EXAMINATIONS COUNCIL OF ZAMBIA
JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION (GRADE 9) - 2015

Design and Technology 608/2
Paper 2

(INTERNAL AND EXTERNAL CANDIDATES)

Time: 2 hours 30 Minutes
Marks: 100

Instructions to candidates

1. Pull out the Answer Booklet from the question paper.
2. Write your Name, Examination Number, School/Centre name and Code at the top of the first page on the Answer Booklet.
3. There are three (3) sections in this question paper, Section A, B and C.
4. Answer all questions from Section A and Section B, and choose any two (2) questions from Section C.
5. In sections A, B and C answer all questions on the Answer Booklet provided.
6. In Section A answer all questions on the answer sheet provided. Choose the best answer from A, B, C or D. Mark the letter of the answer that you have chosen with a cross (X)
7. In Section B, write your answers in the spaces provided in the Answer Booklet provided.
8. In Section C, write all your answers on the blank pages provided at the end of the Answer Booklet.

Information for candidates

Cell phones are not allowed in the examination room.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO.
SECTION A

Multiple choice questions

Answer all questions from this section. Write all your answers in the Answer Booklet provided. Cross out the best answer from the four (4) choices that are given A, B, C, and D with the letter X.

1 Which one of the following is not a safety precaution when using hand tools?
   A Do not use tools which are blunt.
   B File handles must be secured.
   C Never use a hammer that has a loose head.
   D Use a chisel with a mushroom head.

2 Which of the following is not found in a First Aid Box?
   A Cotton wool
   B Gauze
   C Salt
   D Soap

3 If a Chisel is used without a Mallet, the action is referred to as ...
   A chopping.
   B grooving.
   C morticing.
   D paring.

4 Figure 1 shows a regular Polygon.

![Figure 1](image)

Name it.
   A Heptagon
   B Nonagon
   C Octagon
   D Pentagon

5 On the drawing of the circle, the symbol Ø put before a figure represents ...
   A circumference.
   B diameter.
   C size.
   D radius.
6 Colors can also be used to communicate. From the options given, choose a colour that communicates danger.
   A Blue  
   B Green  
   C Red    
   D Yellow

7 The drawing in figure 2 shows a Dice drawn in isometric projection.

![Figure 2](image)

**Figure 2**

Which one of the views represents the end elevation of the Dice?

1 2 3 4

A 1  
B 2  
C 3  
D 4

8 What is the use of a Hacksaw in the workshop? For ...
   A cleaning metal.  
   B cutting metal.  
   C drawing parallel lines on metal.  
   D drilling holes in metal.

9 Copper is ductile. This means that it can ...
   A be hammered and rolled without breaking.  
   B be drawn into fine wire.  
   C become a liquid when heated.  
   D resist fracture.
10 Name the hole shown in figure 3.

![Figure 3]

A Blind hole  
B Counter hole  
C Countersunk  
D Through hole

11 A cutting list or parts list is a list of ...
A all materials needed with the dimensions indicated.  
B all the joints to be constructed.  
C the cuts to be made.  
D the required operations in construction.

12 Which of the following statements qualifies to be a design brief?
A Design a test rack to hold test tubes.  
B Design and make a rack to hold test tubes.  
C Design and make an artefact to hold test tubes.  
D Make a rack to hold test tubes.

13 The steps given below show the process of fixing the countersunk screw.
1 Drill the pilot hole.  
2 Countersunk for the screw head.  
3 Drive in the screw.  
4 Drill the clearance hole.

A 1 4 2 3  
B 1 4 3 2  
C 2 3 1 4  
D 4 3 2 1

14 Jane is a new Grade 8 learner in your school and would like to make a straight cut through a piece of thin sheet metal. Which one of the following tools would you advise her to use?
A Marking knife  
B Pliers  
C Scissors  
D Tin snips
15 Which class of levers has the load in the middle?
A 1\textsuperscript{st} Class
B 2\textsuperscript{nd} Class
C 3\textsuperscript{rd} Class
D 4\textsuperscript{th} Class

For questions 16 and 17 refer to figure 4.

16 Identify the tool.

A Junior hacksaw
B Panel saw
C Piercing saw
D Standard hacksaw

17 What is the use of the tool? For ...
A cleaning out slots.
B cutting joints.
C cutting wide slots.
D small light works.

18 When an electric iron is switched on, what energy changes take place?
A Electrical energy to heat.
B Heat to electrical energy.
C Kinetic to heat.
D Mechanical to electrical energy.

19 Figure 5 shows part of a type of Chisel used on wood.

Figure 5

Name the Chisel.
A Bevel edged
B Firmer chisel
C Mortice chisel
D Square edged
A group of entrepreneurs bought materials at K200.00 and realised K2 050.00 after selling chopping boards. Transport costs amounted to K350.00, airtime K50.00 and council levy K20.00. How much profit did they make?

A  K620.00  
B  K 1430.00  
C  K1 850.00  
D  K2 050.00

Figure 6 shows a simple circuit.

Figure 6

Name the part labelled 'P':
A  Battery  
B  Current  
C  Electronics  
D  Resistor

Name the part labelled 'T':
A  Battery  
B  Bulb  
C  Resistor  
D  Transistor

Figure 7 shows a Resistor. What is the use of this electronic component?

Figure 7

A  Acts as a booster.  
B  Increases the brightness of the bulb.  
C  Serves as a storage for electrical energy.  
D  To restrict the flow of electricity.
24 Which Saw can be used for cutting curves in Wood and Plastic?
A Back saw  
B Bow saw  
C Coping saw  
D Cross cut saw

25 What is the most effective method of removing the metal (waste) in figure 8?
A Chain drilling  
B Counter sinking  
C Cutting  
D Grinding

26 Which shape in figure 9 represents an irregular Quadrilateral?

A 1  
B 2  
C 3  
D 4

27 Sometimes the Stock of the Marking Gauge has brass strips to ...
A make the gauge accurate.  
B make the gauge heavy.  
C make the gauge look beautiful.  
D reduce wear on the stock.
28 When you reheat a Thermoplastic, it returns to its original shape. This is referred to as plastic ...

