



CENTRE NUMBER	CANDIDATE NUMBER

MINISTRY OF EDUCATION AND HUMAN RESOURCES DEVELOPMENT

SOLOMON ISLANDS SCHOOL CERTIFICATE

2017

DESIGN AND TECHNOLOGY

QUESTIONS AND ANSWER BOOKLET

THURSDAY 9TH NOVEMBER 9.00 AM

**TIME: 3 HOURS plus 10 mins
Reading Time**

<u>SECTION</u>	<u>CONTENT</u>	<u>MARK</u>
A	MULTIPLE CHOICE QUESTIONS	20
B	SHORT ANSWER QUESTIONS	24
C	LONG ANSWER QUESTIONS	44
D	REASONING / EVALUATIVE QUESTIONS	34
		122

INSTRUCTION TO CANDIDATE

1. DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO.
2. WRITE BOTH YOUR CENTRE NUMBER AND CANDIDATE NUMBER IN THE BOX PROVIDED AT THE TOP RIGHT HAND CORNER OF THIS PAGE.
3. BEFORE YOU BEGIN EACH PART, READ THROUGH THE INSTRUCTIONS CAREFULLY.
4. WRITE BEST ANSWER LETTERS TO **SECTION A** IN THE FOLD OUT FLAP OF THIS BOOKLET.
5. WRITE YOUR ANSWERS TO **SECTION B, C AND D** IN THE SPACES PROVIDED IN THIS BOOKLET.
6. USE 10 MINUTES READING TIME TO READ THROUGH THE PAPER.

THIS BOOKLET CONTAINS 21 NUMBERED PAGES

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

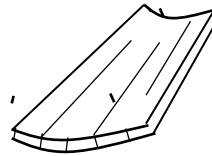
ALL QUESTIONS IN THIS SECTION ARE COMPULSORY. THEREFORE ALL QUESTIONS MUST BE ATTEMPTED.

1. One of our country's natural resources is timber. The main timber species which is recommended for boat building in Solomon Islands is:

- A. Akwa (Taun),
- B. Kauri,
- C. Rosewood (lingi),
- D. Vasa,

2. *Cupping* is a timber defect caused by;

- A. Live sawing of timber,
- B. Tangential shrinkage,
- C. Radial shrinkage,
- D. Circumferential shrinkage,

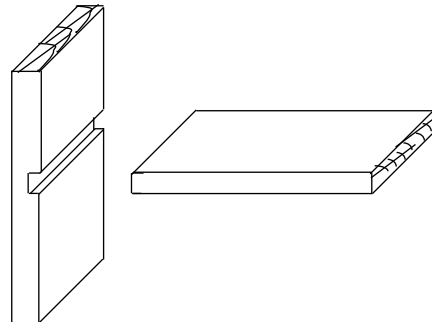


3. An important reason why timber must be seasoned before used is to ensure its moisture content is:

- A. 6% in equilibrium to its surrounding.
- B. 12% in equilibrium to its surrounding.
- C. 5% in equilibrium to its surrounding.
- D. 7% in equilibrium to its surrounding.

4. The exploded view of the wood joint shown is an example of...

- A. Stopped rebate Joint,
- B. Mortise and tenon joint,
- C. Stopped housing Joint,
- D. Through housing joint,

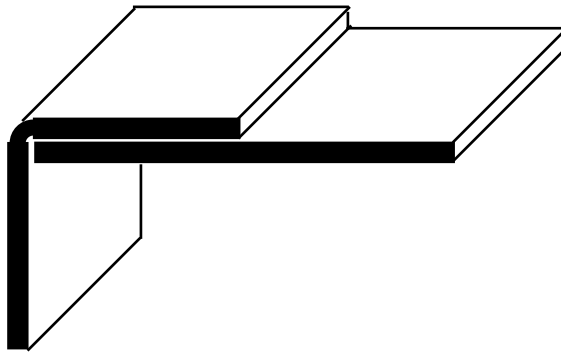


5. The reason for sharpening a chisel blade on an oilstone is to:
- A. align the cutting blade evenly,
 - B. align & remove fault from the blade,
 - C. hone the cutting edge for fine cutting,
 - D. hone the cutting iron for fine cutting,
6. The term "finishing" in woodwork in relation to a timber project is often referred to as applying:
- A. final sketches to the timber product,
 - B. a chamfer on a timber product,
 - C. a timber finish to increase appearance and durability,
 - D. a finish on uneven timber surfaces.
7. You can tell the age of a tree by looking at the:
- A. Medullary Rays,
 - B. Bark,
 - C. Pith,
 - D. Annual Rings,
8. The MOST appropriate manufactured material that can be used for making Notice Boards is:
- A. Hard wood,
 - B. Soft wood,
 - C. Soft board,
 - D. Hard board,
9. What is the name of the **mould** used to produce the **bottom part** of the GRP boat below, shown by the arrow?

