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

FORM 4 **DESIGN & TECHNOLOGY** **TIME: 2 hours**

Name: _____ **Class:** _____

---------- 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**	**T**	**F**				
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

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SECTION A: **Design**

Read the situation below and answer questions 1 to 7.

A toy manufacturer has noticed that the sales of pull along toys *(a toy which can be pulled/pushed along)* for children aged between 2 and 3 years old are declining. The manufacturer wants to sell the product around the globe.

1. Write down a design brief for the given situation and on your design brief underline TWO keywords.

_____

_____

_____

1 mark + (½ × 2) = 2 marks

2. Research is an important part of a design process. In the space provided mention THREE aspects you would research for to design a pull along toy.

■_____

■_____

■_____

1 mark × 3 = 3 marks

3. Write THREE design specifications that you would consider essential for an appropriate pull along toy required by the manufacturer.

■_____

■_____

■_____

1 mark × 3 = 3 marks

4. In the space provided below sketch ONE idea you would present to the manufactu
producing a pull along toy. *In your answer add notes, dimensions, labelling, and colou*

6 marks

5. Explain briefly how you could evaluate the initial ideas in order to find out the best idea for your project.

_____

_____

_____

1 mark

6. Which is the most suitable method used for making your product and state why?

■ Method of production: _____

■ Reason why: _____

_____

1 mark × 2 = 2 marks

7. Explain 3 types of testing that should be applied to the model (prototype) before it is manufactured.

■_____

_____

■_____

_____

■_____

_____

1 mark × 3 = 3 marks

8. A student needed a mechanism with three variable rotational speeds for a project. The st… came up with a combination of six pulleys set-up on two shafts. Figure A explains how thi… mechanism functions.

