DEPARTMENT FOR CURRICULUM, RESEARCH, INNOVATION AND LIFELONG LEARNING
Directorate for Learning and Assessment Programmes
Educational Assessment Unit

Annual Examinations for Secondary Schools 2018

YEAR 11 DESIGN AND TECHNOLOGY TIME: 1h 15min

Name: ___________________________________________ Class: ___________________

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

Useful formulas:

\[ V = I \times R \]

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

<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>
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</tr>
</tbody>
</table>

Design and Technology – Year 11 – 2018
Section A: Design Process

Situation: A company specialising in tools and gadgets for the elderly wants to increase its sales. The company intends to introduce tools that would facilitate the elderly’s life in the kitchen.

1. a. Mention the problem in this situation.

________________________________________

1 mark

b. Identify TWO areas from where you can carry out research.

________________________________________

________________________________________

½ marks x 2 = 1 mark

2. In the following space, sketch and colour TWO completely different ideas, which should include the annotations and dimensions that would explain further your designs. Briefly explain the need identified for each idea.

IDEA 1

Need ____________________________________

IDEA 2
3. Choose ONE of the ideas you sketched and write FOUR specifications for this idea.

IDEA:______

_________________________________________________________________

_________________________________________________________________

___________________________________________

_________________________________________________________________

1 mark x 4 = 4 marks
4. Following your Chosen Idea, plan the material and equipment needed to produce the artefact. In the space below identify TWO main parts of your Chosen Idea, name their material; their standard form and the equipment needed.

<table>
<thead>
<tr>
<th>NAME OF PART</th>
<th>MATERIAL</th>
<th>STANDARD FORM</th>
<th>EQUIPMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

½ marks x 8 = 4 marks

5. Name and explain ONE test you would perform on your finished product.

Test: ________________________________________________

Explain: ____________________________________________

________________________________________

1 mark x 2 = 2 marks

Section B: Resistant Materials

6. Refer to Figure A to answer the questions in this section.

![Figure A: Multi size bottle cap opener](image)

a. Figure A shows a multi size bottle cap opener which is made out of plastic. Suggest a suitable thermo-plastic that can be used to make this product.

_____________________________________________________

1 mark

b. State the difference between thermoset plastic and thermoplastic materials.

_____________________________________________________

2 marks
c. In the space provided below, draw an annotated sketch to suggest one modification to the device in Fig A to make it even easier for an elderly to use.

2 marks

d. Name the lever class this product is using.

1 mark
e. Injection moulding is normally used to mass produce this product. Label the machine components in Fig B using the following part names:

| motor | hopper | screw | product | heater | mould |

![Diagram of injection moulding machine components]

7. Kitchen tongs are very useful to handle food while cooking on grill or BBQ. Figure C shows a pair of metal kitchen tongs.

![Diagram of kitchen tongs]

a. On Figure C, label the effort, load and pivot.  

b. Suggest a suitable metal for kitchen tongs.
c. Give TWO reasons why you chose the material in question (7b).

__________________________________________________________________________
__________________________________________________________________________

2 marks

d. Since metal is a good heat conductor, suggest a process that can be used to insulate the handles of the tongs.

i. Process: __________________________________________________________________

1 mark

ii. Briefly explain the method required to produce the process mentioned above in a minimum of 3 steps:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

3 marks

Section C: Electronics

Some elderly people may find it difficult to hear doorbells or fixed line phones (home) ringing. A designer is generating ideas for a device which shall be used to visually alert users that:

the doorbell is ringing OR fixed line phone is ringing OR both doorbell and fixed line phone are ringing

8. The first idea included the use of logic gates.

a. Label the following truth tables by naming the corresponding logic gate:

<table>
<thead>
<tr>
<th>INPUTS</th>
<th>OUTPUT</th>
<th>INPUTS</th>
<th>OUTPUT</th>
<th>INPUTS</th>
<th>OUTPUT</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

NAME OF GATE

LOGIC GATE 1
LOGIC GATE 2
LOGIC GATE 3

1 mark × 3 = 3 marks
b. From the given logic gates, identify the one which satisfies the requirements of the alerting device. Give a reason for your choice of logic gate.

<table>
<thead>
<tr>
<th>LOGIC GATE</th>
<th>REASON FOR CHOICE</th>
</tr>
</thead>
</table>

2 marks

c. Complete the circuit diagram shown in Figure D by drawing the symbol of the logic gate identified in Question (8b) above.

Figure D

1 mark

9. Consider the circuit diagram shown in Figure D. Both LED1 and LED2 are high-brightness red LEDs which need 2.1V, 50mA to light up.

a. Calculate the value of R1.

3 marks
b. Explain how you would measure the exact value of resistor R1 in the circuit in Figure D.

______________________________________________________________________________________

______________________________________________________________________________________

2 marks

10. The designer realised that the circuit shown in Figure D does not recognise whether the doorbell is ringing, the fixed line phone is ringing or both are ringing.

a. Suggest a reason why this is happening.

______________________________________________________________________________________

______________________________________________________________________________________

1 mark

b. The designer sketched a block diagram as shown in Figure E to explain how a new system should work without using logic gates. Use the following words to complete the block diagram.

