RISHIKUL SANATAN COLLEGE

YEAR 13 APPLIED TECHNOLOGY WORKSHEET.

INSTRUCTIONS

1. Write your **Name** and **Year Level** on the front page and inside the back flap of the **Answer Booklet**.

2. Write **all** your answers in the **Answer Booklet** provided.

3. If you use extra sheets of paper, be sure to show clearly the question number(s) being answered and to secure each sheet in your **Answer Booklet** at the appropriate places. Ensure that your **Name** and **Year Level** is written on the extra sheets.

4. Answer **all** the questions with a blue **or** black ballpoint pen or ink pen. Do **not** use red ink. You may use a pencil **only** for drawing.

5. You may use a calculator, provided it is silent, battery-operated and non-programmable.

6. There are **three** sections in this paper. **Sections A and B are compulsory. Note the options in Section C.**

SUMMARY OF QUESTIONS

SECTION	QUESTION TYPE	TOTAL MARK	SUGGESTED TIME
A	There are **twenty** multiple-choice questions. **All the questions are compulsory**.	20	36 minutes
B	There are **six** questions. **All the questions are compulsory.**	60	108 minutes
C	There are **three** questions. **Answer only one question.**	20	36 minutes
	TOTAL	**100**	**180 minutes**

SECTION A MULTIPLE-CHOICE QUESTIONS [20 marks]

All the questions in this section are compulsory. Each question is worth **1** mark.

INSTRUCTIONS FOR MULTIPLE-CHOICE QUESTIONS

1. In your **Answer Booklet**, **circle** the letter which represents the **best** answer. **If you change your mind**, put a line through your first choice and circle the letter of your next choice.

For example:

8	A	B	C	D

2. **If you change your mind** again and like your first answer better, put a line through your second circle and tick (✓) your first answer.

For example:

8	A	B ✓	C	D

3. **No mark** will be given if you circle more than one letter for a question.

1. Which of the following is the correct way of handing a hand tool to a person?

   A. Toss it to the person
   B. Hold it with both hands
   C. Pass it with the blade first
   D. Pass it with the handle first

2. While working in the workshop, it is appropriate not to wear loose clothing because it

   A. does not look good.
   B. will make you sweat.
   C. will make you uncomfortable.
   D. can get caught on moving machine parts.

3. The beauty aspects of an object which make it appealing or pleasing to the viewer is called

   A. Aesthetic.
   B. Function.
   C. Brightness.
   D. Ergonomics.

4. The elements of design that shows the surface characteristics of a material through the sense of touch or the illusion of touch is

   A. value.
   B. colour.
   C. texture.
   D. proportion.

5. Which of the proceses given below is used to ensure a certain level of quality in a product?

   A. Quality Control
   B. Quality Assurance
   C. Quality Management
   D. Quality Measurement

6. In engineering materials, timber is classified under

   A. metal.
   B. ceramic.
   C. polymer.
   D. composite.

7. Which of the following materials is used to insulate and conduct electricity?

   A. Metals
   B. Metalloids
   C. Non-metals
   D. Non-ferrous metal

8. The name of a transparent film used in wood finishing which is made of dry oil, resin and thinner is called

   A. paint.
   B. stain.
   C. sealer.
   D. varnish.

9. An attachment that is used to cut timbers evenly, precisely and safely while using a portable circular saw is called a

A. rip fence.
B. base plate.
C. blade guard.
D. plate tilt adjustment.

Turn Over

10. The name of the device that opposes the flow of current in any electrical circuit is a/an

A. Ohmeter.
B. Resistor.
C. Insulator.
D. Multimeter.

11. The name of the tool shown on the right is

A. Tile Cutter.
B. Chalk Line.
C. Grout Float.
D. Notch Trowel.

12. Which of the following processes is shown on the right?

A. Ripping
B. Rebating
C. Grooving
D. Cross-Cutting

13. Which of the following machines is used for smoothing timber?

A. Sander
B. Grinder
C. Circular Saw
D. Surface Planer

14. In welding, the best result is produced when the gap between the electrode and the workpiece is between

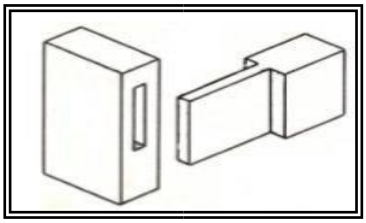
A. 1 mm – 2 mm.
B. 2 mm – 4 mm.
C. 4 mm – 5 mm.
D. 5 mm – 10 mm.

