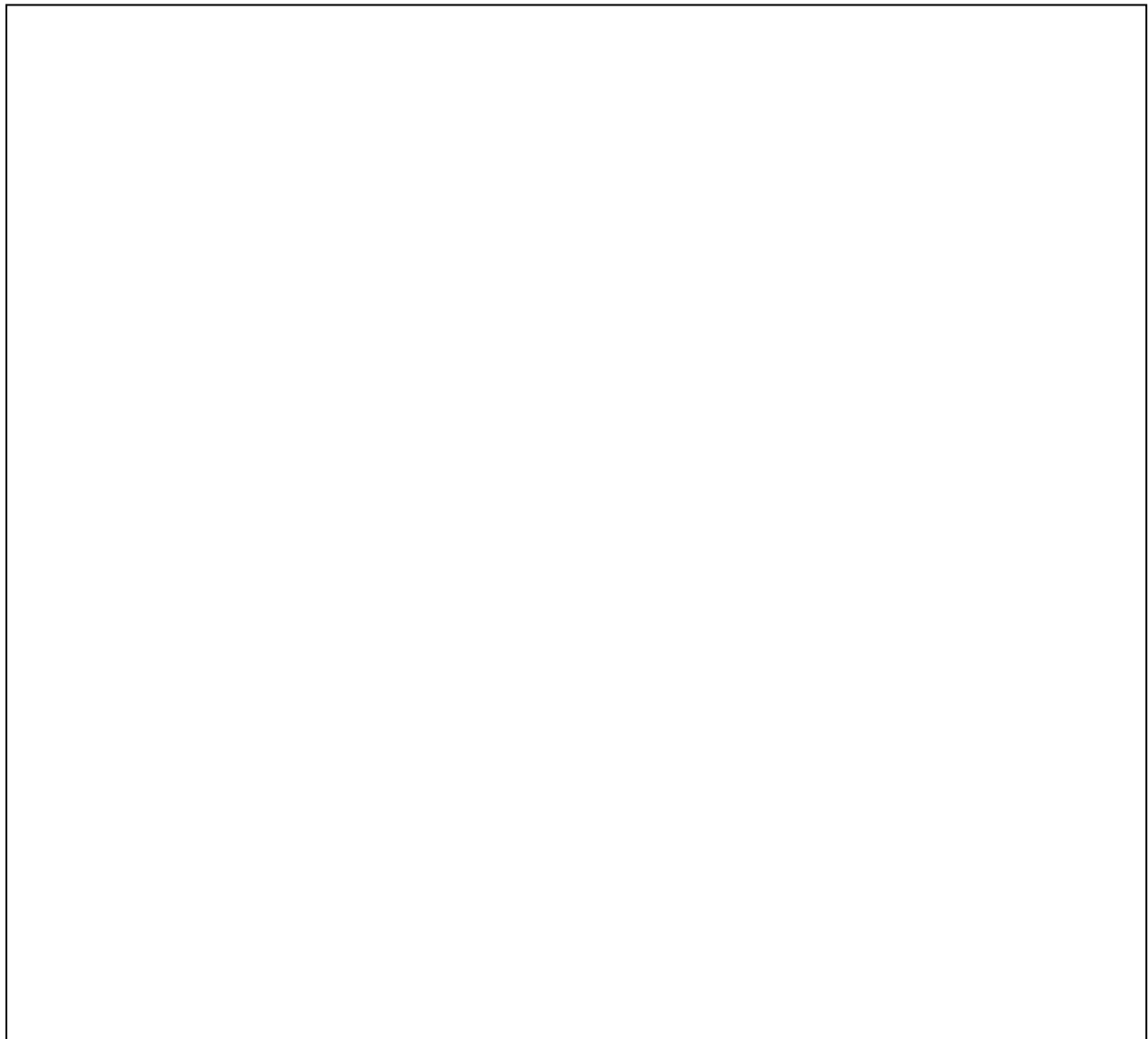
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**1 mark x 3 = 3 marks**

**4.** In the space below, sketch ONE idea for your design brief. Add notes, overall dimensions and colour to your sketch.