- A. Male mould,
- B. Top mould,
- C. Female mould,
- D. Bottom mould,



10. A ferrous metal;
- A. contains iron, and is magnetic & rusts easily,
 - B. has mixture of metal and non-metallic compounds,
 - C. has mixture of two or more metal components,
 - D. does not contain iron or other added elements,
11. What is the reason for using "centre punch" in metal fabrication? It is used as a guide for;
- A. cutting Metal,
 - B. finishing metal,
 - C. joining metal,
 - D. drilling metal,
12. In metal fabrication, what is the purpose for shaping edges of metal?
- A. identify weak edges,
 - B. to give greater strength and prevent injuries,
 - C. avoid gradual eroding of metal edges
 - D. avoid joint allowance in metal joints.
13. What is the name of the tool used to mark lines on metal surfaces?
- A. Centre punch,
 - B. Nail punch,
 - C. Scriber,
 - D. Marking knife,
14. The joint below is used in making sheet metal buckets. A suitable joining method to create this metal joint is;
- A. Pop Riveting,
 - B. Soft soldering,
 - C. Brazing,
 - D. Hard soldering,



15. What is the appropriate tool used in **sheet metal work** from the list below?

- A. Round pene hammer
- B. Warrington cross pene hammers
- C. Soft faced hammer
- D. Bullet head hammer

16. Soft solder is an alloy of tin and lead and is graded by the amount of these metals in its composition. The percentage (%) in ratio is:

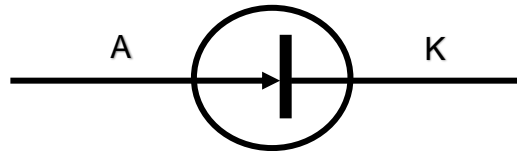
- A. 40 tin: 60 lead
- B. 60 tin: 40 lead
- C. 50 tin: 50 lead
- D. 70 tin: 30 lead

17. **Flux** is an important component in soldering work and is responsible for;

- A. allowing residue to be part of the joint,
- B. heating the metals to a high temperature,
- C. stopping the solder to flow around the joint,
- D. de-oxidising the metal so that the solder can hold,

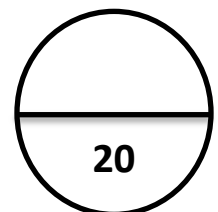
18. In electronic work, the **symbol** shown below is that of a;

- A. LED
- B. Resistor
- C. Capacitor
- D. Diode



19. In the study of Electronics, Ohms law is the relationship between voltage, current and resistance. An increased resistance, would cause the current to:
- A. increase,
 - B. decrease,
 - C. remain the same,
 - D. be the same as the voltage,
20. Which of the following is the most common method used for joining electronic components?
- A. Welding
 - B. Riveting
 - C. Soldering
 - D. Clamping

Total marks for Section A:



SECTION B: SHORT ANSWER QUESTIONS

(24 MARKS)

ALL QUESTIONS IN THIS SECTION ARE COMPULSORY. READ THE QUESTIONS CAREFULLY AND WRITE YOUR ANSWERS ON THE SPACES PROVIDED.

21. The picture below is a tool used in construction work and industry.
Write the full NAME of the tool and **ONE** of its main USES.



Name: _____
(1 mark)

Use: _____

(1 mark)

22. Explain the difference between exterior and interior plywood and include the type of glues used.

(2 marks)

23. List TWO things one should consider when buying wood adhesives.

i) _____

ii) _____

(2 marks)

24. When both ends of a timber dry faster than the rest of the timber, it is known as WARP. Write down TWO other defects that may result from the same seasoning process.