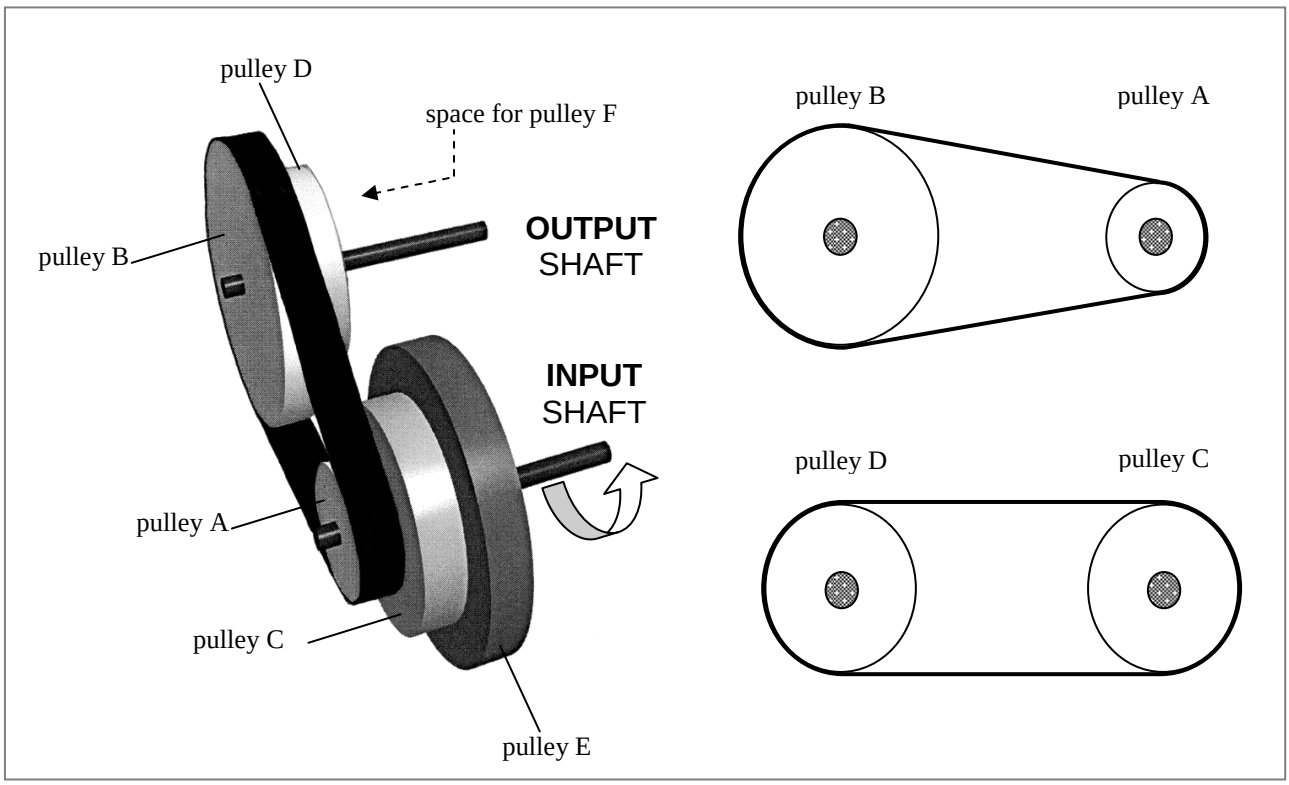


Figure A

a. State the direction of rotation of the OUTPUT shaft. _____

1 mark

b. Underline the correct words in the following sentences:

i. When the belt is engaged on pulley A and pulley B the output speed is (less than / equal to / greater to) the input speed.

ii. When the belt is engaged on pulley B and pulley C, the output speed is (less than / equal to / greater to) the input speed.

½ mark × 2 = 1 mark

c. The student wanted to obtain an increase in speed from the input to the output when pulley E and pulley F are engaged. Complete the diagram on Figure B by drawing and labelling pulley F and adding the belt.

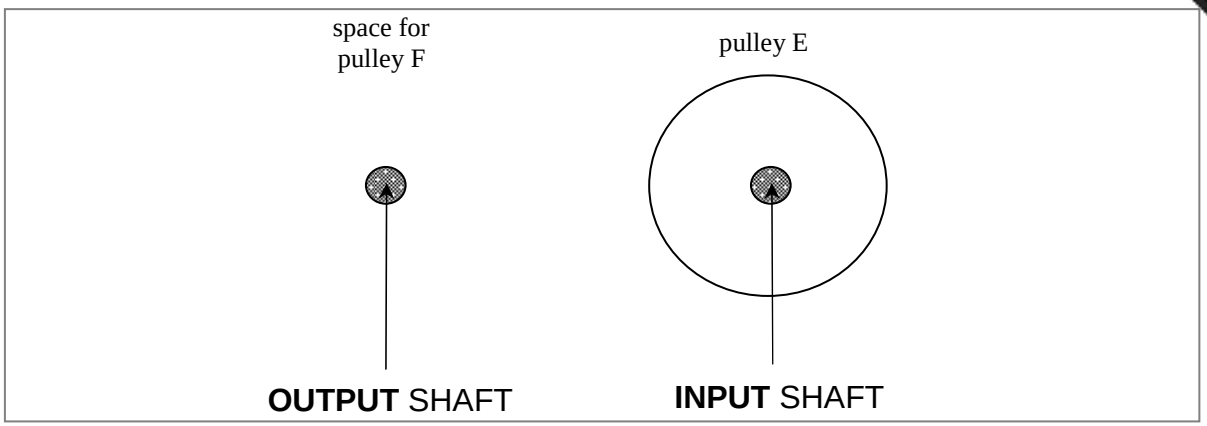


Figure B

2 marks

d. Describe the relationship between the speed and force in a pulley and belt mechanism.

_____

2 marks

9. MDF was used to make a model of the pulley system.

a. Define what MDF stands for: _____

1 mark

b. Give TWO reasons for this choice of material:

■_____

■_____

1 mark × 2 = 2 marks

c. Here is a list of tools that the student could have used when producing the model of pulleys.

