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

Track

FORM 3 (1st yr) **DESIGN & TECHNOLOGY** **TIME: 2 hours**

Name: _____ **Class:** _____

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

FOR TEACHERS' USE ONLY DISTRIBUTION OF MARKS

	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									

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 and **T** for Textiles

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SECTION A: **DESIGN**

1. Rewrite the following stages of the design process in the correct sequence.

▪ Situation ▪ Chosen Idea ▪ Specification ▪ Design Brief ▪ Research

▪ Initial Ideas ▪ Development ▪ Testing and Evaluation ▪ Making ▪ Planning

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____
7. _____
8. _____
9. _____
10. _____

½ mark × 10 = 5 marks

2. Carefully read the situation below and then answer questions **a** to **d**.

A local authority will be launching a campaign to promote Malta as a touristic destination for food lovers. The campaign will be launched during an international food fair held abroad. As a designer, you were invited to design and propose a range of products, both food and not, to be presented during the fair.

a. Identify the need from the situation above.

_____

2 marks

b. Give TWO reasons why you should perform research before generating the ideas.

▪ _____

▪ _____

1 mark × 2 = 2marks

c. Jot down TWO examples of how you can do research for this project.

- _____
- _____

1 mark × 2 = 2marks

d. Describe ONE product which you would make to satisfy the need of the above situation.

_____

1 mark

e. Suggest ONE test which you would perform on the prototype of the product once it is produced.

_____

2 marks

3. Complete the following table by naming and explaining the remaining methods of production. Also add an example product accordingly.

METHODS OF PRODUCTION		
NAME	**EXPLANATION**	**EXAMPLE PRODUCT**
		custom made bracelet
	manufacturing products in groups of small amounts called batches	
Mass / continuous production		

1 mark × 6 = 6 marks

SECTION B: **RESISTANT MATERIALS**

4. Traditional metal kettles containing boiling water may damage kitchen surfaces. coasters are used to avoid such damage. Figure A shows a design for a kettle coaster.

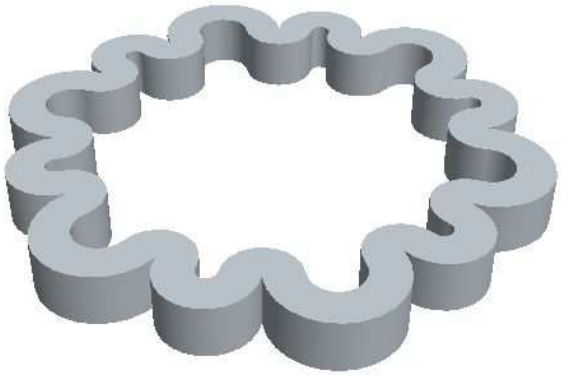


Figure A

a. Give ONE reason why traditional kettles are made from metal.

_____

1 mark

b. From the list below, underline the most suitable metal for making traditional kettles.

▪ brass ▪ lead ▪ mild steel ▪ aluminium

1 mark

c. List TWO properties which the material of the kettle coaster should have.

▪ _____

▪ _____

1 mark × 2 = 2 marks

d. Here is a list of materials.

▪ expanded polystyrene ▪ plywood ▪ cast iron

Considering the properties and shape of the kettle coaster in Figure A, underline the most suitable material to be used for its manufacture.

2 marks

5. Marta tried to shape a piece of thermosetting plastic sheet around a mould by heating it up with a hot-air blower; however she did not succeed.

a. Explain why this happened.

_____

1 mark

b. Give the name of the type of plastic which Marta should use instead of the t… plastic sheet.

_____ **1 m…**

c. Marta needs to shape several plastic sheets and obtain identical forms. Suggest another process she could use instead of heating with the hot-air blower.

_____ **2 marks**

6. Aldo bent a mild steel wire into a ring as depicted in Figure B. The steel rod had a diameter of 1.5 mm.

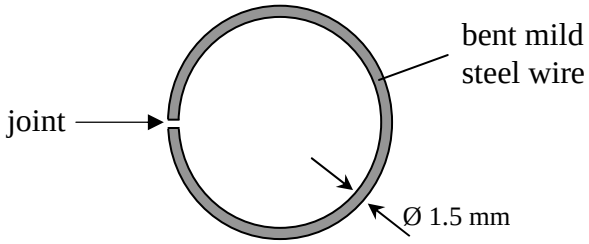


Figure B

a. State ONE method of joining the two ends of the mild steel wire with the use of heat.

_____ **1 mark**

b. Illustrate, by using sketches, what equipment is needed when performing the joining method you mentioned in question **6a**.