**9 marks**

## SECTION B: RESISTANT MATERIALS

5. Figure A shows a set of outdoor table and benches. The frames are made of steel, while the tops are made of mahogany.



**Figure A**

a. Complete the following by underlining the correct word or phrase in the brackets.

- Mahogany is a reddish-brown ( softwood / hardwood / manufactured board ) that can be used for outdoor furniture because it is ( durable / soft / elastic ).
- Steel is a ( ferrous / non-ferrous ) alloy made from a mixture of ( aluminium and carbon / zinc and carbon / iron and carbon ). The higher the carbon content, the ( tougher / harder / heavier ) is the steel.
- The steel frame of the outdoor furniture shown in Figure A can be joined by ( soft soldering / pop-riveting / electric-arc welding ).

**$\frac{1}{2}$  mark  $\times$  6 = 3 marks**

b. Name ONE suitable finish for the mahogany tops.

\_\_\_\_\_ **1 mark**

c. Name ONE suitable finish for the steel frames.

\_\_\_\_\_ **1 mark**

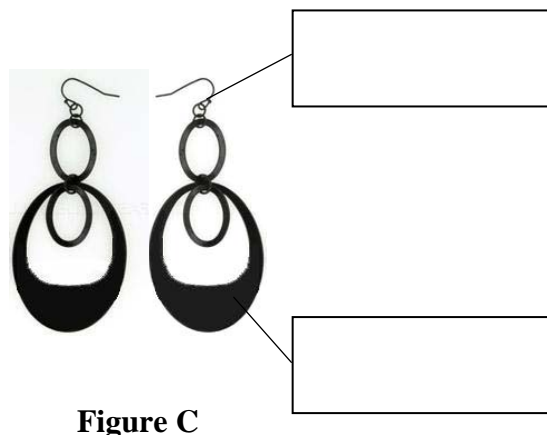
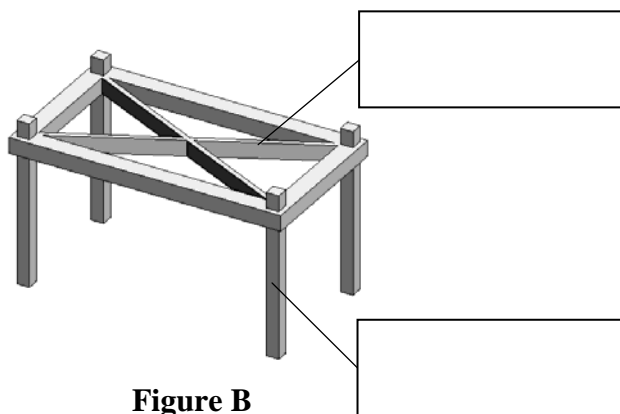
d. Name ONE method used to join the wooden tops to the metal frames.

\_\_\_\_\_ **1 mark**

6. The following is a list of standard forms for metals.

- wire
- square section
- sheet
- flat bar

Use the above list to label Figure B and Figure C with the appropriate standard forms.



**1 mark × 4 = 4 marks**

7. A student needs to use the plastic line bender in order to bend a piece of 3mm Acrylic at a right angle.

a. Fill in the missing stages of the following work plan.

Align the marked bending line with the heating element.
↓
↓
Once the plastic heats adequately, switch off heating element and apply bending force.
↓
↓
Remove the bent Acrylic from the line bender.

**1 mark × 2 = 2 marks**

b. Mention TWO safety precautions which must be taken when using the line bender.

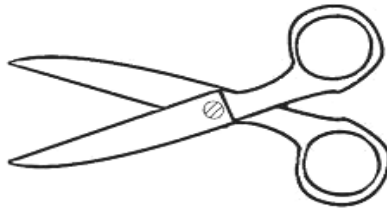
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**1 mark × 2 = 2 marks**

8. The pair of scissors shown in Figure D is being used to cut out a piece of THIN track.
- a. On Figure D, label the input and output of the scissors mechanism. Also add arrows to explain the direction of movement.