▪ chisel ▪ pillar drill and twist drill ▪ Vernier callipers ▪ a pair of compasses ▪ coping saw

Using the above list, state the most suitable tool for each of the following processes:

i. marking the outside diameter of the pulley_____

ii. cutting the outside diameter of the pulleys _____

iii. making the centre holes on the pulleys _____

iv. checking the dimension of the outside diameter of the pulleys _____

_____

½ mark × 4 = 2 mark

10. Both input and output shafts were made from a wooden dowel and each pulley wa
2mm away from the other on the same shaft.

a. Name the most suitable adhesive for joining the pulleys to the shaft. _____

1 mark

b. In the space below, illustrate ONE method how to keep the 2mm distance between each pulley on the shaft.

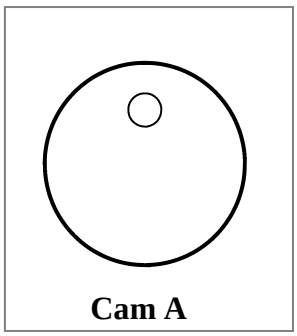
2 marks

11. A cam was connected on the output shaft of the pulley system shown in Figure A in order to obtain a change in motion.

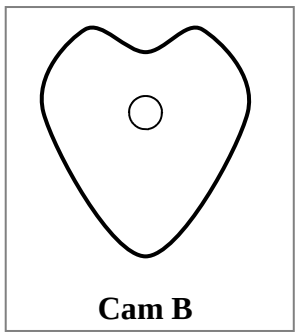
a. What type of motion is obtained at the output of a cam? _____

1 mark

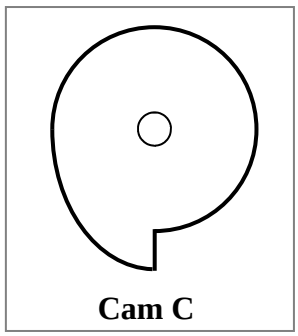
b. Give the names of the following cam profiles.



Cam A



Cam B



Cam C

_____ _____ _____

1 mark × 3 = 3 marks

c. Which of the above cams will not work in the system that the student designed? Give ONE reason for your answer.

■ CAM: _____

■ REASON: _____

1 mark × 2 = 2 marks

12. Figure C shows a block diagram of an electronic circuit used in a project.

a. On Figure C, properly show in the INPUT, PROCESS, and OUTPUT stages of the circuit.

