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

FORM 3 (3rd 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. Write the stages of the design process in the correct sequence.

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**.

The "Maltese Federation of Athletics" will be celebrating its 50th anniversary. For this occasion, the federation is planning to organise athletic activities for the general public. During these activities, a gift will be distributed to each participant as souvenir for the occasion. You are asked to design this gift.

a. Write down a design brief and underline TWO keywords.

_____

_____

3 marks + (½ mark × 2) = 4 marks

b. Give TWO design specifications that you would consider for your design brief.

_____

_____

_____

1 mark × 2 = 2 marks

c. In the space provided below, sketch ONE idea for the mentioned gift. Add colour and notes to your idea.

4 marks

d. Fill in the blank with one word.

The _____ should be considered when choosing an idea for further development.

1 mark

e. In the space provided write a short work plan for the making of the gift you designed. Include only the most important stages.

4 marks

SECTION B: **RESISTANT MATERIALS**

3. 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.

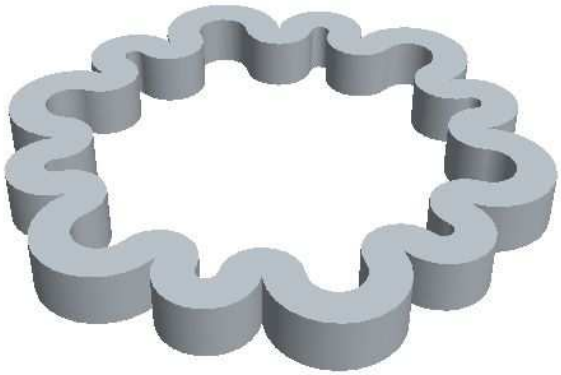


Figure A

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

_____

1 mark

b. Suggest ONE metal which is suitable for making kettles.

_____

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.

▪ chipboard ▪ brass ▪ 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

4. 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 another plastic which Marta can use instead of the thermose[illegible] sheet.

_____ **1 m[illegible]**

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**

5. Aldo wants to join a steel round bar to a steel flat bar as shown in Figure B to be used as a wiping tool.

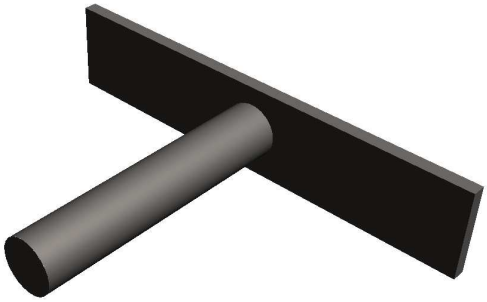


Figure B

a. State ONE method of joining these two metals 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 **5a**.

3 marks

c. Mention ONE safety precaution that should be followed when performing the method you mentioned in question **5a**.