3 marks

c. Mention ONE safety precaution that should be followed when performing the method you mentioned in question **6a**.

_____

1 mark

7. Figure C shows part of the mechanism of a piece of gym equipment.

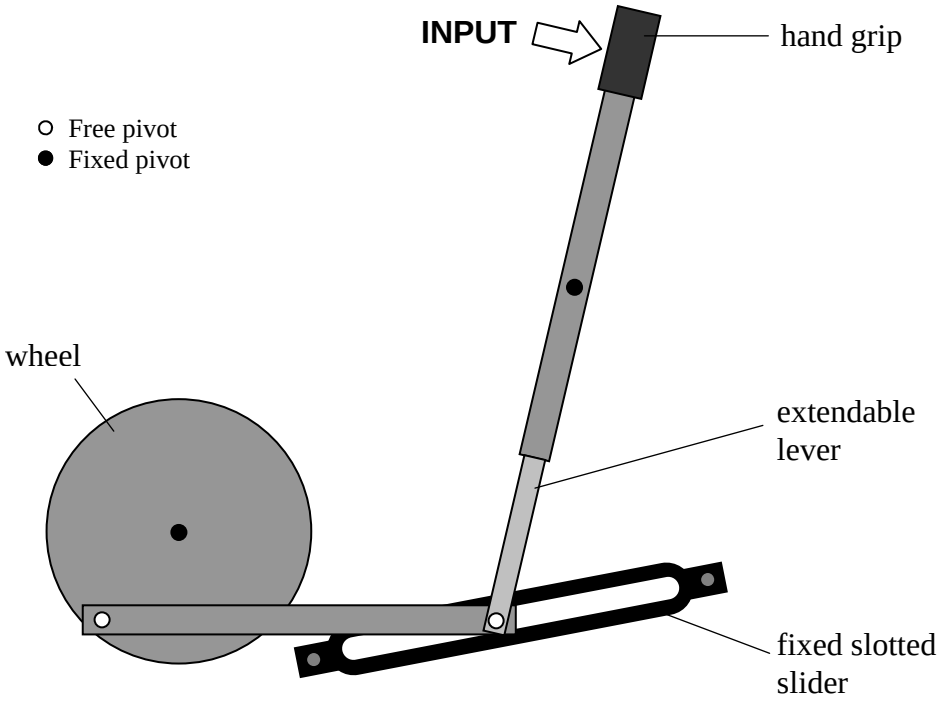


Figure C

a. On Figure C, draw TWO arrows to explain the two movements of the extendable lever.

1 mark × 2 = 2 marks

b. Considering the direction indicated on the input of the mechanism, draw another arrow on Figure C to show the direction of rotation of the wheel.

1 mark

c. Underline the correct phrases inside the brackets.

i. If the wheel is enlarged, (less / the same amount of / more) energy will be required to perform the exercise.

ii. The wheel can turn (only clockwise / only anti-clockwise / both clockwise and anti-clockwise).

1 mark × 2 = 2 marks

SECTION C: **ELECTRONICS**

8. Figure D shows a backlight project designed by a student. This project was intend backlight the new design and technology department sign. The following were specifications wanted by the department for the new sign:

- powered by an environmentally friendly power source.
- turn ON/OFF the complete electronic circuit by a latched type toggle switch.
- a variable light sensor to automatically turn on the backlight in dark.