15. The symbol given on the right is

A. face side.
B. face edge.
C. socket outlet.
D. a one way switch.

Turn Over

16. The joint shown on the right is called



A. Haunched Mortise and Tenon.
B. Barefaced Mortise and Tenon.
C. Common or Through Mortise and Tenon.
D. Long and Short Shouldered Mortise and Tenon.

17. A plumbing tool that has an adjustable **jaw** is

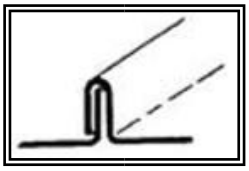
A. Pliers.
B. Pipe Wrench.
C. Wire Stripers.
D. Adjustable Spanner.

18. A protective equipment that is worn to protect the welder against harmful gas that causes poisoining and toxic contamination is called

A. respirator.
B. nose plugs.
C. welding helmet.
D. fire resistant clothing.

19. Which of the following joints is given on the right?

A. Lap Seam
B. Standing Seam
C. Grooved Seam
D. Double Hem Edge



20. The **swaging tool** is a refrigeration tool used to

A. cut copper tubing to size.
B. solder the joints of two copper pipes.
C. expand the inside diameter of copper tubes.
D. spread the end of the copper pipe to form flares.

Turn Over

SECTION B SHORT ANSWER QUESTIONS [60 marks]

The **six** questions in this section **are all compulsory**. Each question is worth **10** marks.

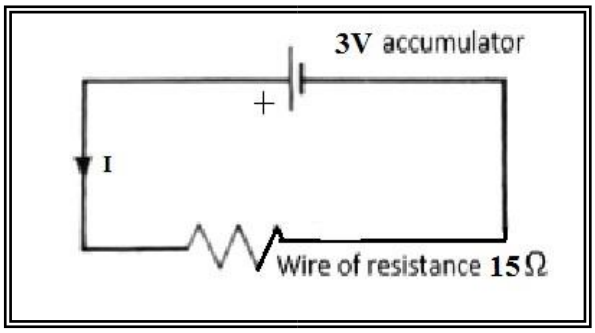
QUESTION 1 BASIC HOME IMPROVEMENT (10 marks)

(a) Fittings are used in pipe and plumbing systems to connect straight pipe or tubing sections, to adapt to different sizes or shapes, and to regulate fluid flow.

(i) Name a pipe fitting that is used to connect two pipes of the same diameter. **(1 mark)**

(ii) Differentiate between **direct** and **indirect** water supply system. **(2 marks)**

(b) Study the diagram given below and answer the questions that follow.



(i) Calculate the amount of current that flows in the circuit given above. **(2 marks)**

(ii) Differentiate between **Alternating Current (AC)** and **Direct Current (DC)**. **(2 marks)**

(c) Study the diagram given below and answer the questions that follow.

(i) Identify the **process** carried out in the diagram above. **(1 mark)**

(ii) Explain the finishing stage of the above process. **(2 marks)**

Turn Over

(Continued)

QUESTION 2 MACHINES AND ENGINES (10 marks)

(a) Study the diagram of the bit given below and answer the questions that follow.

(i) Name the portable machine that uses the above bit. **(1 mark)**

(ii) Name the process in which this bit is used. **(1 mark)**

(iii) State **one** safety precaution that needs to be followed while using the machine stated in **(i)** above. **(1 mark)**

(iv) Sketch the profile of the above bit after it has been used on timber. **(3 marks)**

(b) Differentiate between an **Electric Belt Sander** and an **Orbital Finishing Sander**. **(2 marks)**

(c) Explain the function of a **key** in a Portable Electric Drill. **(2 marks)**

QUESTION 3 CARPENTRY (10 marks)

(a) Before a house can be built weather large or small, permission must be sought and given by the local authority.

Name a **Local Authority** where we can apply for a Building Permit. **(1 mark)**

(b) Discuss the terms given below in building construction.