_____

1 mark

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

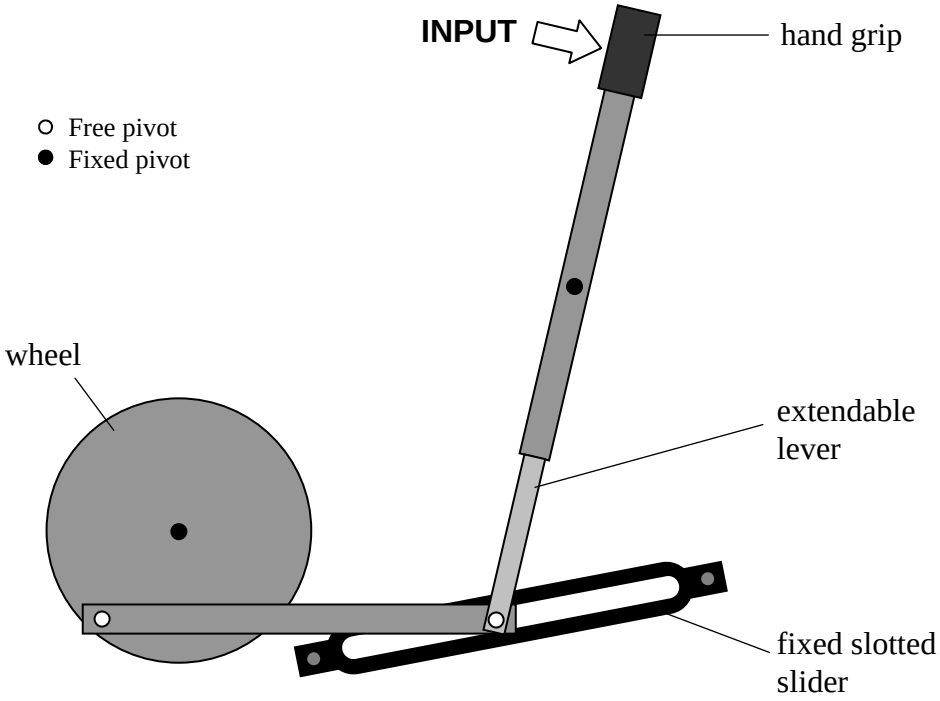


Figure C

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**

7. Figure D shows a backlight project designed by a student. This project was intended backlight the new design and technology department sign. The following were the 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.

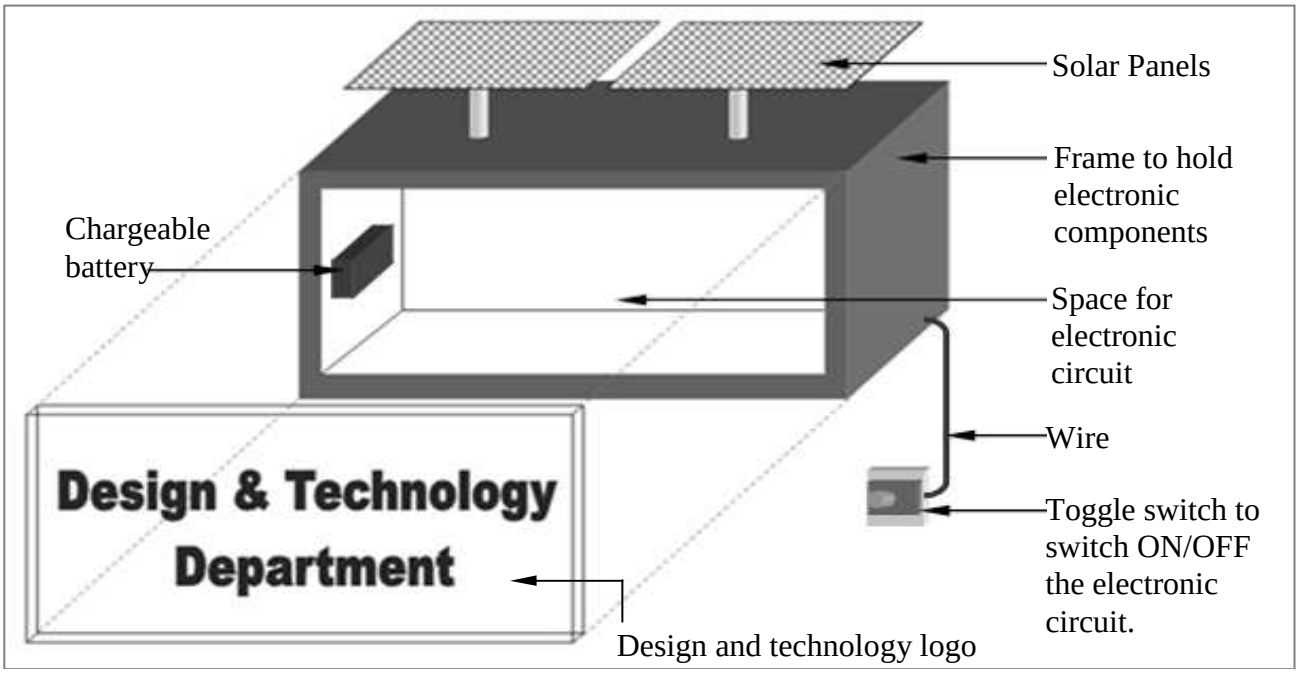


Figure D

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, use electronic symbols to design an 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.

_____

_____

_____

2 marks

8. 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, use electronic symbols only, draw a potential divider circuit with a potentiometer and LDR.