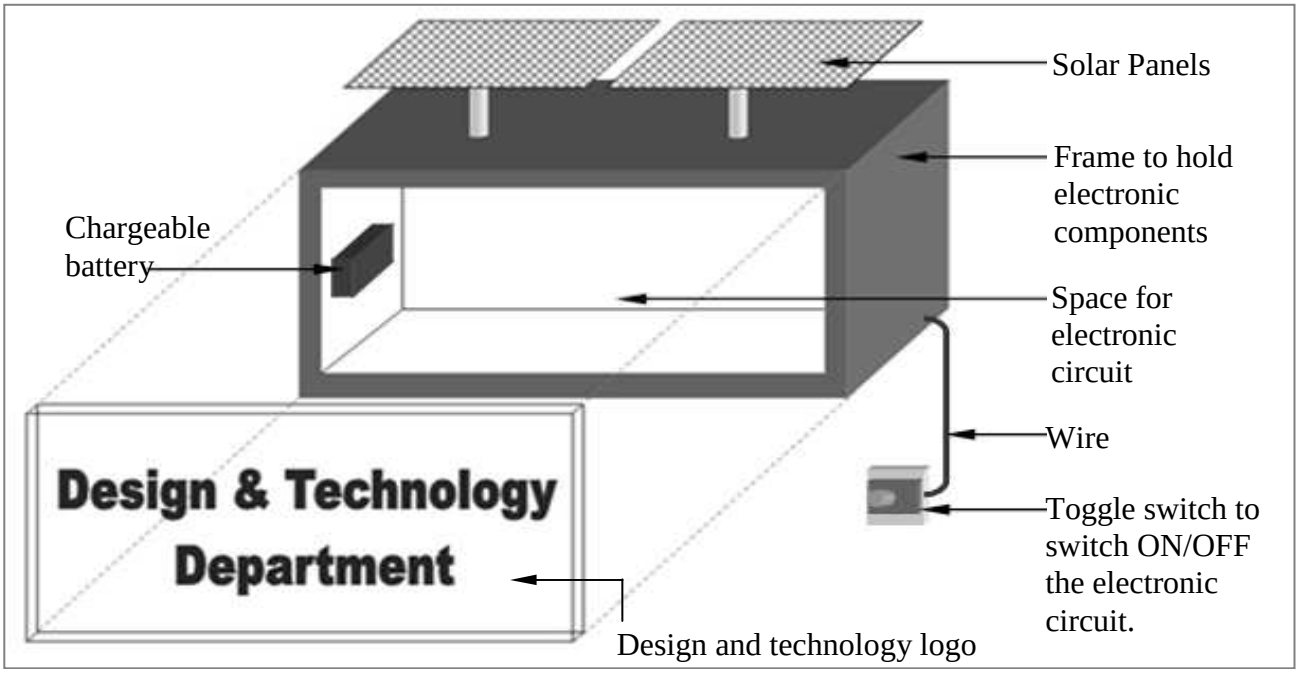


Figure D

a. State whether solar panels are a primary or a secondary type sources.

_____ **1 mark**

b. The chargeable battery shown in Figure D was composed from six AAA rechargeable type batteries. In the space provided, complete the electronic circuit showing how the six AAA rechargeable batteries are connected in series.

2 marks

c. Calculate the total voltage for the six AAA rechargeable batteries connected in series.
(Vt = V1 + V2 + V3 + V4 + V5+ V6)

_____

_____

_____

2 marks

9. A variable light sensor was one of the specifications set by the design and [illegible] department. From research carried out, the student found that the specification [illegible] achieved by connecting a potentiometer and an LDR in a potential divider circuit.

a. In the space provided, complete the potential divider circuit by connecting the LDR.

3 marks

b. Connect the two components shown in Figure E to obtain a potential divider circuit.

1 mark

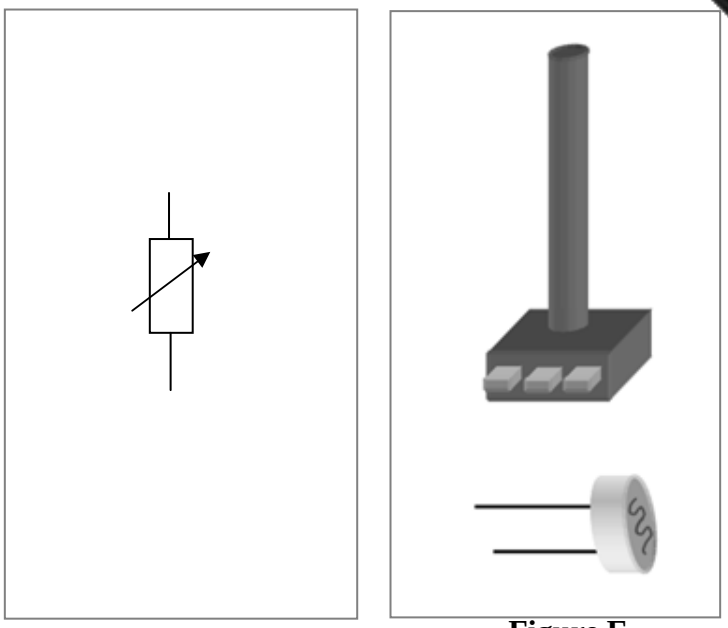


Figure E

10. A toggle, latch type switch was used to turn ON/OFF all the backlight electronic circuit used in the project.

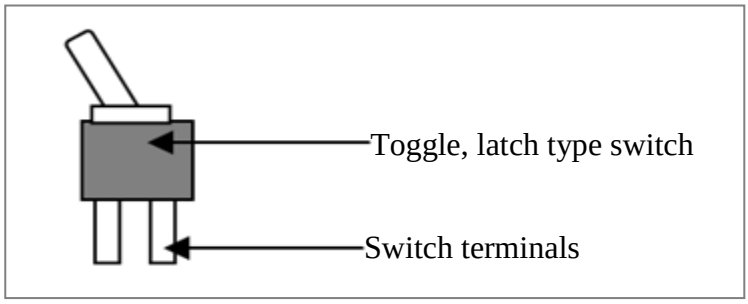


Figure F

a. What do we mean by a latch type switch?

