DIRECTORATE FOR QUALITY AND STANDARDS IN EDUCATION
Department for Curriculum Management and eLearning
Educational Assessment Unit
Annual Examinations for Secondary Schools 2011

Tra

FORM 1 **DESIGN AND 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**	**--**	**--**				
Max. Marks	20	40	40	--	--	100	100	200	**%**
Student's mark									

In the above table, enter the marks obtained by student in each area.
D - Design, **RM** – Resistant Materials, **E** – Electronics

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SECTION A – **DESIGN**

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

Making	**Situation**	**First Ideas**	**Planning**	**Testing and Evaluation**
Development	**Design brief**	**Specifications**	**Research**	**Chosen Idea**

1 _____ **6** _____

2 _____ **7** _____

3 _____ **8** _____

4 _____ **9** _____

5 _____ **10** _____

½ marks x 10 = 5 marks

2. Read carefully the design brief given below before answering questions a to e.

> **Design brief:**
> Design and make a night light for a ten year old child. The night light should be switched on and off manually.

a. Write down TWO keywords from the given design brief.

_____

_____

1 mark x 2 = 2 marks

b. List down TWO specifications that you would consider before designing the night light.

_____

_____

1 mark x 2 = 2 marks

c. State TWO methods by which you can communicate your ideas about the night light to other persons.

_____

_____

1 mark x 2 = 2 marks

d. In the space below sketch ONE idea for a night light. Your sketch must be clear, approximate overall sizes, materials, and any proposed finish or decoration. You are colour your sketches.

8 marks

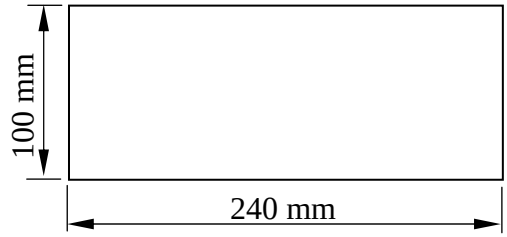
e. Give ONE reason for the choice of material you indicated on your sketch for question **d**.

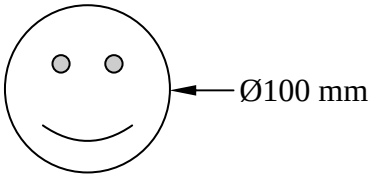
_____

1 mark

SECTION B – **RESISTANT MATERIALS**

3. You need to cut the following two shapes from a sheet of 3mm PVC.





The rectangle below represents the PVC sheet. Inside the rectangle, mark out the two shapes with the least wastage possible.

2 marks

4. **a.** State to which type of plastic each of the following statements refer to. Mark your answers with a ✓ under the correct column.

	THERMOPLASTIC	**THERMOSETTING**
These plastics can be reshaped.		
These plastics are very difficult to recycle.		
These plastics withstand high temperatures before burning.		
These plastics tend to be more brittle.		

½ mark × 4 = 2 marks

b. Mention THREE objects that are made from **thermosetting** plastics and THREE that are made from **thermoplastics**.

THERMOSETTING	THERMOPLASTIC

½mark × 6 = 3 marks

5. Complete the following passage by filling in the missing words.

_____ timbers are classified under two groups: hardwood and softwood.

_____ come from deciduous trees having wide leaves which normally fall in autumn. _____ trees are mostly evergreen and have needle-like leaves.

Examples of hardwood are _____ and_____. Examples of softwood are _____ and _____. With technological advances, man started to produce new kinds of woods called _____ boards. Examples of such wooden boards are _____ and _____.

½ mark × 10 = 5 marks

6. Alex is doing some research on metals. Since he knows that iron is attracted by a magnet, Alex can find out which metals contain iron. He tested the following metals:

- **Mild steel**
- **Copper**
- **Aluminium**
- **Cast iron**

a. Fill in the following table so that Alex can check whether his findings are correct.

Metals attracted by magnet	Metals NOT attracted by magnet

½ mark × 4 = 2 marks

b. By using the results of the magnet test, Alex can later classify the above metals under TWO **groups**: those containing iron and those that do not contain iron.

i. How is the group of metals containing iron called? _____

ii. How is the group of metals containing no iron called? _____

1 mark × 2 = 2 marks

c. Alex found out that mild steel is a metal made up from a mixture of two elements.