3 marks

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

1 mark

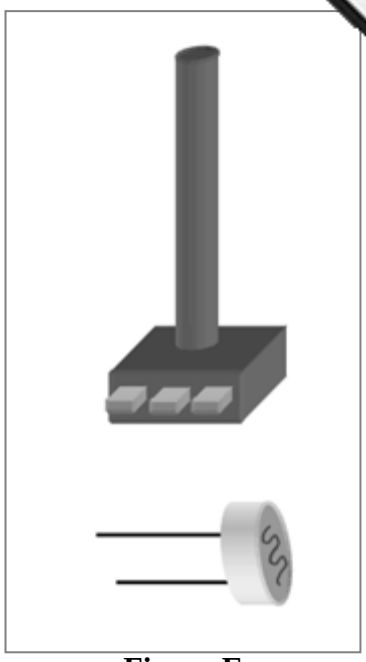


Figure E

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

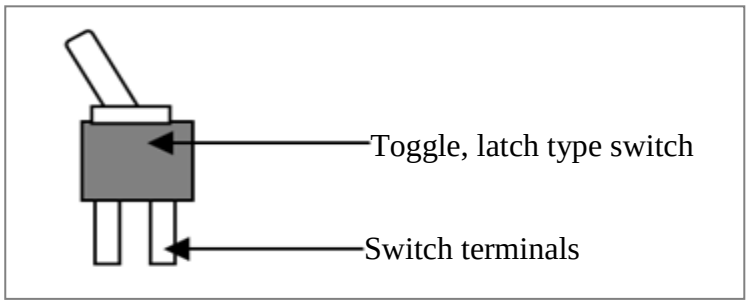


Figure F

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

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

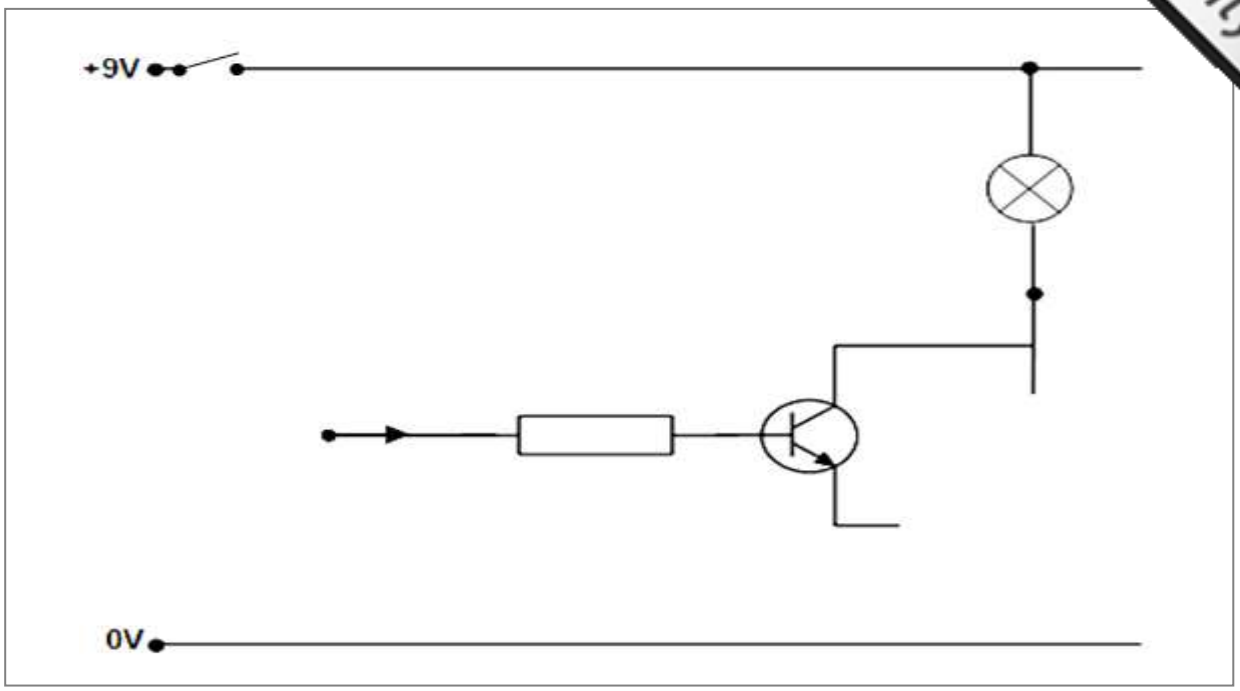


Figure G

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 complete the electronic circuit 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

