

GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

WOODWORK SG
(Second Paper: Theory)

TIME: 2 hours

MARKS: 100

INSTRUCTIONS:

- Answer ALL the questions.
 - Sketches may be used to illustrate your answers.
 - Start each question on a new page.
 - Answer Question 1 on the **answer sheet** on the **inside cover** of your **answer book**.
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QUESTION 1A
MULTIPLE-CHOICE QUESTIONS

The multiple-choice questions that follow cover the full syllabus.

Carefully study the statements and questions below and, in each case, choose the most correct answer from A, B, C or D. Indicate your answer by making a cross (X) over the appropriate letter on the **answer sheet** on the **inside cover** of your **answer book**.

Timbers

1.1 This kind of timber is an exotic conifer.

- A. Imbuia
- B. Oregon pine
- C. Oak
- D. Beech

1.2 The under-mentioned timber is indigenous to Mexico but planted in South Africa.

- A. Pinaster pine
- B. Imbuia
- C. Patula pine
- D. Beech

- 1.3 Which place is responsible for the grading of timber?
- A. SANS (SABS)
 - B. HSRC
 - C. CSIR
 - D. KVV
- 1.4 Which one of the following grading marks appears on timber of bad quality?
- A. MG
 - B. XX
 - C. M6
 - D. FC
- 1.5 This timber corrodes mild steel screws.
- A. Japanese oak
 - B. Yellow wood
 - C. Pau Marfin
 - D. Imbuia

Hand tools

- 1.6 A blunt tool is more conducive to accidents because _____.
- A. the material being cut gets damaged
 - B. more force is required leading to a loss of control
 - C. the edge of the cutting tool might get chipped
 - D. the material being cut, might split
- 1.7 The size of a paring chisel is determined by the _____.
- A. mass of the blade
 - B. number of ferrules on the handle
 - C. length of the blade
 - D. width of the blade
- 1.8 Files are used for _____.
- A. squaring wood
 - B. finishing joints
 - C. shaping work in wood
 - D. None of the above mentioned.

- 1.9 What makes the mortice chisel ideal to be hammered on by a mallet?
- A. A ferrule and a leather washer
 - B. A strong handle
 - C. A thicker blade
 - D. The handle has two ferrules
- 1.10 What is used to maintain the correct angle when inclined holes are bored in wood?
- A. A try square
 - B. A slided bevel
 - C. A marking gauge
 - D. A bench hook
- 1.11 This plane is used for the finishing of completed work.
- A. Router plane
 - B. Jack plane
 - C. Smoothing plane
 - D. Trying plane
- 1.12 This hammer is used to pull out nails.
- A. Claw hammer
 - B. Carpenter's mallet
 - C. Cross pene hammer
 - D. Ball pene hammer
- 1.13 Which oilstone is the natural stone?
- A. Sandstone
 - B. Indian stone
 - C. Turkish stone
 - D. Carborundum oilstone

Machine tools

- 1.14 When the cutting technique is used on the lathe, the tool-rest should be adjusted as follows.
- A. Precisely on the centre of the wood
 - B. The tool rest is not used.
 - C. Above the centre of the wood
 - D. Below the centre of the wood

- 1.15 Which part of the circular saw prevents the wood from pinching (binding)?
- A. Splitter
 - B. Check-rail
 - C. Blade guard
 - D. Mitre gauge

Miscellaneous

- 1.16 When making a concealed mortice and tenon joint, the tenon must always be deeper than the length of the mortice. The reason for this is _____.
- A. it establishes a stronger joint
 - B. to strengthen the gluing ability
 - C. to ease the working procedures
 - D. to leave room for excessive glue
- 1.17 This beetle only attacks seasoned timber.
- A. Powder post beetle
 - B. Ambrosia beetle
 - C. Pinhole borer
 - D. Green beetle
- 1.18 The poisonous effectiveness of a preservative agent against destructive factors is called _____.
- A. absorption
 - B. toxicity
 - C. permeability
 - D. retention
- 1.19 The study of the development of the human environment in terms of the human body is known as _____.
- A. anatomy
 - B. ergonomics
 - C. functionality
 - D. geography
- 1.20 During the design process principles such as the following should be borne in mind:
- A. The needs of the client
 - B. Climate
 - C. Line, form, shape, texture and contrast
 - D. Functionality, appearance, material and construction