What is such a mixture called? _____ **1 mark**

7. Look at the following signs and then answer the following questions.

Sign A

Sign B

Sign C

Sign D

Sign E

a. Which sign shows the way to an **emergency exit**? _____

b. Which sign can be found printed on the package of certain **adhesives**? _____

c. Which sign should be placed near a **fire extinguisher**? _____

d. Which sign indicates the location of an **Emergency switch**? _____

e. Which sign obliges you to wear a pair of **safety glasses**? _____

1 mark × 5 = 5 marks

8. Complete the following table by drawing the appropriate standard form of these metals in 3D.

STANDARD FORM	SKETCH
Square bar	
Tube	
Round bar	

1 mark × 3 = 3 marks

9. **Figures A** and **B** show two tasks commonly carried out during Design and Techn
State the process, tools and material that are shown in each figure.

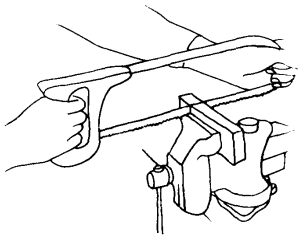


Figure A

PROCESS	
TOOLS	
MATERIAL	

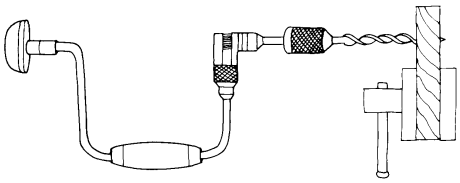


Figure B

PROCESS	
TOOLS	
MATERIAL	

1 mark × 9 = 9 marks

10. Tony and Debbie decided to race two model cars having exactly the same body shape and powered by the same system. The body was produced from sheet material 2 mm thick as shown in **Figure C**. Tony used mild steel sheet while Debbie used aluminium sheet.

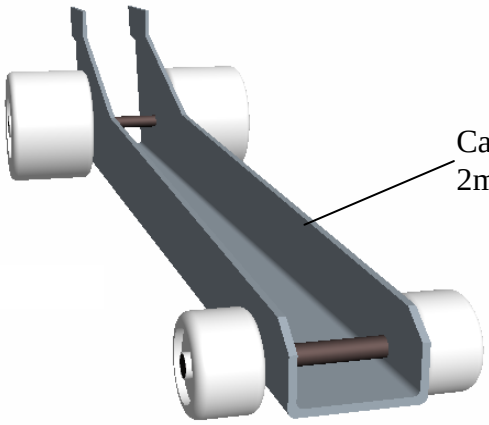


Figure C

a. Tony's mild steel car lost the race. Give ONE reason why this happened.

_____

_____

2 marks

b. Tony wants to produce another car body with the same shape to win over Debbie's car. Suggest ONE suitable material which he can use for the new body.

_____

2 marks

c. Debbie wants to give some colour to her car body. Suggest a suitable surface finish she can use.

_____

2 marks

SECTION C – **ELECTRONICS**

11 a. Why do we use fixed resistors in electronic circuits?

_____

1 mark

b. **Figure D** shows an electronic circuit which a student used to switch on an LED. When the student tested the circuit, the LED burned out.

In the space provided re-draw the circuit in a way to prevent the LED from burning out.

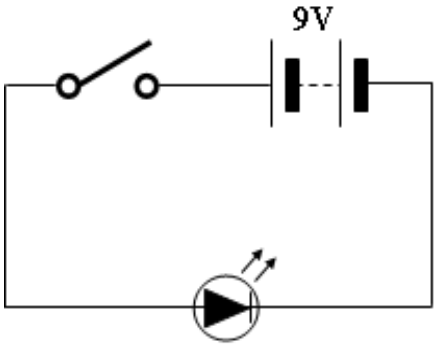


Figure D

2 marks

12. **Figure E** shows THREE fixed resistors in a circuit.