i. _____

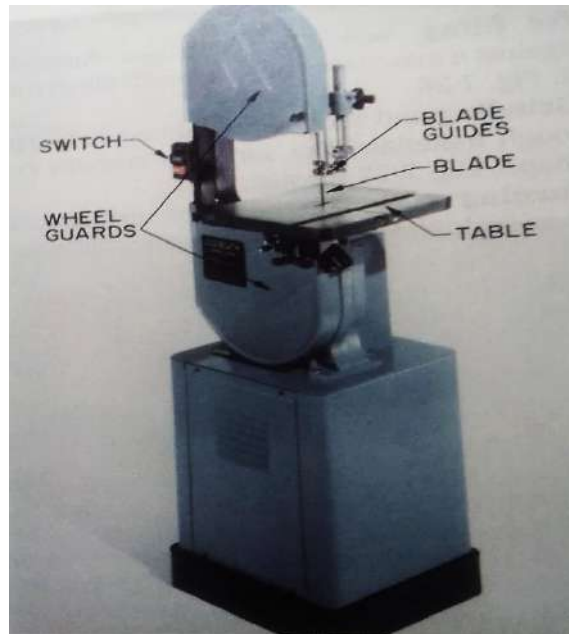
ii. _____

(2 marks)

25. What is the gauge of a screw? *You may use **sketches** as part of your explanation.*

(2 marks)

26. Study the wood working machine shown below and answer the questions that follow on page 8.



1. What is the name of the wood working machine above?

(1 mark)

2. Write down one use of the machine shown above.

(1 mark)

27. Paint is applied in three coats on a job. State TWO reasons for applying the Primer coat.

i) _____

ii) _____

(2 marks)

28. Write down **Two** types of flame used in gas welding. Then explain how each flame comes about.

Flame 1: _____

(2 marks)

Flame 2: _____

(2 marks)

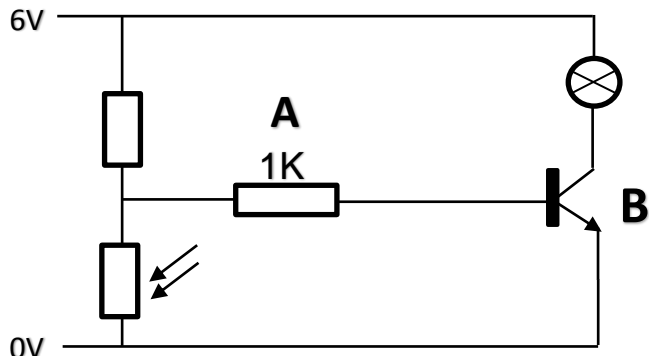
29. Explain the difference between Thermoplastics and Thermo-setting plastics.
Thermoplastics

(1 mark)

Thermo-setting plastics

(1 mark)

30. a) Write down the names of the components marked with letters **A** and **B** as shown in the circuit below.



i. **A** _____

ii. **B** _____

(2 marks)

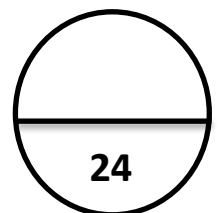
b) Write down a function of components **A** and **B** as applied in the circuit above.

A _____

B _____

(2 marks)

Total marks for Section B:



SECTION C: LONG ANSWER QUESTIONS (44 MARKS)

READ EACH QUESTION CAREFULLY, THEN ANSWER EACH ON THE SPACES PROVIDED.

31. State the procedures required for producing a Glass reinforced plastics (GRP) product.

(5 marks)

32. Maintenance of woodworking hand tools must be done on a regular basis such as Saw sharpening.

Name the process used to reduce the sharp pointed teeth of a Saw to the same height.

(a) Name of the process _____

(b) Explain your answer with the aid of diagram or sketches. (3 marks)

33. Use the measurements provided below to calculate the timber order and costing below at the Timol Timber Company in Honiara. Show all working out in the space provided.

Length: 1000mm = 1m

Volume: 1,000,000cm³ = 1m³

- A. Calculate the total number of cubic metres in this timber order.
(Show all working out)

30 lengths (pieces) of 350mm x 100mm x 10m DAR Rosewood

(3 marks)

- B. Calculate the total cost of the above order if a cubic metre of the DAR Rosewood costs \$2,000.00

(2 marks)

34. The three common methods of welding are Oxy-acetylene welding, Arc welding and Mig-welding. Briefly explain these **three methods** and one of its uses as applied to metal work.

(a) Oxy-acetylene welding:

Use

(b) Arc welding:

Use

(c) Mig welding

Use

(6 marks)

35. Tinsnips are used for cutting thin sheet metal by hand. Explain the difference between Straight snips and Curve snips.