(20)

QUESTION 1B

The following multiple-choice questions (1.21 – 1.30) are in tubular format. Read the item(s) in the first column and choose your answer from Columns A, B and C. Indicate your answer by making a cross (X) over the appropriate letter on the **answer sheet** on the **inside cover** of your **answer book** e.g. 1.31 – D.

| | | Column A | Column B | Column C |
|------|--|---|---|--|
| 1.21 | Heart rot | Tamboti | Kiaat | Stinkwood |
| 1.22 | Frame saw | Square sawn method | Quarter-sawn method | Cross-cutting method |
| 1.23 | Adjusting lever | Hand drill | Brace | Smoothing plane |
| 1.24 | Sliding bevel | Marking of dovetail joints | Marking of half-lapped joints | Marking of mortice and tenon joints |
| 1.25 | Morticing attachment | Band saw | Drill press | Jointer |
| 1.26 | Driving in of panel pins | Claw hammer | Cross pene hammer | Ball pene hammer |
| 1.27 | Lathe | Paring chisel | Parting tool | Firmer chisel |
| 1.28 | Fine sanding paper | 40 | 80 | 120 |
| 1.29 | Staining | The process through which the colour of the wood can be changed | The process through which timber can be treated against insects | The process through which the colour of wood can be made lighter |
| 1.30 | Not suitable for joints in wood | PVA glue | Contact glue | Epoxy glue |

Table 1.2

(10)
[30]

**QUESTION 2
TIMBERS, CONVERSION METHODS, DEFECTS AND GRADING**

2.1 Timbers

Table 2.1 gives various facts on timber. In your answer book, write down the letters **A** to **P** below one another. Read the rows vertically and use the information provided to find the answers. Write only the numbers of the relevant facts next to the letters **A** to **P**. For example, A – 1, B – 2, etc.

| | Distribution: | Colour of heartwood: | Odour: | Texture: | Contains: | Uses: |
|-----------------|--|--|---|---|--|---|
| | <ol style="list-style-type: none"> 1. Zambia 2. Knysna (SA) 3. Uganda 4. Britain 5. Mpumalanga 6. Brazil 7. Japan 8. USA 9. South America | <ol style="list-style-type: none"> 1. Varies from yellow-brown to chocolate-brown 2. Light brown to dark brown 3. Red-brown to dark brown 4. Golden brown 5. Yellow-brown to red-brown 6. Light red-brown 7. Light red to dark red 8. Yellow | <ol style="list-style-type: none"> 1. Cedar 2. Spicy 3. Resin 4. Sweet 5. Unpleasant 6. Curry-like 7. None | <ol style="list-style-type: none"> 1. Fine 2. Medium 3. Rough 4. Even | <ol style="list-style-type: none"> 1. Oil 2. Resin 3. Gallic acid 4. Salt crystals | <ol style="list-style-type: none"> 1. Construction work 2. Tool handles 3. Used as contrasting colour in expensive furniture 4. Expensive wood used for furniture |
| Beech | A | | | | | |
| Real Yellowwood | | | G | | | |
| Imbuia | | D | | | | |
| Iroko | | | H | | | |
| Japanese Oak | | | | J | | |
| Kiaat | B | | | | | |
| Oregon pine | | E | | | | |
| Pau Marfin | C | | | | | O |
| S.A. pine | | | | K | M | |
| Sapele mahogany | | F | | | | |
| Stinkwood | | | | L | | P |
| Tamboti | | | I | | N | |

Table 2.1

(16)

2.2 Conversion of timber

- 2.2.1 State FOUR reasons why logs should be sawn into boards as quickly as possible, after the trees have been cut down. (4)
- 2.2.2 Name and make a drawing of the method which is mainly used for the conversion of softwoods. (2)
- 2.2.3 State THREE reasons why the method mentioned in Question 2.2.2 is used to convert softwoods. (3)

2.3 Defects in timber

- 2.3.1 Name and draw TWO defects that occur in growing tree trunks. (4)
- 2.3.2 What is the cause of cracks occurring at the ends of boards? (2)
- 2.3.3 Why are knots in boards regarded as defects? (2)
- 2.3.4 State the name of a timber known for all the knots it has. (1)
- 2.3.5 When is a board cross grained? (2)

2.4 Grading of timber

Study the two grading marks shown in **Figure 2.4 A** and **B**, and answer the questions that follow.

