Name: _______________________________                               Class: _______________

Note to student: You are required to answer all questions

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DISTRIBUTION OF MARKS

<table>
<thead>
<tr>
<th>Areas corrected</th>
<th>Marks for Written Exam.</th>
<th>Marks for Design Folio</th>
<th>TOTAL</th>
<th>FINAL MARK</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>RM</td>
<td>E</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td>Max. Marks</td>
<td>20</td>
<td>20</td>
<td>20</td>
<td>20</td>
</tr>
<tr>
<td>Student’s mark</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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

![Figure A](image)

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 thermosetting plastic sheet.

_________________________________  
1 mark

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]

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.

[Blank space for sketch]

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

1 mark

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

   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
7. Figure D shows a backlight project designed by a student. This project was intended to 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 technology department. From research carried out, the student found that the specification could be 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.

   ![Potentiometer and LDR](image)

   3 marks

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

   ![Figure E](image)

   1 mark

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

   ![Toggle, latch type switch](image)

   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 circuit on the project shown in Figure D.

![Figure G](image)

**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**

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

2 marks
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:

<table>
<thead>
<tr>
<th>FOOD COMPONENT</th>
<th>ALTERNATIVE COMPONENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>white flour</td>
<td></td>
</tr>
<tr>
<td>salt</td>
<td></td>
</tr>
<tr>
<td>whole milk</td>
<td></td>
</tr>
</tbody>
</table>

   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.

![Tools Diagram]

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.

<table>
<thead>
<tr>
<th>FIBRE</th>
<th>PLANT</th>
<th>EXTRACTED FROM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>EDGE FINISH</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facings</td>
<td>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.</td>
</tr>
</tbody>
</table>

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.

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Meaning</th>
</tr>
</thead>
</table>

2 marks × 3 = 6 marks