**Figure D**

**1 mark  $\times$  4 = 4 marks**

- b. The same scissors will now be used to cut a piece of THICK carton. How will this effect the input force?

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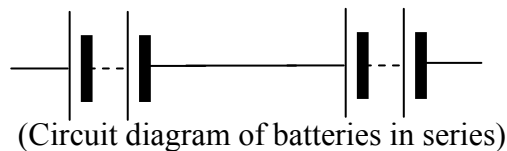


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**2 marks**

### SECTION C: ELECTRONICS

9. To power her environmentally friendly project, Anne needs two AA batteries connected in series.



**Figure E**

- a. For Anne's project to remain environmentally friendly, does she need to use PRIMARY or SECONDARY batteries? Give ONE reason.

Type of battery: \_\_\_\_\_

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

**1 mark  $\times$  2 = 2 marks**

- b. Calculate the total voltage of the two AA batteries connected in series as shown in Figure E. Show ALL working.

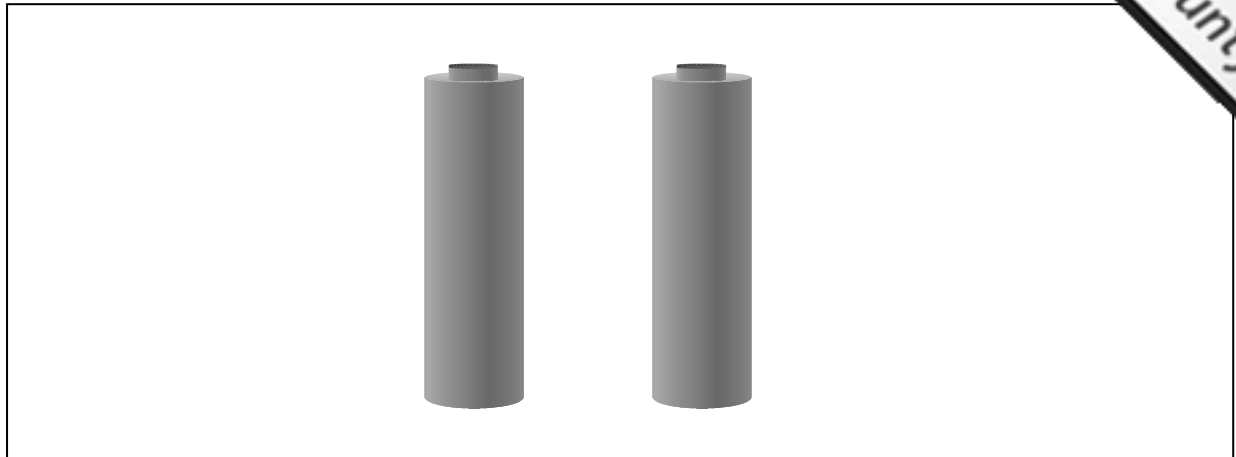
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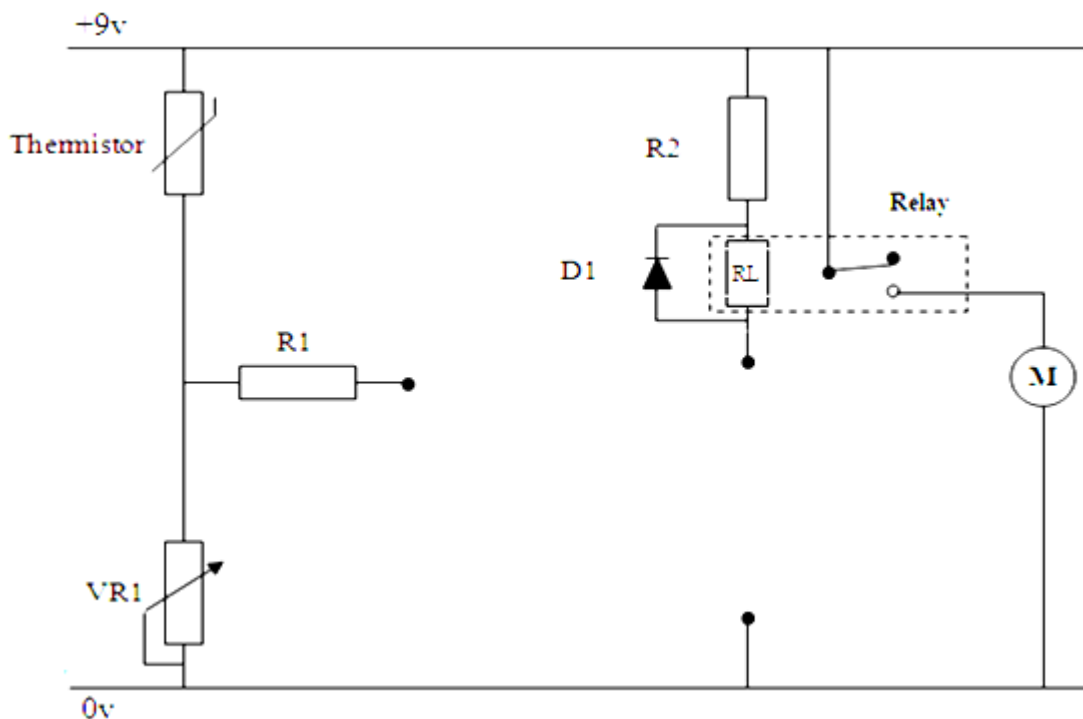
**2 marks**

