



EXAMINATIONS COUNCIL OF ZAMBIA
JUNIOR SECONDARY SCHOOL LEAVING EXAMINATION (GRADE 9) – 2020

Design and Technology 608/1

Paper 1 (Theory)

Specimen

(INTERNAL & EXTERNAL CANDIDATES)

Time: 2 hours 30 Minutes

Marks: 155

Instructions to candidates

- 1 Pull out the **Answer Booklet** from the question paper.
- 2 Write your **Name, Examination Number, School/Centre** and **Code** on the first page of the Answer Booklet.
- 3 There are **three (3)** sections in this question paper: Section **A, B** and **C**.
- 4 Answer all questions on sections **A** and **B**.
- 5 Section **C** has parts: **I, II** and **III**, part **I** is compulsory.
- 6 Write all your answers in the Answer booklet provided

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: [30 marks]

Multiple choice questions

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

- 1** Identify the statement that is **not** a workplace and safety issue.
- A** Safe storage and use of materials, chemicals finishes and solvents.
 - B** Safe storage and use of tools and equipment.
 - C** Selling of the finished product in the work room.
 - D** Wearing of protective clothing in the workplace.
- 2** **Figure 1** below shows a block used as a teaching aid by our Design and Technology teacher. Identify the correct end elevation.

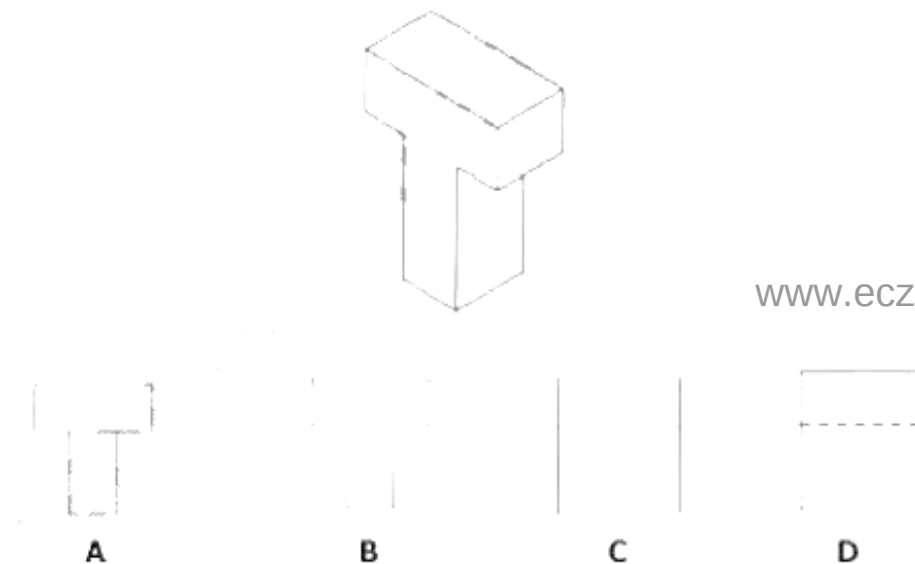


Figure 1

- 3** What is the general term given to houses, bicycles and aircrafts?
- A** Equipment
 - B** Infrastructure
 - C** Mechanics
 - D** Structures
- 4** The most suitable tool for removing bent nails is the . . .
- A** pincers.
 - B** pliers.
 - C** screwdriver.
 - D** waddington hammer.

- 5 Part of the sequence of the design process is shown below. Which of the following steps is the missing stage in the sequence?



- A Development
 - B Investigation
 - C Making
 - D Testing
- 6 The drawing in **Figure 2** shows a key holder cut out of a 2mm thick mild steel sheet metal.



Figure 2

Which file would you use to finish off the curved part marked X.

- A Flat file
 - B Half round file
 - C Hand file
 - D Triangular file
- 7 There are three main reasons why it is necessary for us to work on materials. Identify **one** reason which is **not** correct. To change the ...
- A appearance of the material.
 - B moulding of the material.
 - C properties of the material.
 - D shape of the material.
- 8 The tools listed below are driving tools except ...
- A hammers.
 - B screw drivers.
 - C spanners.
 - D vices.

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- 9 Correctly seasoned timber has the following **except** increased ...
 A moisture.
 B resistance.
 C stability.
 D strength.
- 10 In design process, the stage where ideas are made into an artefact is called ...
 A evaluation.
 B investigation.
 C realisation.
 D solution.
- 11 **Figure 3** below shows three sections of files. Select the correct set showing the names of the files correctly.