3 marks

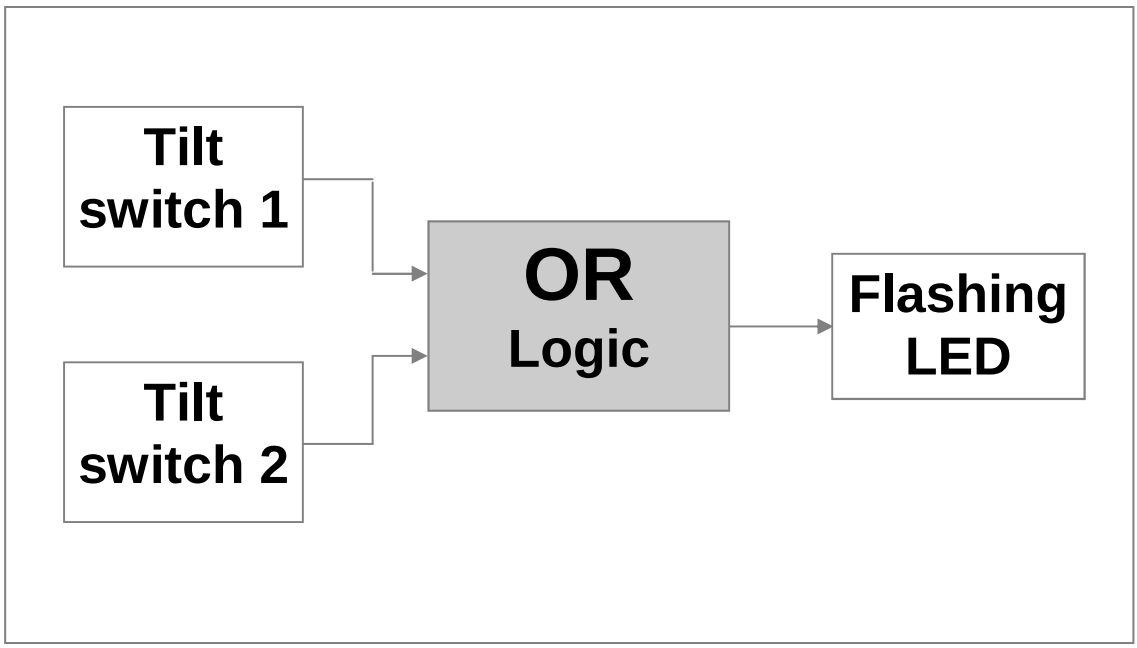


Figure C

b. Draw the symbol used for an OR gate and label its inputs **A,B** and its output **Z.**

2 marks

c. Complete the truth table for an OR gate.

OR gate truth table		
INPUTS		OUTPUT
0	**0**	
0	**1**	
1	**0**	
1	**1**	

½ mark × 4 = 2 marks

d. Logic gates are built within an IC. What does IC mean?

_____

1 mark

13. Figure D shows a possible layout to develop the design idea in **question 1**. When the shaft shown in Figure D rotates, either clockwise or anticlockwise, an LED lights.

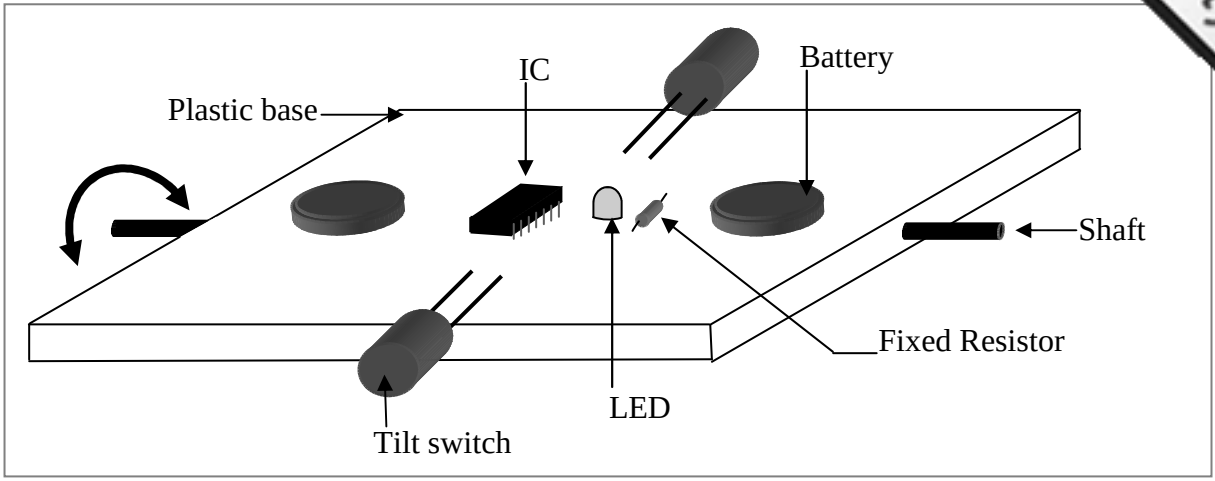


Figure D

a. What type of batteries did the student use for the project shown in Figure D?

_____

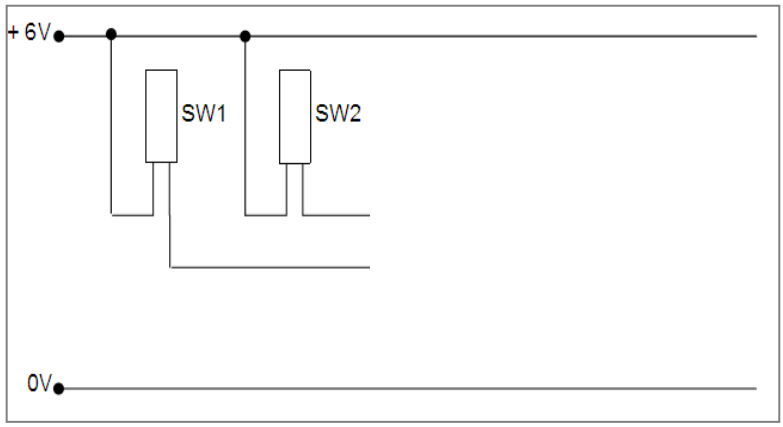
1 mark

b. If each battery has a voltage of 3V and the student needs to have 6V, show how the two batteries are to be connected using electronic symbols only.