(2 marks)

36. Distortion in metal is a problem encountered during welding. State any **Two (2)** methods that are used to overcome distortion.

1. _____

2. _____

(2 marks)

37. Briefly describe a metal lathe and give two uses

Use (1) _____

Use (2) _____

(4 marks)

38. **Iron** is an important product for metal fabrication work. There are **three** elements that constitute iron during production.

Name ANY two principal raw materials required to extract iron.

1. _____

2. _____

(2 marks)

39. **Brass** is an alloy,

A. Name ONE basic element of brass.

Element 1 _____

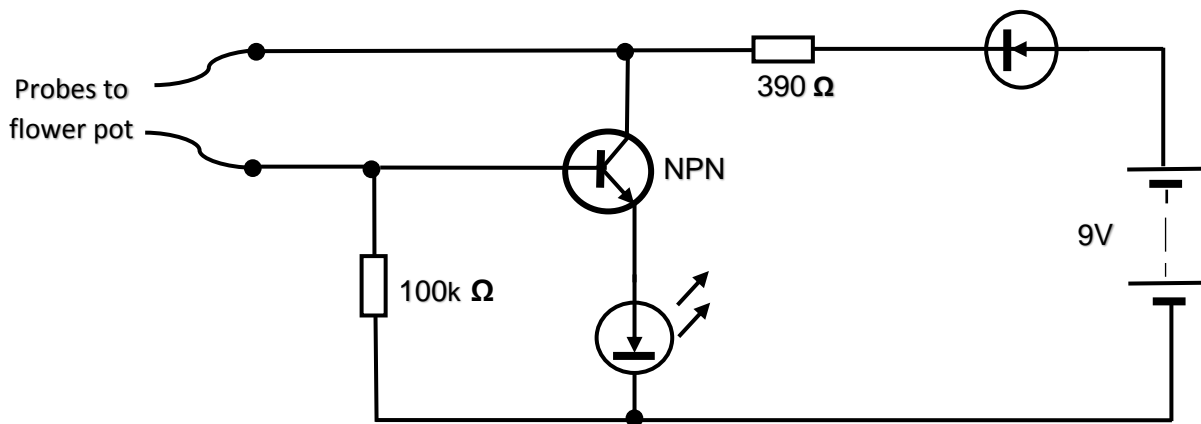
B. Give an example of where this alloy (Brass) is used.

(2 marks)

40. The application of gelcoat is an important part in the hand laying process of GRP. Explain what the gelcoat does and when it is applied?

(2 marks)

41. An electrical circuit of a **Water Indicator** is shown below. Describe the purpose of this circuit and how it works



(3 marks)

42. Explain your understanding of the following terms below with regards to Electronics principles

Voltage

Current

(4 marks)

43. Electronics is a study that can be divided into two categories; namely **Analogue Electronics** and **Digital Electronics**. Explain the difference and give one example each of where these are used

Analogue Electronics

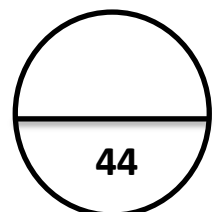
Use _____

Digital Electronics

Use _____

(4 marks)

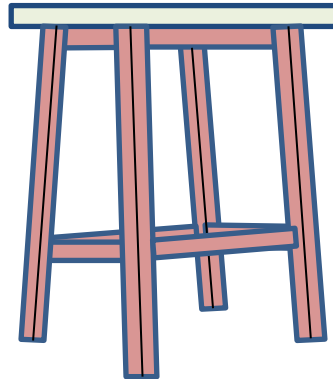
Total marks for Section C:



SECTION D: REASONING/EVALUATION QUESTION (34 MARKS)

THE QUESTION BELOW IS COMPULSORY. ANSWER IT ON THE SPACE PROVIDED.

44. Shown below is the drawing of a stool. Study the drawing and the design specifications, then answer the questions that follow on page 17.



Here are two design specifications.

1. The stool is designed to be used by young children normally at Primary schools.
2. It must be designed with a structure that provides balance and strength.

Examine the product as shown above in relation to its specification and assess how well the specifications have been met or not been met. If any specification(s) yet to be met, then suggest ways in which the product could be improved.

Stool Measurements:

Length – 350mm
Width – 350mm
Height – 500mm

Specification 1:

The stool is designed to be used by young children normally at Primary schools.

(i) Confirm and explain if this specification has been met or not.