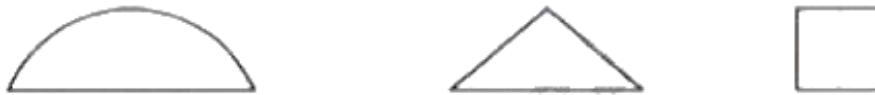


Figure 3

- A Half round file, triangular file, square file.
 B Round file, triangular file, square file.
 C Semi-round file, three square file, square file.
 D Three triangle file, semi round file, square file.
- 12 Storage area for different metals must **not** be ...
 A damp.
 B dry.
 C dusty.
 D sunny.
- 13 Dimensions or measurements are required to be placed on any drawings as shown in **Figure 4** below:

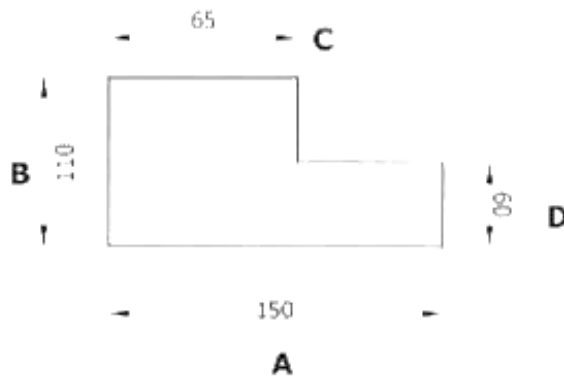


Figure 4

Which side of the drawing is correctly dimensioned?

- 14 The method of enhancing a drawing to show the type of materials to be used is known as ...
- A colouring.
 - B line shading.
 - C texturing.
 - D tone shading.

- 15 Choose the suitable use of copper from the following.
It can be used ...
- A for making battery terminals.
 - B for making electrical wires.
 - C when galvanising.
 - D when manufacturing.

- 16 What do we refer to as curing of bricks?
- A Drying of bricks
 - B Making of bricks
 - C Stacking of bricks
 - D Storing of bricks

- 17 **Figure 5** below shows two PVC pipes to be joined together at **A**, which of the following glues would be appropriate to use?



Figure 5

- A Contact adhesive.
 - B Epoxy adhesive.
 - C PVC adhesive.
 - D synthetic wood adhesive.
- 18 The tool that is used to check that the surfaces are at right angles to each other is known as the ...
- A a carpenter's or engineer's try square.
 - B a steel rule
 - C a tee square
 - D pair of compasses or dividers.

- 19 In addition to beauty, colours are also used to communicate. Which of the following communicates "danger"?

A Blue
B Green
C Red
D Yellow

- 20 **Figure 6** shows different drawings of a vee- block. Choose **one** drawing in isometric.

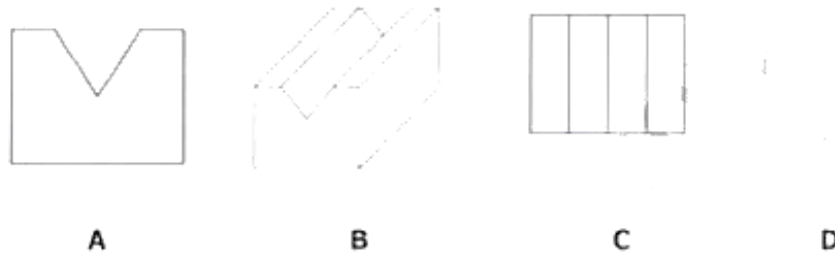


Figure 6

- 21 When a formed thermoplastic is reheated, it returns to its original shape. This is called ...

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

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- 22 **Figure 7** shows a project to be made in the design and technology workshop. How would you bend the bracket to its shape?

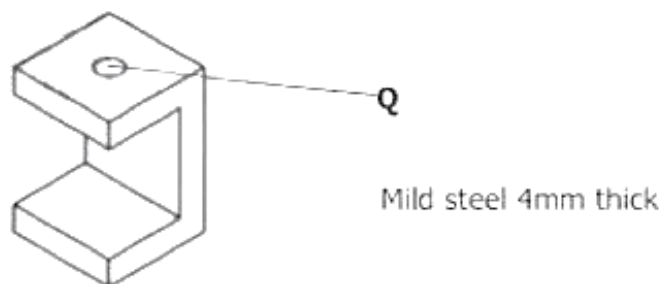


Figure 7

A Using heat and a former.
B Using the bench vice.
C using the pin vice.
D using the tongs.