2 marks

c. Figure E shows the INPUT circuit diagram of the project. Complete the circuit by designing the PROCESS and OUTPUT stages. Label all components used and show the necessary calculation.

Datasheet information for: LED: 2.3V, 0.025amps
OR gate output voltage: + 5V



Design calculations:

Figure E

5 marks

14. Instead of using an LED for the OUTPUT stage, a design and technology student [illegible] circuit shown in Figure F to have a beeping type sound for the OUTPUT.

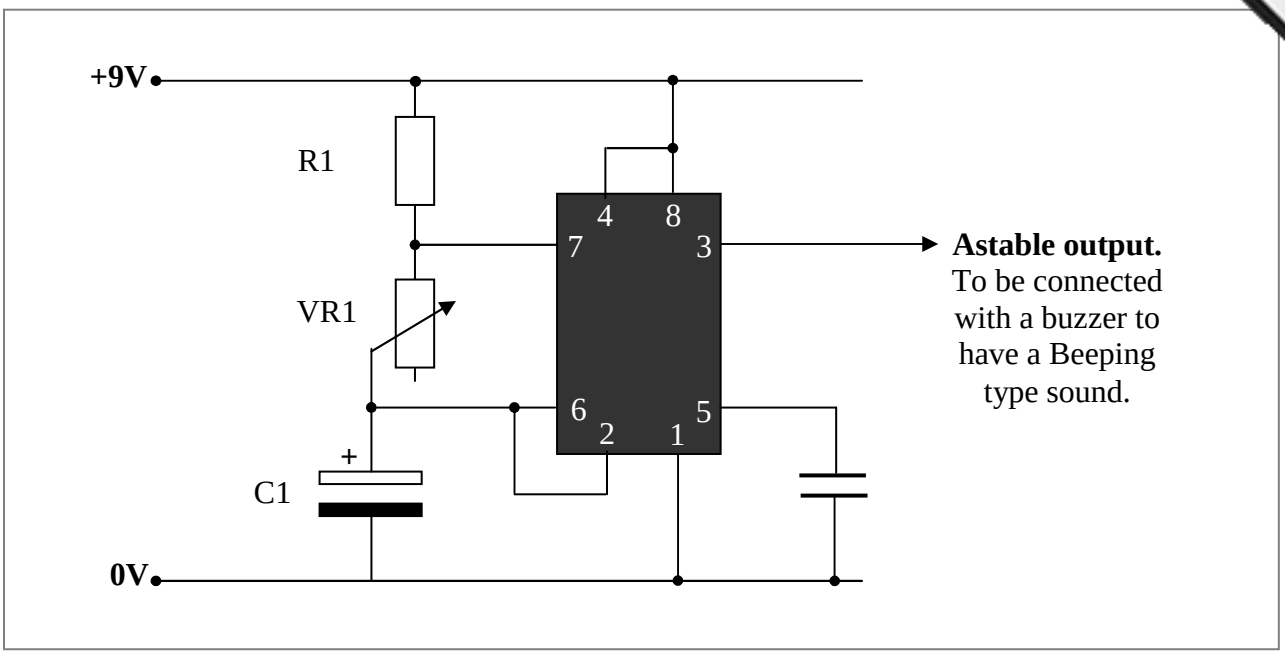


Figure F

a. On Figure F, label the non-electrolytic capacitor.

1 mark

b. Use the ✓ symbol and mark the correct answer only.

☐ Figure F shows an electronic circuit diagram.

☐ Figure F shows a block diagram.

☐ Figure F shows a veroboard layout.