<table>
<thead>
<tr>
<th>LED1</th>
<th>signal from phone</th>
<th>signal from doorbell</th>
<th>LED2</th>
</tr>
</thead>
</table>

![Figure E Diagram]

5V power supply

LED1

signal from phone

signal from doorbell

LED2

INPUT

PROCESS

transistor

transistor

OUTPUT

Figure E

½ mark × 4 = 2 marks
c. Complete the circuit diagram shown in Figure F to satisfy the requirements of the system shown in Figure E.

![Circuit Diagram]

**Figure F**

2 marks

d. Give ONE reason why transistors were used in the circuit shown in Figure F.

__________________________________________________________________________________________

__________________________________________________________________________________________

2 marks

11. Suggest TWO ways by which the output light can be made to flash.

__________________________________________________________________________________________

__________________________________________________________________________________________

1 mark × 2 = 2 marks
Section D: FOOD

12. The following are the ingredients for a Pasta recipe.

- 3 tbsp. butter
- 1 small onion, thinly sliced
- 1 can tomato juice
- 2 peppers, thinly sliced
- 200g minced beef
- 300g pasta
- 150g grated cheddar
- 1 tsp. salt
- Freshly ground black pepper

For each condition shown below, select TWO ingredients and substitute these with other two ingredients to make the recipe suitable for each condition:

a. Condition 1: people with high blood pressure

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

½ mark x 4 = 2 marks

b. Condition 2: people on a low fat diet

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>Substitute</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

½ mark x 4 = 2 marks
13. Peter started his first job in a restaurant kitchen, where he prepared the following food.

a. In the table below state which chopping boards should he use to cut the following foods:

<table>
<thead>
<tr>
<th>Food</th>
<th>Green pepper</th>
<th>Raw fish</th>
<th>Cheese</th>
<th>Raw pork</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

½ marks x 4 = 2 marks

b. Identify how the following food items should be stored in the places mentioned in the table below.

<table>
<thead>
<tr>
<th>Food Item</th>
<th>Raw meat</th>
<th>Tomatoes</th>
<th>Canned Peas</th>
<th>Milk</th>
<th>Onions</th>
<th>Cooked Chicken</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Fridge - Middle shelf</td>
<td>Cupboard - Room temperature</td>
<td>Fridge - Drawer</td>
<td>Vegetable - rack</td>
<td>Freezer</td>
<td>Fridge - Door</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

½ marks x 6 = 3 marks


- [ ] Steaming
- [x] Boiling

b. Give a reason for your answer.

__________________________________________________________________________________

1 mark x 3 = 3 marks
15. a. List the FOUR main ingredients used in a basic bread recipe.

__________________________________________________________________________

2 marks

b. Give the function of TWO ingredients that are used in the bread recipe.

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Function</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1 mark x 2 = 2 marks

c. Suggest ONE variation to make a fancy bread alternative

__________________________________________________________________________

__________________________________________________________________________

2 marks

16. List TWO factors that influence the planning of family meals and suggest ways in which these challenges can be overcome.

Factor 1: _______________________________________________________________
Suggestion: ______________________________________________________________
__________________________________________________________________________

Factor 2: _______________________________________________________________
Suggestion: ______________________________________________________________
__________________________________________________________________________

1 mark x 2 = 2 marks
Section E: TEXTILES

17. Fill in using the following fabric names to determinate the type of fibre used in the flame test.

| silk | wool | polyester | cotton |

a. __________ burns slowly and stops to burn when removed from flame.
b. When burnt __________ smells like burning paper and leaves grey ashes.
c. __________ burns with difficulty and smells like burning hair.
d. __________ ignites quickly, it can continue to burn even if removed from flame, fibres melt leaving a harsh black bead.

4 marks

18 a. Cotton flannel is a suitable fabric for elderly clothing. Give TWO physical properties of this fabric.

________________________________________________

________________________________________________

2 marks

b. Identify the most practical fastener that can be used on elderly people clothing.

________________________________________________

1 mark

c. Name ONE type of seam you would use for a neat and comfortable finish on cotton flannel clothing for the elderly.

________________________________________________

1 mark
d. Cotton flannel can be manufactured in two different weaves. Name the TWO weaves.

________________________              ___________________________

1 marks x 2 = 2 marks

19. The diagram below shows the pattern of a tie.
   a. Place the pattern on the piece of fabric below to show how the fabric needs to be cut.

   Remember that the tie has to go round the neck.

Pattern of tie

FABRIC

Warp

Weft

3 marks
b. CAD is used for producing the design of the garment. What does CAD stand for?

C____________________ A__________ D___________________

1 mark

c. List THREE advantages of CAD/CAM.

_______________________________________________________

_______________________________________________________

_______________________________________________________

3 marks

20. These symbols were on the care label of the garment. Explain what they stand for or draw the symbol where applicable:

<table>
<thead>
<tr>
<th>Symbol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>[Image of a care symbol indicating 30 degrees C]</td>
<td>30°C</td>
</tr>
<tr>
<td>[Image of a care symbol indicating do not iron]</td>
<td>Do not iron</td>
</tr>
<tr>
<td>[Image of a care symbol indicating do not bleach]</td>
<td>Do not bleach</td>
</tr>
</tbody>
</table>

3 marks