_____

_____

_____

_____

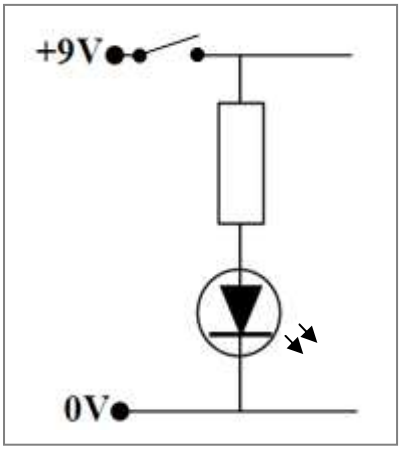


Figure H

2 marks

SECTION D: **FOOD**

11. What safety precautions should be taken to avoid:

a. burning your hands when putting a pie in the oven?

_____

b. slipping and hurting yourself?

_____

c. getting an electric shock from appliances?

_____

1 mark × 3 = 3 marks

12. Give a healthy alternative to the following components:

FOOD COMPONENT	ALTERNATIVE COMPONENT
white flour	
salt	
whole milk	

1 mark × 3 = 3 marks

13. Give THREE reasons why we cook food.

- _____
- _____
- _____

1 mark × 3 = 3 marks

14. Fill in with the correct temperature.

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

15. Look at Figure I and complete the following sentences.

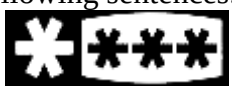


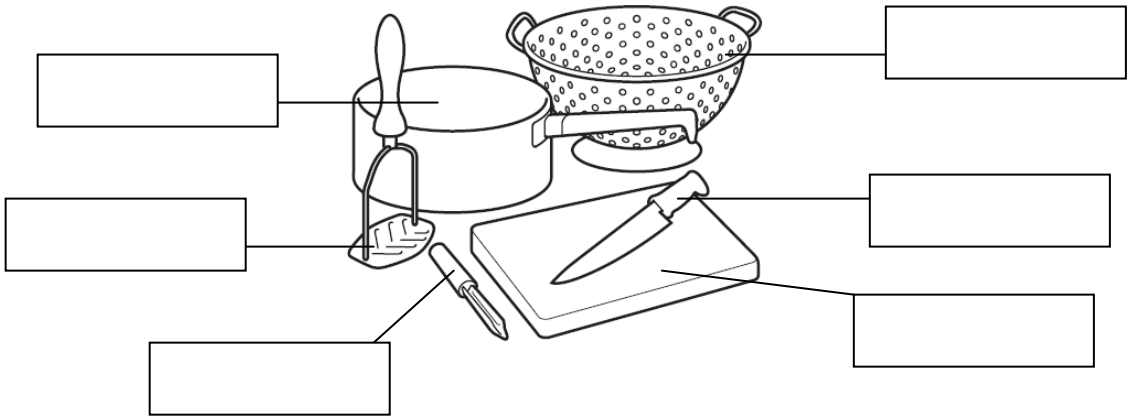
Figure I

a. This is the symbol of a _____ freezer.

b. It indicates that the freezer is suitable to store food for a long period of time and that food can be stored from _____.

1 mark × 2 = 2 marks

16. Write the name of each tool in the corresponding box.



1 mark × 6 = 6 marks

SECTION E: **TEXTILES**

17. Name the TWO vegetable sources for textile fibres. Also state the plant and part of plant used for the extraction of each fibre.

FIBRE	PLANT	EXTRACTED FROM

1 mark × 6 = 6 marks

18. Give TWO advantages of using a steam iron rather than a dry iron when working with fabrics.

- _____
- _____

1 mark × 2 = 2 marks

19. Complete the table below by naming and describing TWO finishes used on the edges of textile products. An example has been given.

EDGE FINISH	DESCRIPTION
Facings	Facings are pieces of fabrics used to tidy and finish raw edges. They are attached to the wrong side and are invisible on the right side of the fabric.

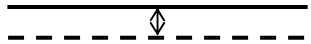
2 marks × 2 = 4 marks

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

▪ _____ ▪ _____

1 mark × 2 = 2 marks

21. Instructions for cutting out pattern templates are shown with symbols. In the table below give the meaning of each symbol.

2 marks × 3 = 6 marks