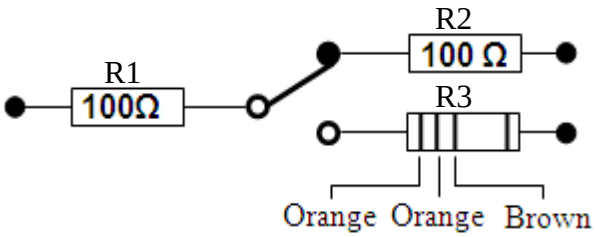
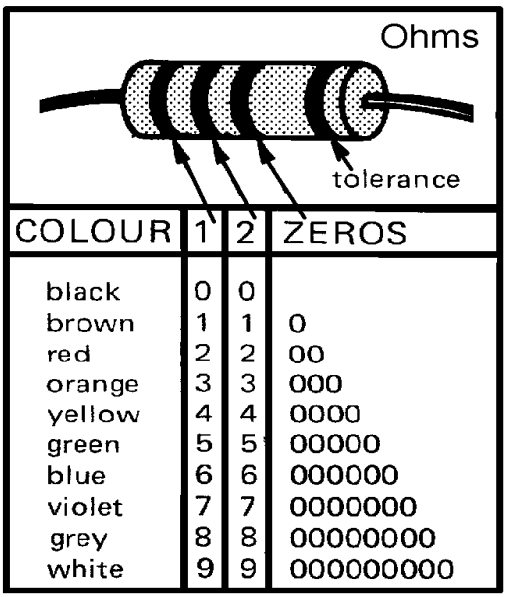


Figure E



COLOUR	1	2	ZEROS
black	0	0	
brown	1	1	0
red	2	2	00
orange	3	3	000
yellow	4	4	0000
green	5	5	00000
blue	6	6	000000
violet	7	7	0000000
grey	8	8	00000000
white	9	9	000000000

Study carefully the circuit shown in Figure E.

a. Which resistor is in series with resistor **R1**?

_____

1 mark

b. Calculate the total resistance of the two resistors you identified as being in series.

_____

_____

2 marks

c. Why do we use the coloured bands of a fixed resistor?

_____

1 m

d. What happens if the switch in **Figure E** is pressed?

_____

1 mark

e. Calculate the total resistance of the two resistors AFTER the switch is pressed.

_____

_____

2 marks

13. **a.** Why do we use batteries in electronic circuits?

_____

1 mark

b. Calculate the total voltage of the batteries shown in **Figure F.**

Answer : _____

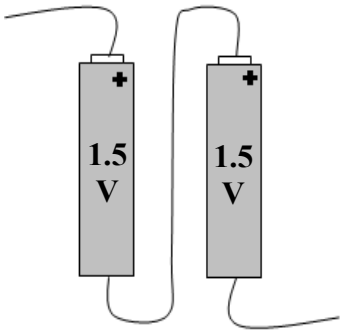


Figure F

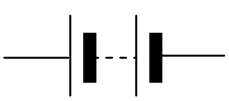
2 marks

c. Draw a sketch to show the following batteries.

PP3 – type Battery	**AA** – type Battery

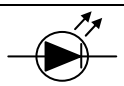
2 marks

d. Complete the circuit diagram to show two batteries connected in series



2 marks

14. Complete the table given below.

Name	Symbol	Used for		
		INPUT	PROCESS	OUTPUT
LED				✓
				
				

½ mark x 4 = 2 marks

15. **Figure G** shows an electronic circuit using different types of switches.

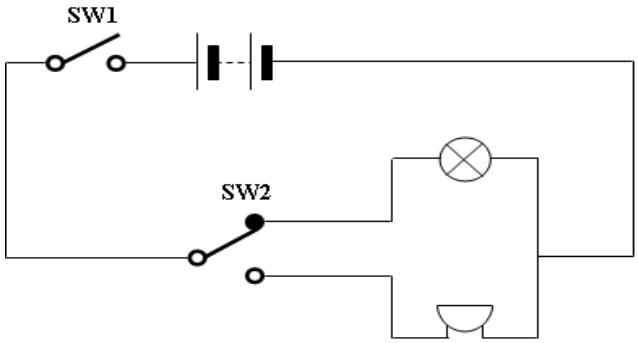


Figure G

a. Switch **SW1** is called a single pole single throw switch (SPST).
What do we call switch **SW2**?

_____ **1 mark**

b. What will happen when switch **SW1** is pressed and switch **SW2** is not pressed?

_____ **1 mark**

c. What will happen when both **SW1** and **SW2** are pressed?

_____ **1 mark**

16. **Figure H** shows the electronic circuit used for ultra bright LED torches. To work properly, the ultra bright LED needs 2.8V and 0.037Amps.