(i) Boxing **(2 marks)**

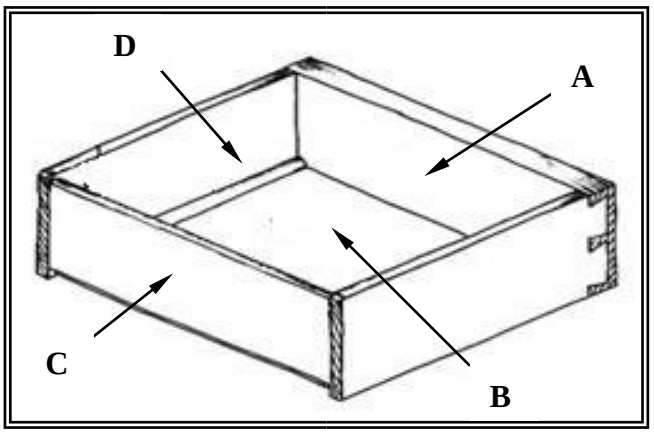
(ii) D.P.C. **(2 marks)**

SECTION B

(c) Sketch and explain how you are going to square the profile of a concrete foundation. **(5 marks)**

QUESTION 4 JOINERY (10 marks)

(a) Study the diagram given below and answer the questions that follow.

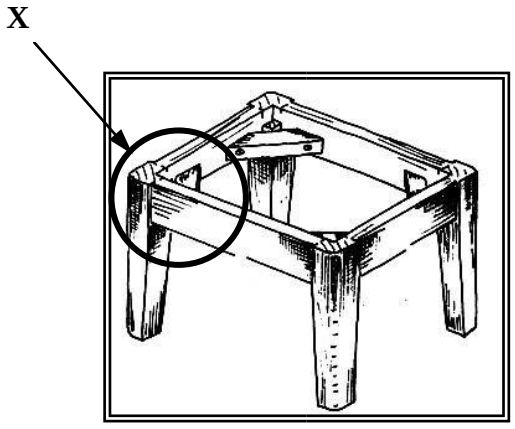


Source: *Year 11 Applied Technology*,Ministry of Education, 2015.

(i) Label parts **A** and **B**. **(2 marks)**

(ii) Sketch the exploded view of **A**, **B**, **C** and **D**. **(3 marks)**

(b) Study the diagram given below and answer the questions that follow.



(Continued)

Label the parts **A**, **B**, **C** and **D**. **(4 marks)**

(b) Study the diagram given below and answer the questions that follow.

(i) Sketch the exploded view of a suitable joint labelled **X** above. **(3 marks)**

(ii) Explain the process in making the joint stated in **(i)** above. **(2 marks)**

QUESTION 5 WELDING AND FABRICATION **(10 marks)**

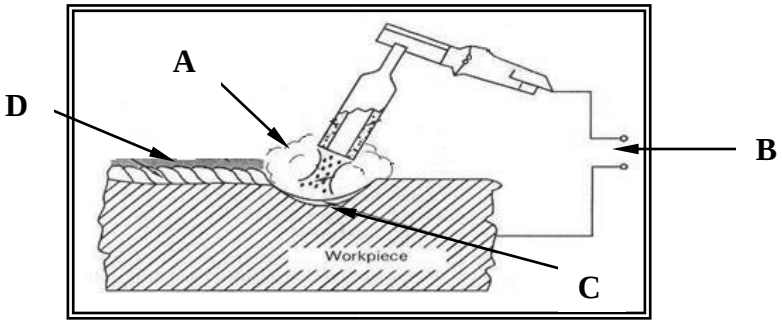
(a) Study the diagram given below and answer the question that follows.

Source: *Year 11 Applied Technology,* Ministry of Education, 2015.

(i) Name the tool shown above. **(1 mark)**

(ii) State **one** of the uses of the above machine in welding and fabrication. **(1 mark)**

(iii) State **one** safety precaution that needs to be followed while using the above machine. **(1 mark)**