_____

1 mark

b. What tool is used to solder the switch terminals shown in Figure F to a wire on each end?

_____ **1 mark**

c. Mention TWO safety precautions that should follow when soldering.

▪ _____

▪ _____

1 mark × 2 = 2 marks

11. Figure G shows the electronic circuit diagram used to control the backlight ci[illegible] project shown in Figure D.

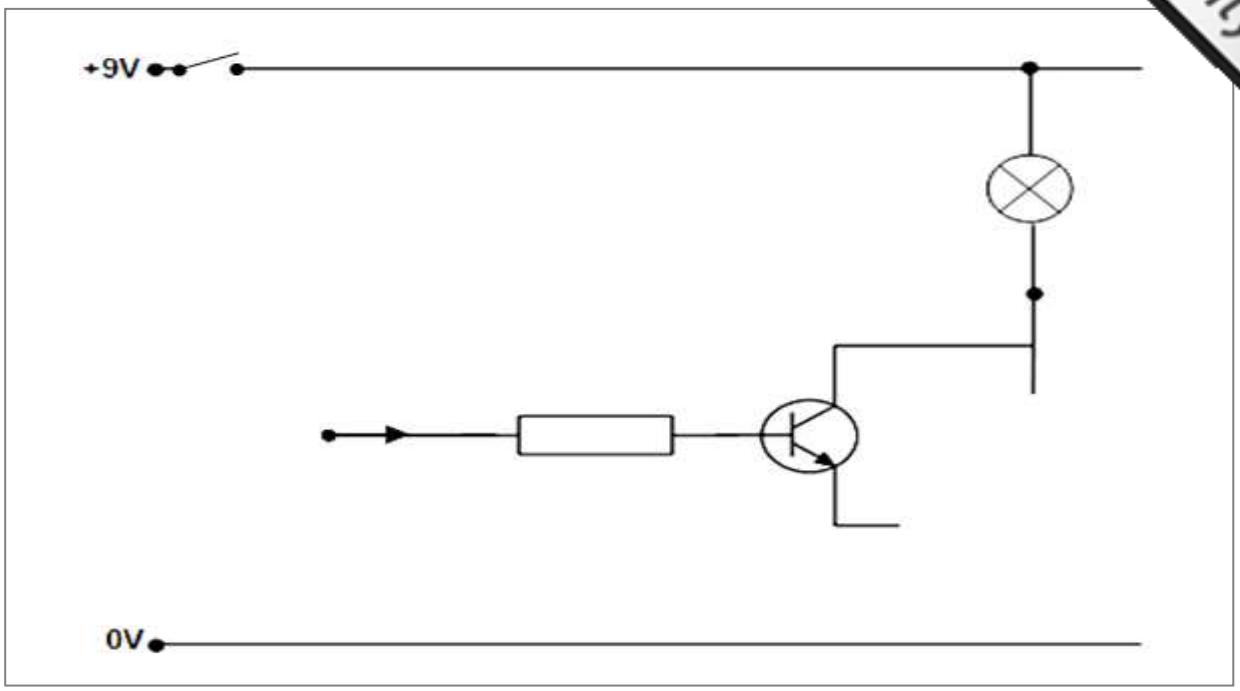


Figure G

a. Connect the potential divider circuit you have designed in question **8a** to be used in the electronic circuit shown in Figure G**.**

2 marks

b. When the whole circuit was tested, it was found that the bulb was not bright due to a lack of current. On Figure G add an NPN transistor to show how a Darlington pair transistor should be connected in order to obtain an increase in current.

3 marks

c. Figure H shows a modification over the electronic circuit shown in Figure G. Calculate the value of the resistor used to light the LED. Show ALL working.

LED specification: 2.5V 0.027mA

_____

_____

_____

_____

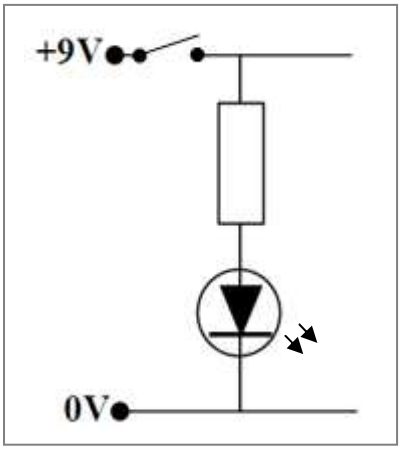


Figure H

2 marks

SECTION D: **FOOD**

12. Why do you take the following safety precautions in the food lab? Answer by completing the following sentences.

a. Oven gloves should be worn when putting the food in the oven because one might _____