1 mark

c. The three components involved to control the timing in Figure F are R1, VR1 and C1. If the total resistance of R1 and VR1 is 100KΩ and C1 is 1000μF, calculate the charging time. *(time=Resistance × Capacitance).*

_____

_____

_____

2 marks

SECTION D: **Food**

15. Put the following food items into the appropriate categories.

- Pasteurised milk
- yoghurt
- milk
- Tomato sauce
- tomato juice
- tomatoes

RAW FOOD	PRIMARY FOOD	SECONDARY FOOD

½ mark × 6 = 3 marks

16. Give ONE example of each working property of food given below. An example is given.

a. Thickening: adding flour to sauce.

b. Coating: _____

c. Aerating : _____

1 mark × 2 = 2 marks

17. A food outlet wants to offer savoury, healthy wraps. Suggest ONE filling for the wraps and give a reason for your choice.

a. Filling: _____

b. Reason: _____

1mark × 2 = 2 marks

18. Fill in the table below by putting the SIX vitamins under the correct heading.

WATER SOLUBLE VITAMINS	FAT SOLUBLE VITAMINS

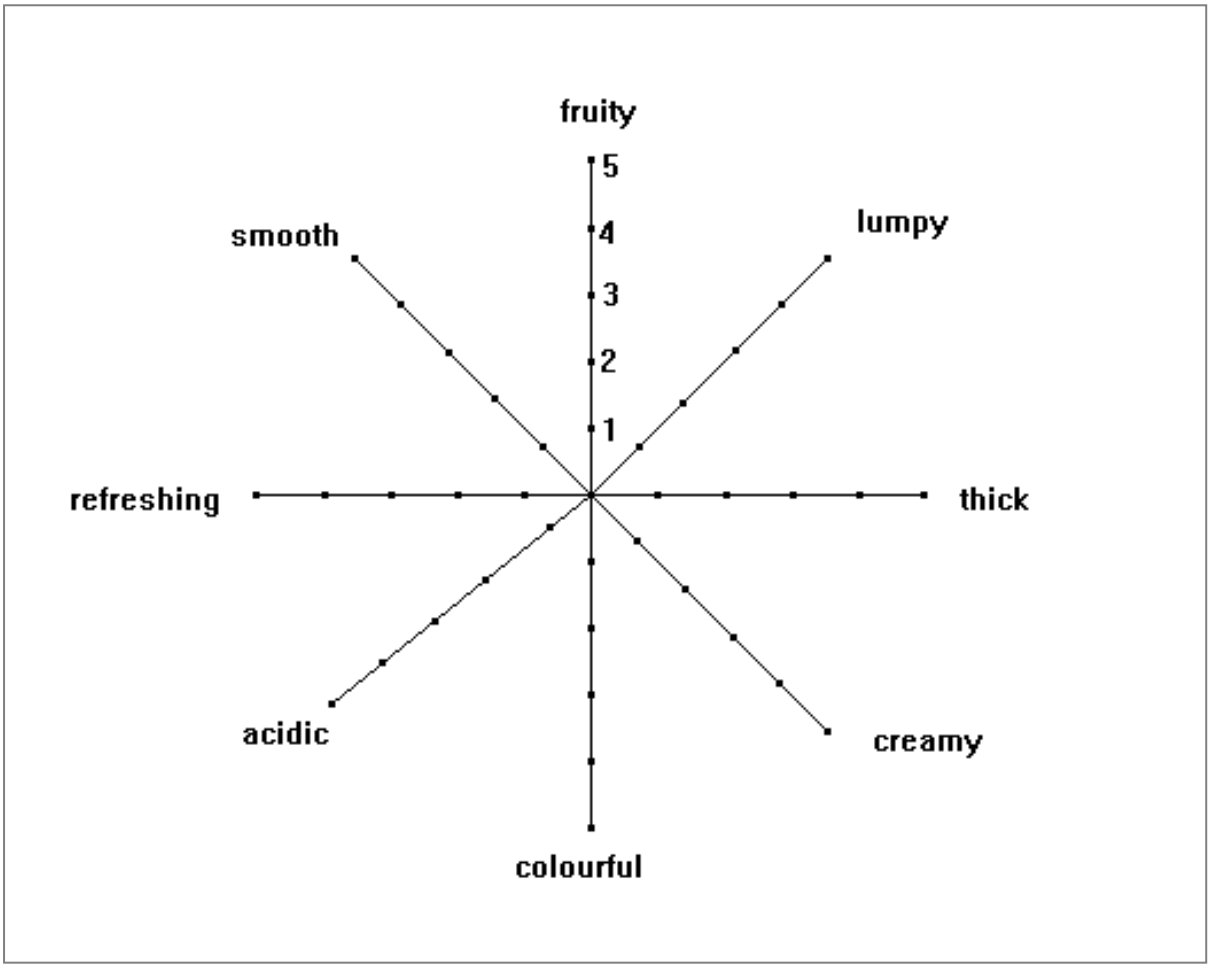
½ mark × 6 = 3 marks

19. State the healthiest cooking method used for the following foods and give ONE re each method.

FOOD	METHOD	REASON
Vegetables		
Beef burgers		