- c. In the space provided below show how the two AA batteries are to be wired in series.



**1 mark**

10. A Design and Technology student designed an electronic circuit so that when the temperature rises above 28°C a DC motor rotates. From his research, the student found that a Darlington pair is needed to amplify the input current so that a 6V relay switch could be energized, hence the DC motor will rotate. Figure F shows the electronic circuit diagram of the student without the Darlington pair.



**Figure F**

- a. Complete the electronic circuit diagram shown in Figure F to show how the Darlington pair is to be connected.

**1 mark**

b. Why did the student connect a resistor in series with the relay switch?

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1 mark

c. On the circuit shown in Figure F draw an SPST type switch, so that the student could switch the given circuit ON and OFF.

1 mark

d. Give a reason why the student used a diode in his circuit.

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2 marks

11. Figure G shows an electronic component.

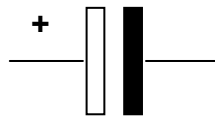


Figure G

a. What component is shown in Figure G?

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1 mark

b. Mention ONE use of the component shown in Figure G.

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1 mark

c. State TWO precautions that should be observed when using the component shown in Figure G.

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1 mark  $\times$  2 = 2 marks

d. Mention ONE type on a non-polarized capacitor.

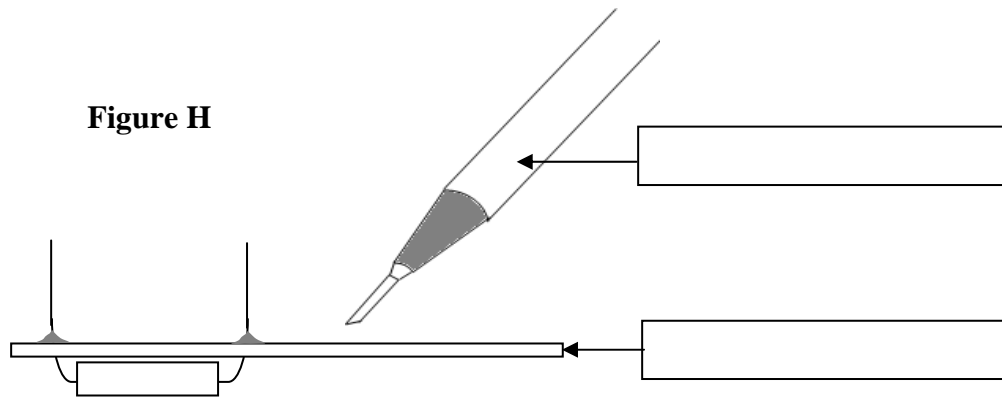
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1 mark



12. Figure H shows an electronic component being assembled for a Design and Technology

**Figure H**



a. In the spaces provided in Figure H, label the diagram accordingly.