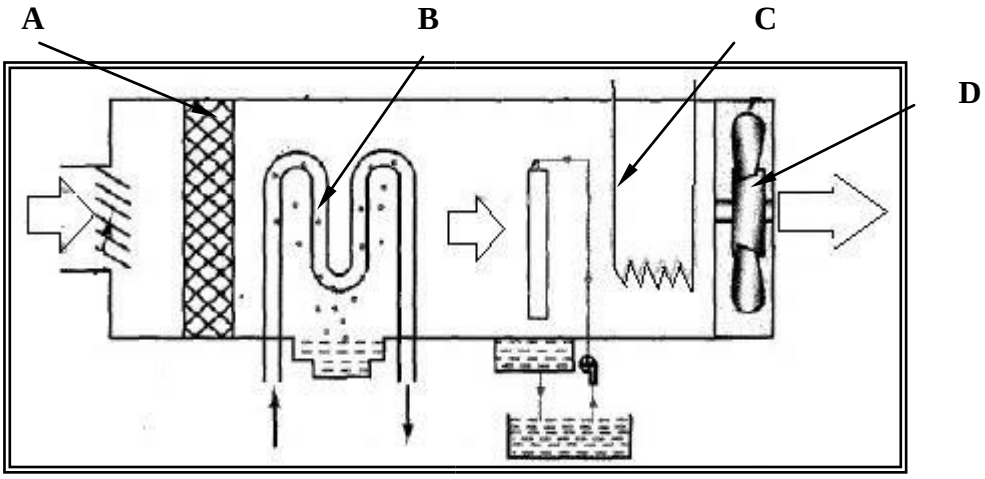


(c) In welding, proper care and cleaning of work area must be taken for safety reasons. Write instructions on how to carry out the above in the work area. **Number** your instructions. **(3 marks)**

SECTION B

QUESTION 6 AIR CONDITION AND REFRIGERATION **(10 marks)**

(a) Study the diagram and answer the question that follows.



Name parts labelled **A**, **B**, **C** and **D**. **(4 marks)**

(b) Explain the function of the refrigerator components listed below.

(i) Refrigerator

(ii) Refrigerant **(4 marks)**

(c) Explain briefly why air conditioning filters need to be cleaned or replaced regularly. **(2 marks)**

(Continued)

SECTION C DESIGN [20 marks]

There are **three** questions in this section. Answer **only one** question. Each question is worth **20** marks.

QUESTION 1

PROBLEM

The carrying of farm produce from carriers and buses to the market and also from the market to vehicles is a hassle for shoppers and vendors.

DESIGN BRIEF

Design a more stable **push and pull goods cart** with more carrying capacity for the purpose of carting goods from carriers and buses to the market.

SPECIFICATIONS

The **goods cart** should:

(i) have ample carrying capacity;
(ii) have at least three or more tyres;
(iii) be able to be **pushed and pulled** whichever way the user decides; (iv) be light and easy to construct.

REQUIREMENTS

(a) Produce pictorial freehand sketches of **two** possible solutions. **(6 marks)**

(b) Draw a pictorial rendered free hand sketch of the final solution taking ideas from the two possible solutions. **(4 marks)**

(c) Make a detailed drawing to show the joint between any **two** members. **(4 marks)**

(d) Evaluate the two possible solutions using the following headings.

(i) Materials Selected
(ii) Safety
(iii) Structural Strength

(6 marks)

SECTION C

QUESTION 2

PROBLEM

Planting flowers in containers or flower pots is a hobby for a lot of people but displaying it nicely outside and inside the house can be difficult and sometimes messy with soil and water getting spilled on the floor.

DESIGN BRIEF

Design a **flower stand** to cater for at least 3 medium sized containers/flower pots to be used as a display unit.

SPECIFICATIONS

The **flower stand** should be:

- portable;
- raised slightly above the floor;
- suitable for use inside and outside the house;
- made from a combination of metal, wood and plastic.

REQUIREMENTS

(a) Produce pictorial freehand sketches of **two** possible solutions and label the parts. **(6 marks)**

(Continued)

(b) Draw a pictorial rendered, freehand sketch of the final solution taking ideas from the two possible solutions. **(4 marks)**

(c) Make a detailed drawing to show the joint between any **two** members. **(4 marks)**

(e) Evaluate your final solution on the following criteria:

(i) Materials Selected
(ii) Safety
(iii) Structural Strength

(6 marks)

QUESTION 3

PROBLEM

Greenhouse gas emissions generated by burning non-renewable fossil fuels: coal, oil, natural gas and liquid petroleum gas (LPG) is of concern on health, climate change and energy utilization.

DESIGN BRIEF

Design an outside **cooking stove** for a family that uses a renewable source of energy.

SPECIFICATIONS

The **cooking stove** should:

- be a simple design that is built at a reasonable cost;
- be portable so that is can be moved to another location;
- be made of materials that are readily and locally available;
- utilize a renewable source of energy to produce the heat for cooking.

REQUIREMENTS

(a) Produce pictorial freehand sketches of **two** possible solutions. **(6 marks)**

(b) Draw a pictorial rendered free hand sketch of the final solution taking ideas from the two possible solutions. **(4 marks)**

(c) Make a detailed drawing to show the joint between any **two** members. **(4 marks)**

(d) Evaluate the two possible solutions using the following headings.

(i) Material Selected
(ii) Safety
(iii) Structural Strength

(6 marks)

THE END