2

- 23 With reference to **Figure 7** in Q22, identify the tool to be used for cutting the internal threads in the hole labelled **Q**.
- A Die
 - B Drill
 - C Screw
 - D Tap
- 24 **Figure 8** shows a component made from plastic. Which type of plastic could be used?



Figure 8

- A Acrylic
 - B Nylon
 - C Polythene
 - D PVC
- 25 The clogging of file teeth with filings is referred to as ...
- A choking.
 - B filing.
 - C fillings.
 - D pinning.
- 26 Which is the safest method of disposing off metals and plastics?
- A Burning
 - B Melting.
 - C Recycling.
 - D Throwing
- 27 The following are the main parts of Business Plan, **except** ...
- A equipment.
 - B logo on the cover.
 - C profit.
 - D start-up capital.
- 28 A line that touches a circle on one point of its circumference is called ...
- A chord.
 - B radius.
 - C sector.
 - D tangent.

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- 29 State the type of force illustrated by the arrows shown in figure 9 below.



Figure 9

- A Bending force
B Compression force
C Tension force
D Torsion force
- 30 A competent entrepreneur has the following characteristics, except ...
A commitment.
B creativity.
C laissez-faire.
D adaptability.

[Total 30 marks]

SECTION B [30 marks]

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Answer all questions

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

- 31 (a) **Figure 10** below shows one of the tools commonly used in the Design and Technology workshop.

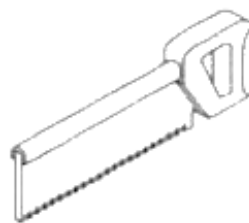


Figure 10

- (i) Name the tool.
(ii) To which class of tools does it belong?
(iii) Mention one similar tool that can be used for cutting plastics.

[1]

[1]

- (b) (i) The tool in **Figure 11** below is used for ... [1]



Figure 11

- (ii) ... is a name given to a hole that does not go through from one end to another of a workpiece. [1]
- (iii) When you are working in an area where there is air pollution, recommend the suitable equipment to use to protect yourself from inhaling the poisonous gas(es). [1]
- (c) Study the table and match the tool with its correct function.

Tool	Functions
(i) Plane	Cutting internal threads
(ii) Bottoming tap	Used where there is a wall
(iii) Try square	Smoothing wood
(iv) Masonry nail	Checking angles at 90°

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[4]

- (d) Identify the parts labelled X, Y and Z in **Figure 12** below:

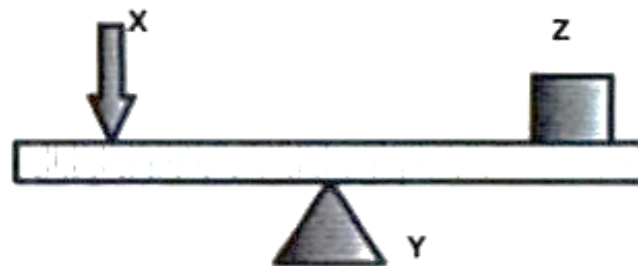


Figure 12

Z

- (e) The diagram in **Figure 13** below shows an electric circuit. Name the parts labelled **A**, **B**, **C** and **D**. [5]

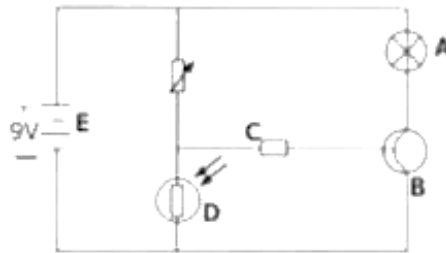


Figure 13

- (f) Complete the table below by filling in the correct information. [4]

	Source	Type of Energy
(i)	Water	
(ii)		Chemical
(iii)	Coal	
(iv)		Solar

- (g) Categorise the following materials according to their specific groups.