(3 marks)

(ii) Suggest ways in which the product could be improved if you consider this specification has not been met.

(3 marks)

Specification 2:

It must be designed with a structure that provides balance and strength

(i) Confirm and explain if this specification has been met or not.

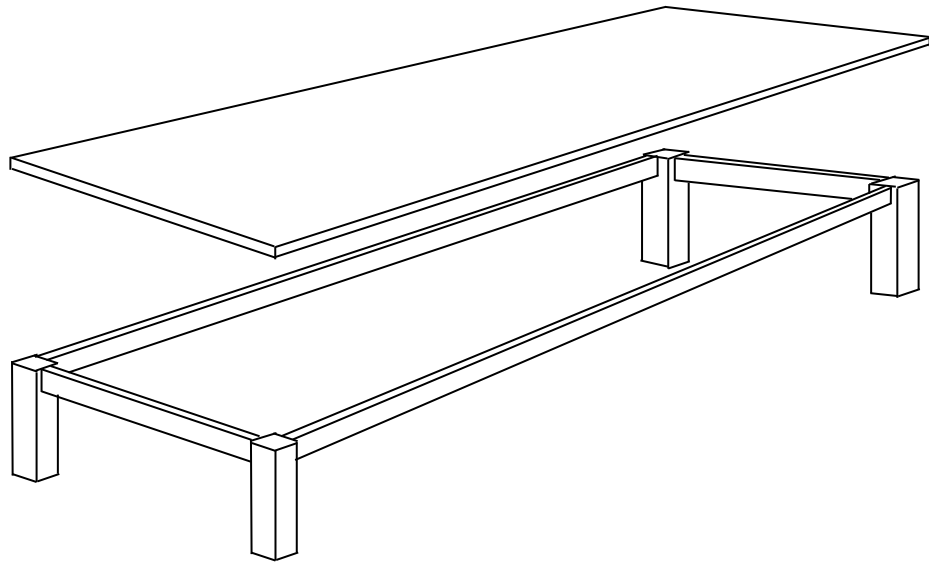
(3 marks)

(ii) Suggest ways in which the product could be improved if you consider this specification has not been met.

(3 marks)

45. A student was given a task to make a **coffee table**.

Below is the exploded view of the table. The timber used for the design is Akwa with the following measurements; 45mm x 45mm x110mm for the legs and 50mm x 25mm x 350 mm for the rails. All joints are nailed. A 12mm particle board is nailed on for the top.



Study the drawing above and answer questions (i) below and (ii) to (iv) on page 19.

a) Identify FOUR (4) weaknesses of the design.

Design weaknesses are;