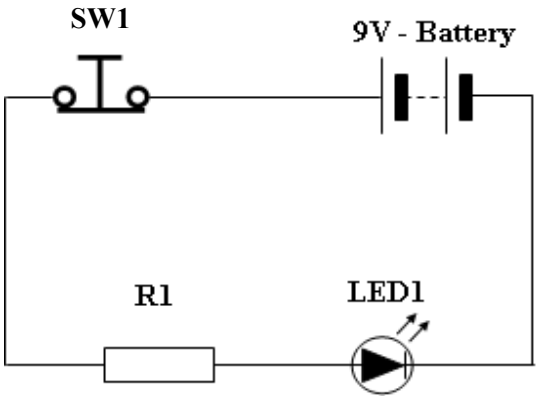


Figure H

a. On figure H, label the voltage across the **LED.**

b. On figure H, label the voltage across **R1**. **1**

c. On figure H, show the direction of the current passing through the **circuit**. **1 mar**

d. Refer to figure H. Calculate the voltage across **R1**. (Show ALL working)

Answer : _____

2 marks

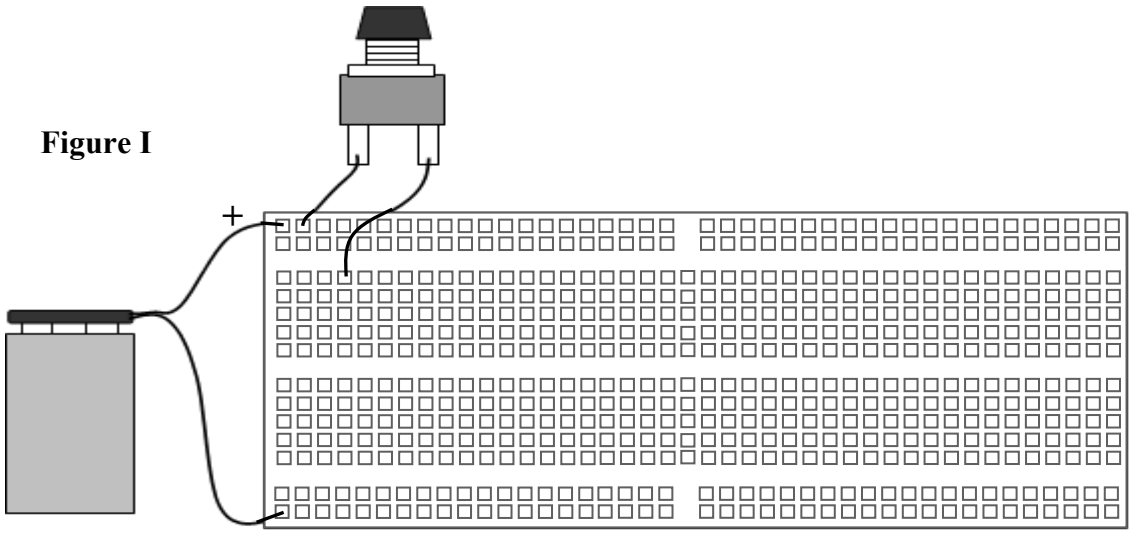
e. Refer to figure H. Using ohm's law R= V/I, calculate the value of **R1**.

Answer : _____

2 marks

f. **Figure I** is showing a breadboard with two components from the circuit given in **Figure H**. Complete **Figure I** by adding the remaining components to show how the circuit in **Figure H** can be tested on the breadboard.

Figure I



2 marks

17. **a.** What tool is used to solder electronic components on a Vero board?

_____

b. In the space provided sketch and label THREE copper tracks on a piece of Vero board.

2 marks

c. Mention TWO safety procedures that should be observed when soldering electronic components on a Vero board.

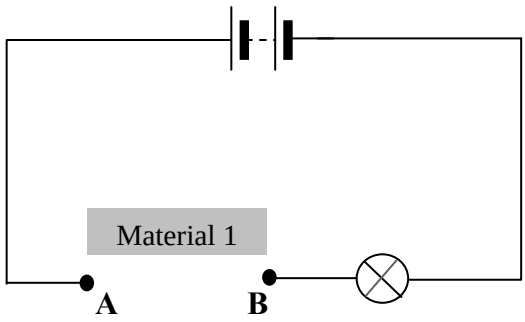
_____

_____

2 marks

18. A design and technology student uses the circuit in **Figure J** to test whether a material is a conductor or an insulator.

Figure J



When the student places Material 1 between points A and B the bulb lights up.

a. State whether **Material 1** is a conductor or an insulator.

_____

1 mark

b. The student requires a sound indicator instead of a light indicator when testing for conductive materials. In the space provided, re-draw the circuit to show how this can be achieved.

3 marks