A deformation.
B elasticity.
C formation.
D memory.

29 Flat head rivet shown in figure 10 is used for ...

![Figure 10]

A general purpose where a flush surface is needed.
B general purpose where finish is not important.
C joining soft materials whenever necessary.
D joining thin plates which cannot be countersunk.

30 At what stage should a designer ask these questions in the design process?

- What size should it be?
- Who will use it?
- What materials should be used?
- How will it function?
- Where will it be used?
- What finish should it have?

A Evaluation stage
B Specification stage
C Testing stage
D Working procedure stage

[Total 30 marks]
SECTION B

Attempt all questions

Write your answers in the spaces provided in the Answer Booklet.

31  (a)  Figure 11 below shows some tools used in a Design and Technology workshop. Name each of them.

(i)  
.................................................................................. [1]

(ii) 
.................................................................................. [1]

(iii) 
.................................................................................. [1]

(iv) 
.................................................................................. [1]

Figure 11

(b)  (i)  Annealing is the heat treatment process of................................. [1]

(ii)  Which Tap is used for cutting threads in a Blind hole? [1]

(iii)  Sawing, planning, drilling, filing and shaping are methods of ... [1]

(c)  (i)  Write down the electronic device used for reducing current. 
.................................................................................. [1]

(ii)  A device that allows current to flow in one direction is called
.................................................................................. [1]
(iii) Study the diagrams in Figure 12.

Figure 12

Draw the symbols of the electronic components above.
........................................................................ (1 mark) ................................................................ (1 mark)

(d) Classify the following situation:

(i) the ability to perform work ........................................ [1]

(e) What movements do the following produce?

(i) Windscreen wipers: ........................................ [1]

(ii) Bicycle wheels: ........................................ [1]

(iii) Train moving from one town to another: ................. [1]

(f) From the list of tools given below, classify them according to their appropriate trade groups. (Write one tool in each group) Pliers, Cold Chisel, Steel Square, Jack plane, Drilling Machine.

(i) Bricklaying and Plastering
Tool: .................................................................................. [1]

(ii) Electrical Engineering
Tool: .................................................................................. [1]

(iii) Carpentry and Joinery
Tool: .................................................................................. [1]

(iv) Metal Fabrication and Welding
Tool: .................................................................................. [1]

(g) In Bricklaying, the tool which is used to pick up mortar and spread it evenly before setting Bricks or Blocks is called ... .............................................................. [1]
(h) The list of plane figures is given below. Arrange them according to their number of sides.
Scalene, Circle, Rhombus, Pentagon, Ellipse.

<table>
<thead>
<tr>
<th>3 sides</th>
<th>4 sides</th>
<th>5 or more sides</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>(ii)</td>
<td>(iii)</td>
</tr>
<tr>
<td>(1 mark)</td>
<td>(1 mark)</td>
<td>(1 mark)</td>
</tr>
</tbody>
</table>

(i) The short statement of what is to be designed is called ... [1]

(j) **Figure 13** shows a Square. Using a pencil draw a line diagonally across the square.

![Figure 13](image)

(k) Name two main groups of plastics.

(l) As an Entrepreneur the first stage of establishing a business enterprise is the ...

[1]

(m) What do you call a set of rules to prevent accidents in the workshop?

(n) What does the symbol mean in Design and Technology?

(i) R20 [1]
SECTION C

Answer question 32 as a compulsory question and any other one from questions 33, 34 and 35.

32 The following situation is obtaining in the school science laboratory. Test tubes are lying all over the bench and on the floor.

![Figure 14](image)

Figure 14

(a) (i) Suggest a problem from the given situation. [2]

(ii) From the problem suggested in (a) above, write a design brief [3]

(b) One of the specifications to the possible solution is material to be used.

(i) Write any other two specifications to be considered. [4]

(ii) Sketch a possible solution in isometric projection. You may consider the following: Interpretation, Proportion, Rendering, Quality and Neatness. [5]

(c) (i) Suggest one type of material you would use on your possible solution. [2]

(ii) Give two reasons for your choice of material. [4]
33  (a)  (i)  Sketch and label **two** parts of a Try Square.  
(ii)  Sketch a 300mm steel rule and give a reason why it has a hole.  

(b)  Write **two** safety precautions to be observed when using the Try Square and Steel rule.  

(c)  **Figure 15** shows a Nail in a piece of wood.

![Figure 15](image)

(i)  Name the tool that can be used to remove the Nail.  
(ii)  Why would you need a waste piece when removing the Nail?  

34  (a)  **Figure 16** shows a Building Trowel.

(i)  label parts A, B, C and D.  

![Figure 16](image)

(i)  What is the use of the tool?  
(ii)  Explain **two** ways you can care for the tool.  

(b)  Mention any **three** other tools used in building.
35  (a) **Figure 17** shows an incomplete table of electrical components. Fill in the missing details.

<table>
<thead>
<tr>
<th>S/N</th>
<th>Component</th>
<th>Symbol</th>
<th>Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i)</td>
<td>Switch</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(ii)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iii)</td>
<td>Cell or Battery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(iv)</td>
<td>Speaker</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(v)</td>
<td></td>
<td></td>
<td>Restrict the flow of electricity</td>
</tr>
</tbody>
</table>

**Figure 17**

(b) Explain why you should avoid touching naked electrical wires with bare hands.
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