i) _____

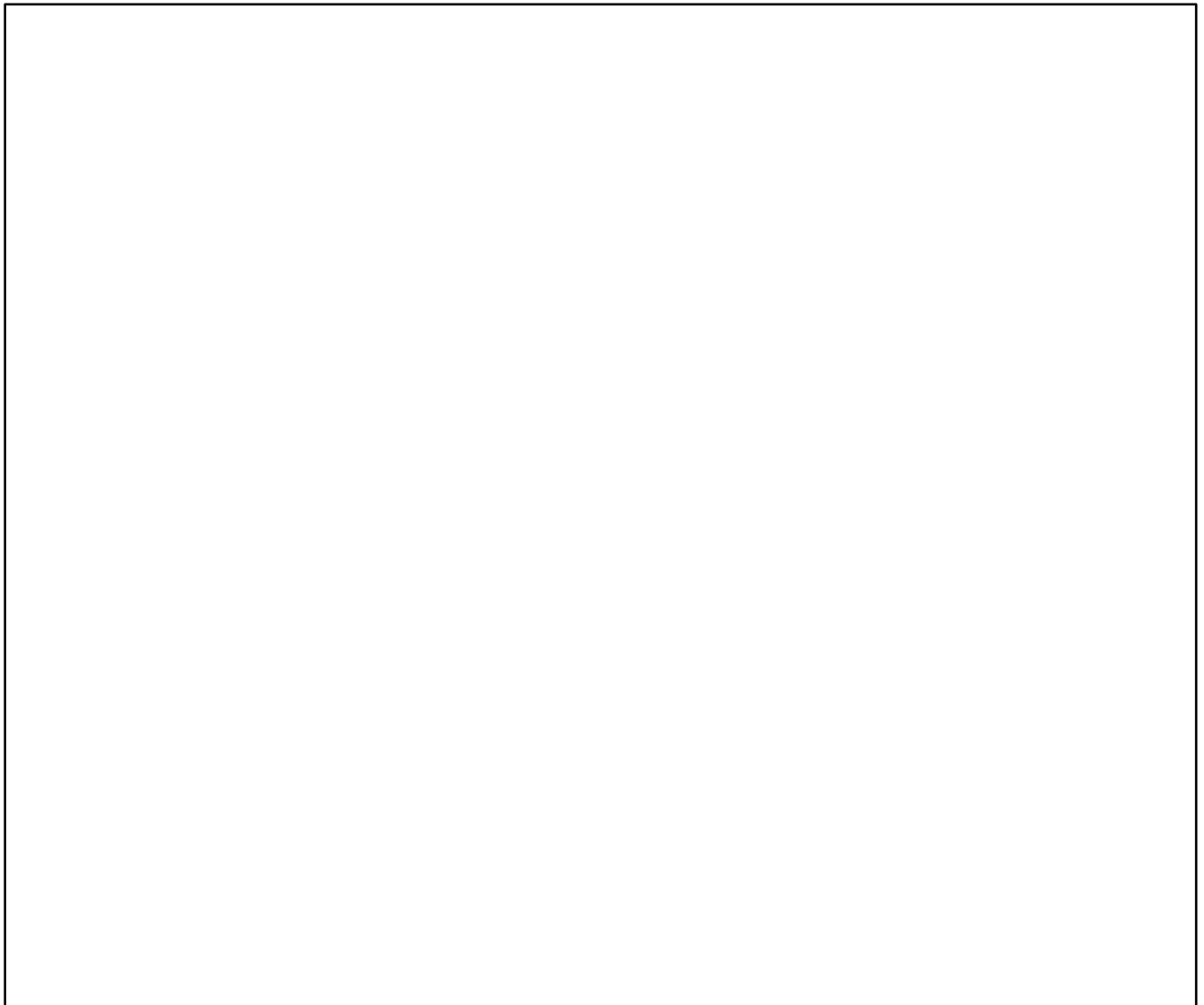
ii) _____

iii) _____

iv) _____

(8 marks)

- b) You are asked to re-design the coffee table and improve its construction. Neatly sketch your design and show clearly ALL areas for improvement.



(6 marks)

46. Fixed value resistors are very small electronic components designed to be used in circuitry work. They are produced in $\frac{1}{4}$ - 1 watts sizes, so tiny that you cannot write their value on the component. Instead a color-code is used.

(a) Apply your understanding of electronics especially color coding and work out the **values** of the following resistors. An example has been done.


Fill in the column for **resistor value** in the table below.

	Color code	Color code	Color code	Tolerance	Resistor Value? Ohms (Ω) 
<i>Example</i>	<i>orange</i>	<i>orange</i>	<i>orange</i>	<i>gold</i>	33000 Ω 5%
a	blue	grey	black	silver	
b	red	green	red	No band	
c	brown	black	Purple/violet	gold	
d	yellow	white	yellow	red	

(4 marks)

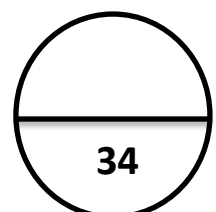
(b) If you need resistors with the following values for your circuit, what **color codes** would you look for? An example has been done.

Fill in the blank columns for the **color code** in the table below

	Color code?	Color code?	Color code?	Tolerance	Resistor value Ohms (Ω) 
<i>Example</i>	<i>orange</i>	<i>orange</i>	<i>orange</i>	<i>gold</i>	33k Ω 5%
a					470 Ω 20%
b					2.8k Ω 10%
c					1.5k Ω 10%
d					390 Ω 2%

(4 marks)

Total marks for Section C:



**SISC – INDUSTRIAL ARTS/DESIGN
TECHNOLOGY 2017**

CENTRE NUMBER				
CANDIDATE NUMBER				

**SECTION A
MULTIPLE CHOICE (20 MARKS)**

Write the letter of the correct answer in the box provided. Make sure your answer is put alongside the right question number.

Example: If you consider A is the correct answer, write it like this:

A

 c

To change your answer from A to C, cross out A and write the new answer by the box, like this:

A

 c

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FOR MARKERS USE ONLY

SECTION	MARKS	ACTUAL MARK
A	20	
B	24	
C	44	
D	34	
TOTAL	122	
Markers Initial		