- (i) High carbon steel [1]
(ii) Acrylic [1]
(iii) Medium Density Fibreboard (MDF) [1]
(iv) Brass [1]

- (h) **Mention**

- (i) **Two** temporary joints. [2]
(ii) Any **two** types of adhesives. [2]

Total [30 marks]

SECTION C [95 marks]

Part I

Compulsory

32

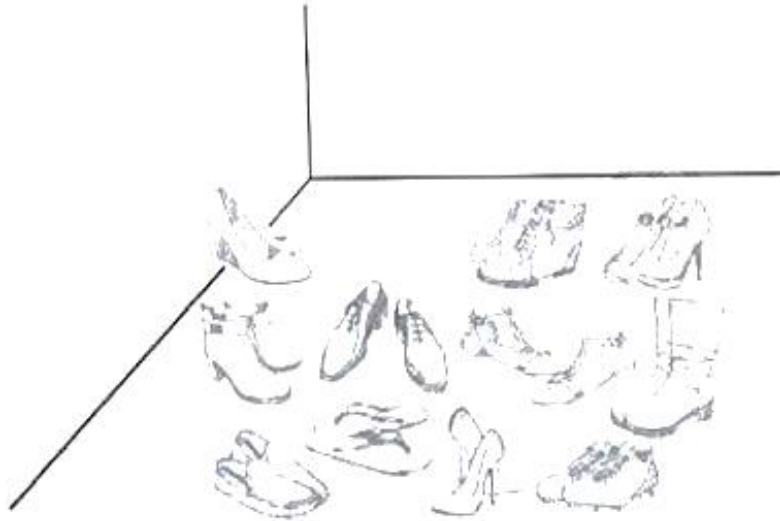


Figure 14

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- (a) The situation shown in **Figure 14** is obtaining in your bedroom.
- (i) Identify the problem from the given situation. [2]
 - (ii) Come up with a design brief from the problem stated in (a) (i). [3]
 - (iii) From your design brief, write **five** specifications. [5]
 - (iv) Sketch freehand a pictorial drawing of the possible solution. [12]
- (b) (i) Suggest **two** possible materials you would use for your possible solution. [2]
- (ii) Give **two** reasons for each of the materials you have chosen.
- (iii) What safety measures did you consider to make the possible solution in (b) (i) safe for use? [2]

[Total:30 marks]

Part II

Choose one question

33 Either (a) The Home Economics Department would like the Design and Technology section to make some tea trays for them.

- (i)** Complete the cutting list that your teacher has started for you. [14]

Part	Qty	L	W	T	Material
Side rails					Pine
Base					

- (ii)** Explain what is involved in the following stages of material preparation and the tools used.

- 1 Measuring
- 2 Marking out [6]

- (iii)** Sketch a freehand pictorial drawing of the tea tray. The sketch must be of good proportion, neat and include rendering. [6]

- (iv)** Name a finish that could be applied on the tray and give the reasons for choosing that type. [4]

[Total: 30 marks]

Or (b) (i) The drawing in **Figure 15** shows a garden tap.

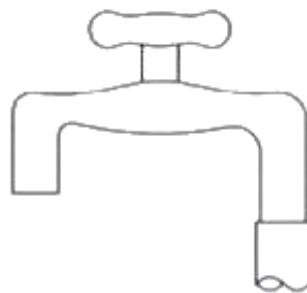


Figure 15

- 1 Name a suitable material that can be used to make a garden tap. [1]
- 2 Give **two** properties of the material you have mentioned in **a (i)**. [2]
- 3 Mention **one** type of bond in bricklaying. [1]

- (ii) 1 Describe the meaning of the following terms in connection with heat effect on plastics:
- Plastic memory [4]
 - Bending [4]
 - Press forming [4]
 - Embedding [4]
- 2 Give **five** effects of plastics on the environment. [5]
- 3 Suggest the best ways of disposing off plastics. [5]

[Total: 30 marks]

Part III

Graphic Communication

Choose one questions.

- 34 Either (a)** A group of Grade 9 School leavers have formed a company to be designing moulders used when making blocks and bricks. The group wants to make a symbol for the company that should have a combination of at least two of the following plane figures.
- A circle, eclipse, triangle, quadrilateral or a polygon.

The symbol will be used on the letter heads of the company.

- (i) Design a symbol that meets the requirements. [15]
- (ii) What name would you give to the company? [2]
- (iii) Render your drawings and give **two** reasons for rendering. [10]
- (iv) Use free hand sketch to show the surface development of rack open from behind. [8]

[Total: 35 marks]

- Or (b)** A swimming pool has just been constructed at a new school. The school has asked you to design some signs that should graphically give the following messages:

- (i) Do not push others in the pool. [15]
- (ii) Keep food away from the pool. [10]
- (iii) Do not smoke [10]

[Total: 35 marks]