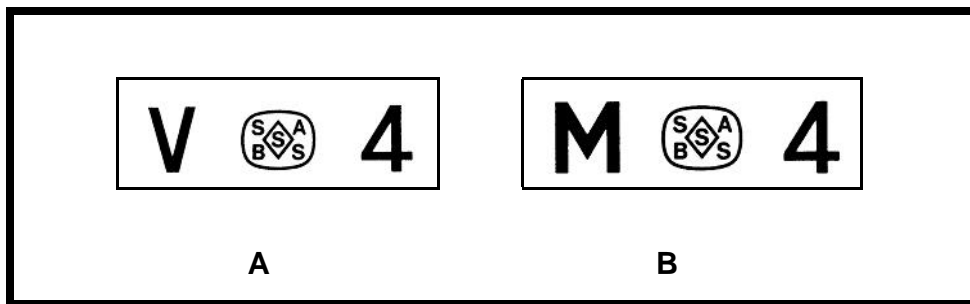


Figure 2.4

- 2.4.1 State the use of timber marked with these grading marks. (1)
- 2.4.2 What do the letters **V** and **M** mean? (2)
- 2.4.3 Which timber in South Africa is marked with these grading marks? (1)

[40]

QUESTION 3
HAND AND MACHINE TOOLS

- 3.1 Why must a rule be held on its side when making measurements? (1)
- 3.2 Except for measuring, what other use does the rule have? (1)
- 3.3 In each of the following cases, name the problem and how can it be solved.
- 3.3.1 A tenon saw jams in the wood despite the blade being sharp.
- 3.3.2 A jack plane which clogs easily
- 3.3.3 A smoothing plane that planes deeper on one side than the other
- 3.3.4 A screwdriver that slips easily out of the slot of the screw 4x2=(8)
- 3.4 Panel pins are left standing slightly proud of the face of the work.
- 3.4.1 Why is this procedure followed? (1)
- 3.4.2 Which tools are used to drive the panel pin below the surface of the timber? (2)
- 3.4.3 What is usually used to cover the panel pin? (1)
- 3.5 Why does a newly ground chisel blade need to be sharpened (honed) on an oilstone? (2)

3.6 **Figure 3.6** shows a rebate joint.

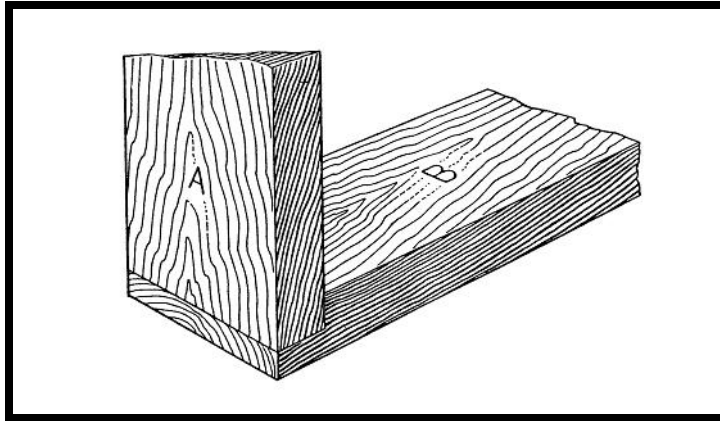


Figure 3.6

Describe step by step how you will make this joint by using **hand tools**.
Refer to the following:

- 3.6.1 Preparation (2)
- 3.6.2 Marking out of the joint (3)
- 3.6.3 Removing of excess material (4)

Note: In your description, refer to the hand tools you will use.

3.7 **The wood turning lathe**

A leg for a table must be turned out of a piece of wood measuring 75 x 75 x 900 mm.

- 3.7.1 Which accessories will you use to mount the wood between the headstock and tailstock? (2)
- 3.7.2 What speed would you set (high, medium or low) when turning the square wood to round? (1)
- 3.7.3 Which turning chisel would you use for the job? (1)
- 3.7.4 What speed would you set (high, medium or low) when doing the final sanding? (1)
- 3.7.5 How is the tool post set during the sanding process? (1)
- 3.7.6 State **TWO** personal safety measures which must be applied during the turning process. (2)

3.8 The combination sander

A board's end grain must be sanded square on the sanding disk.