_____.

b. Spills should be immediately wiped from the floor because one might _____

_____.

c. Electric appliances should not be touched with wet hands because one might _____

_____.

1 mark × 3 = 3 marks

13. List the TWO main categories of vitamins.

- _____
- _____

1 mark × 2 = 2 marks

14. What is the importance of fibre in the diet?

_____

1 mark

15. Use the following temperature to fill in the blanks.

- 200˚C
- 75˚C
- -18˚C

a. Food leftovers should be reheated for 15 seconds at a temperature of _____.

b. The temperature for a home freezer is set at _____.

c. The oven for pastry baking should be set at _____.

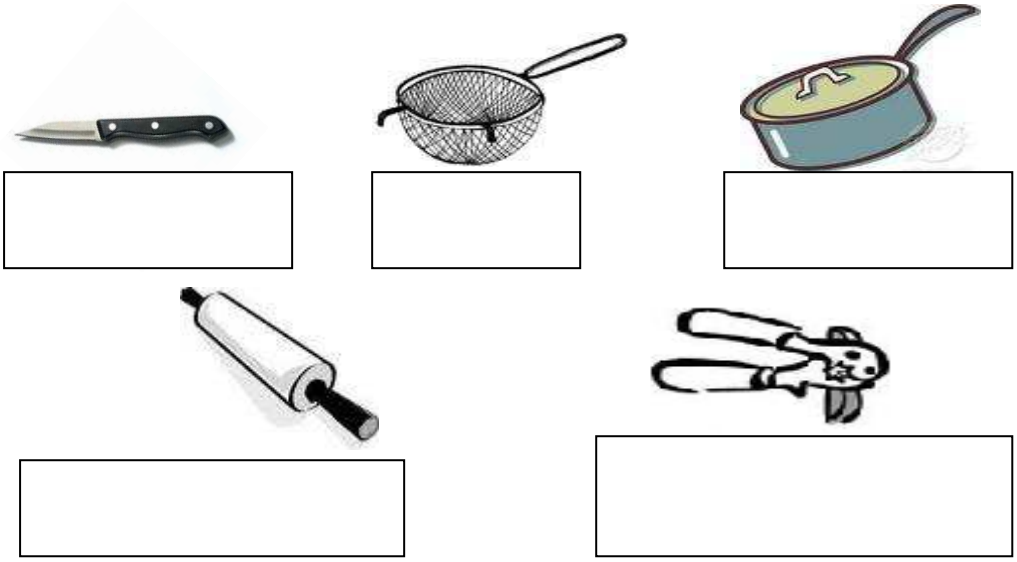
1 mark × 3 = 3 marks

16. Give TWO advantages of using paper/cardboard in the packaging of food products.

- _____
- _____

1 mark × 2 = 2 marks

17. Name the following equipment.



1 mark × 5 = 5 marks

18. Name TWO food products produced by a biotechnological process.

▪ _____ ▪ _____

1 mark × 2 = 2 marks

19. Sensory analysis is used to evaluate a food product and determine details on it. Name TWO senses that are used in analysis. An example has been given.

Example: Sight – Appearance

▪ _____ ▪ _____

1 mark × 2 = 2 marks

SECTION E: **TEXTILES**

20. Name ONE vegetable source for textile fibres. Also state the plant and part of plant used for the extraction of the fibre you mentioned.

FIBRE	PLANT	EXTRACTED FROM

1 mark × 3 = 3 marks

21. Describe TWO ways of recycling textiles product.

▪ _____

▪ _____

2 marks × 2 = 4 marks

22. Give TWO advantages of using a steam iron rather than a dry iron when working w

- _____
- _____

1 mark × 2 = 2 marks

23. State the TWO methods by which fabrics are constructed.

- _____ - _____

1 mark × 2 = 2 marks

24. Name THREE finishes used on the edges of textile product.

- _____ - _____
- _____

1 mark × 3 = 3 marks

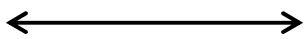
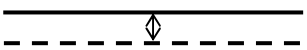
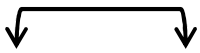
25. Colour can be added to textile products in many different ways. State TWO processes commonly used for this purpose.

- _____ - _____

1 mark × 2 = 2 marks

26. By using the following terms, fill in the table below to give the meaning of each symbol.

▪ Grain line ▪ Notches ▪ Place on a fold ▪ Amount of seam allowance

1 mark × 4 = 4 marks