1 mark × 4 = 4 marks

20. Fill in the star diagram below showing the sensory specifications for peach yoghurt.



½ mark × 8 = 4 marks

21. **a.** Which ingredient helps the bread rise?

_____

1 mark

b. What is the purpose of resting the bread dough before baking it?

_____

1 mark

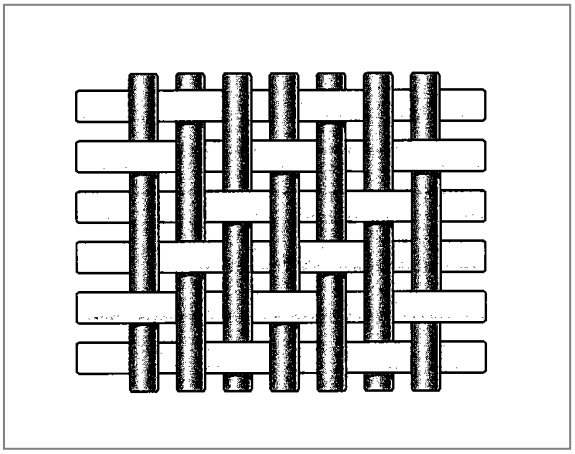
SECTION E: **Textiles**

22. Bathroom towels are often made from 100% cotton towelling. Give TWO reasons why this fabric is suitable for the making of bathroom towels.

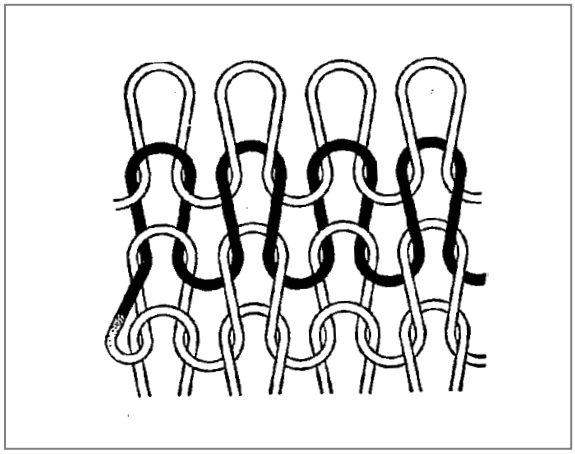
- _____
- _____

1 mark × 2 = 2 marks

23. Identify the following basic construction methods usually used in the manufacture of fabrics.



a. _____



b. _____

1 mark × 2 = 2 marks

24. Give THREE reasons why the information found on a label of a textile product is useful to the consumer.

- _____
  _____
- _____
  _____
- _____
  _____

2 marks × 3 = 6 marks

25. Give THREE reasons why manufacturers now use Elastane fibres to produce swim

- _____
- _____
- _____

2 marks × 3 = 6 marks

26. List FOUR factors to look for when choosing a pair of cutting shears suitable for cutting fabrics.

- _____
- _____
- _____
- _____

1 mark × 4 = 4 marks