- 3.8.1 Describe briefly how the machine should be set square. (2)
- 3.8.2 Which aid should be used to support the board while it is sanded? (1)
- 3.8.3 On which side of the sanding disk will you work? (1)
- 3.8.4 Give a reason for your answer in Question 3.8.3. (2)

3.9 Portable power tools

3.9.1 The router is one of the most handy but also most dangerous machines.

- (a) Describe briefly how you will change and set a cutter. (4)
- (b) State TWO uses. (2)

3.9.2 Describe briefly how a jigsaw can be used to cut a square hole in a piece of 17 mm (thickness) chipboard. Make use of a sketch to illustrate your answer. (3)

3.10 A classmate has cut himself with a tenon saw and needs your assistance urgently.

What precautionary measures would you take to safeguard yourself against possible HIV infection?

(2)
[50]

QUESTION 4
CONSTRUCTION AND WOODWORKING JOINTS

4.1 Joints used in cabinet work perform the following functions:

- A. Widening
- B. Lengthening
- C. Cornering
- D. Framing

Study the following joints and indicate the function that each one performs.
Write only the answer. For example, 4.1.1 - A, 4.1.2 - B, etc.

4.1.1 Finger joint

4.1.2 Mitre joint

4.1.3 Mortice and tenon joint

4.1.4 F-joint (4)

4.2 **Widening joints:**

4.2.1 Show by means of a sketch how you will arrange the annual rings on the ends of four adjacent boards for making a tabletop. (4)

4.2.2 What is the reason for your answer in Question 4.2.1? (2)

4.2.3 How will you arrange the grain, visible on the surface of each board? (1)

4.2.4 What is the reason for your answer in Question 4.2.3? (2)

4.3 **Drawer construction:**

Figure 4.3 shows a sketch of a drawer made of solid wood.

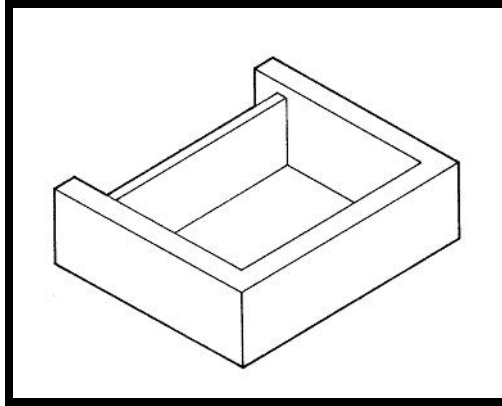


Figure 4.3

- 4.3.1 Name TWO joints that could be used to join the front to the sides. (2)
- 4.3.2 Which joint will you use to join the back to the sides? (1)
- 4.3.3 State the name of a wooden product that you will use for the bottom of the drawer. (1)
- 4.3.4 How will you fix the bottom of the drawer? (2)
- 4.3.5 Show by means of a sketch how will you fix a handle to the drawer. (2)

4.4 **Door frame construction:**

Figure 4.4 shows an isometric sketch of a door frame with a glass panel.

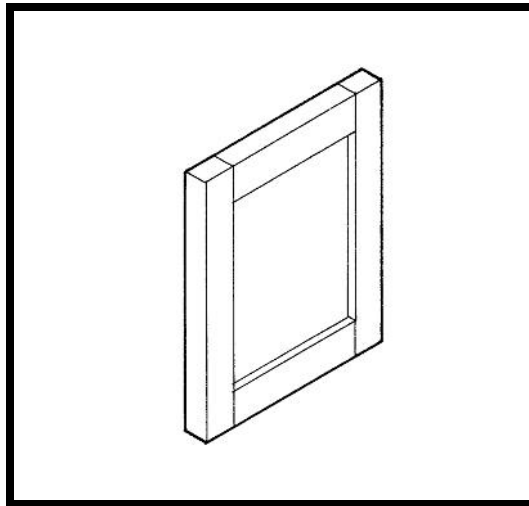


Figure 4.4

- 4.4.1 Which joint will you use to join the stiles and rails? (1)
- 4.4.2 Draw freehand a sectional sketch of the frame showing the following:
- (a) One stile
 - (b) A portion of the glass
 - (c) The beading that keeps the glass in position (4)

4.5 **Table construction:**

Figure 4.5 shows the top view of a table with the top removed.