**1 mark × 2 = 2 marks**

b. What tool is used to cut the excess legs of the component?

**1 mark**

c. Mention TWO safety precautions that should be followed during soldering.



**½ mark × 2 = 1 mark**

d. Is soft solder a conductive or an isolative material?

**1 mark**

## SECTION D: FOOD

13. Name the kitchen tools shown below and state their use.

Picture of tool	Name of tool	Use of tool
		
		

**1 mark x 4 = 4 marks**

14. Mark with a ✓ to show whether the following words are classified as input, process, The first one has been done for you.

	INPUT	PROCESS	OUTPUT
Roasting		✓	
Spices			
Mixing			
Lasagne			
Tomatoes			
Apple pie			
Cooking			
Herbs			
Pea Soup			
Baking			
Weighing			

½ mark x 10 = 5 marks

15 a. At what stages of pastry making were these photos taken?



Photo A taken during: \_\_\_\_\_



Photo B taken during: \_\_\_\_\_

1 mark x 2 = 2 marks

b. State TWO ways of preparing and cooking vegetables in order to avoid loss of nutrients.

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1mark x 2 = 2 marks

16 a. Mention ONE packaging material suitable for hot take-away food.

\_\_\_\_\_

1 mark

b. Give ONE advantage of the material you mentioned in question 16a.

\_\_\_\_\_

1 mark

17 a. Traditional cheeselets (gbejniet) are healthy because they are:

i. LOW in \_\_\_\_\_

ii. HIGH in \_\_\_\_\_

1 mark x 2 = 2 marks

b. Write down the energy value per 1 gram of:

i. Protein \_\_\_\_\_

ii. Carbohydrate \_\_\_\_\_

iii. Fat \_\_\_\_\_

1 mark x 3 = 3 marks

## SECTION E: TEXTILES

18. Figure I shows the weave of a piece of fabric.  
Name the weave used to construct the fabric shown.

\_\_\_\_\_

2 marks

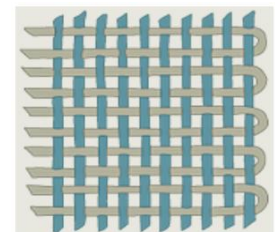


Figure I

19. Figure J shows the weave of a piece of fabric. State what each arrow is showing.

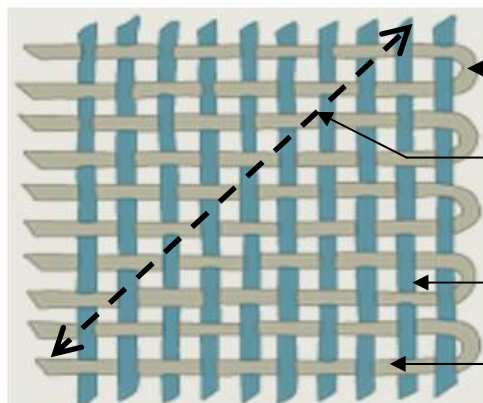


Figure J


1 mark x 4 = 4 marks

20. Say whether the following statements are true or false.

		TRUE or FALSE
1	The origin of synthetic fibres is plants.	
2	Elastane fibre is suitable for the manufacture of bathing suit material.	
3	Fabric made from Lycra fibre is suitable for the manufacture of towels.	
4	The most important property for the fabric of a raincoat is colour.	
5	Cotton is suitable for the manufacture of shower robes.	

1 mark x 5 = 5 marks

21. State TWO ways for giving shape to fabrics.



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1 mark x 2 = 2 marks

22. State what temperature setting the following ironing symbols indicate. State a type of fabric suitable for each ironing symbol.

Ironing symbol	Temperature Setting	Suitable to iron:
		
		

1 mark x 4 = 4 marks

23. State a hazard (*a danger*) associated with each of the following tasks:

a. Using buttons for small children's clothes

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b. Using a steam iron

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c. Using an overlock machine

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1 mark x 3 = 3 marks