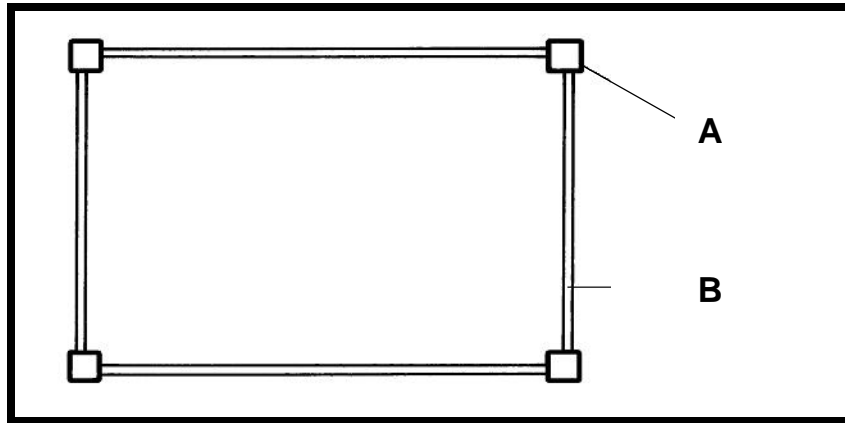


Figure 4.5

- 4.5.1 Name the parts **A** and **B**. (2)
- 4.5.2 Which joint will you use to join **A** and **B**? (1)
- 4.5.3 Show by means of a labelled sketch how you will secure a top to the frame in **Figure 4.5**. (4)
- 4.5.4 Except for using a square, how will you test the frame for squareness? (2)
- 4.6 **The glue process:**
- 4.6.1 How will you prepare the wood for a good glued joint? (2)
- 4.6.2 How will you apply the glue? (1)
- 4.6.3 Give TWO reasons why cramps are used during the glue process. (2)

[40]

QUESTION 5
PRESERVATION, FINISHING AND DESIGN

5.1 Preservation of timber

- 5.1.1 Name TWO types of fungi that influence the durability of timber. (2)
- 5.1.2 State TWO other biological factors that destroy timber. (2)
- 5.1.3 State FOUR properties a good preservative should have. (4)
- 5.1.4 Which preservative shows the following properties? (1)
- Suitable for outdoor use
 - Dark in colour
 - An unpleasant smell
- 5.1.5 Several processes exist for the application of preservatives. Which TWO factors determine the choice of the process that should be used? (2)
- 5.1.6 State the name of a preservation process. (1)

5.2 Finishing of wood

- 5.2.1 Briefly describe how you will protect an article by using varnish. Use the following headings: (2)
- (a) Preparation of the wood (2)
- (b) Application of the first coat (method) (1)
- (c) Preparation of varnished surfaces for the next coat (2)
- (d) What is the period before final hardening is reached? (1)
- 5.2.2 State THREE disadvantages that wax polish has as a protective coating. (3)

5.3 Design

5.3.1 Figure 5.3 (a) shows the side view of a dining room table.

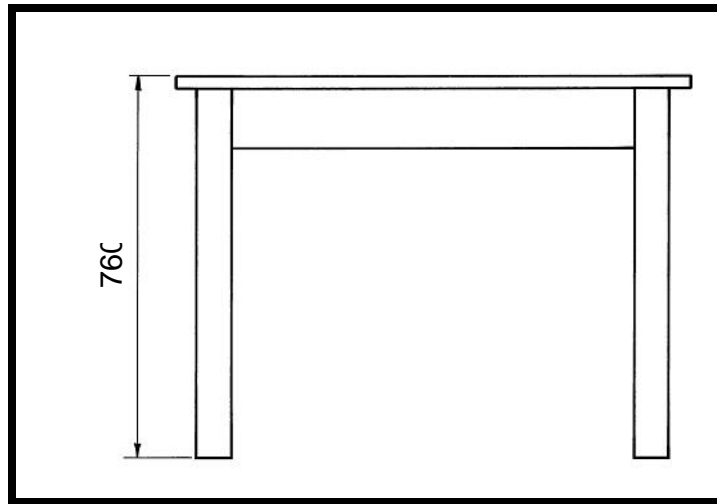


Figure 5.3 (a)

Figure 5.3 (b) shows a number of basic wood turning profiles.

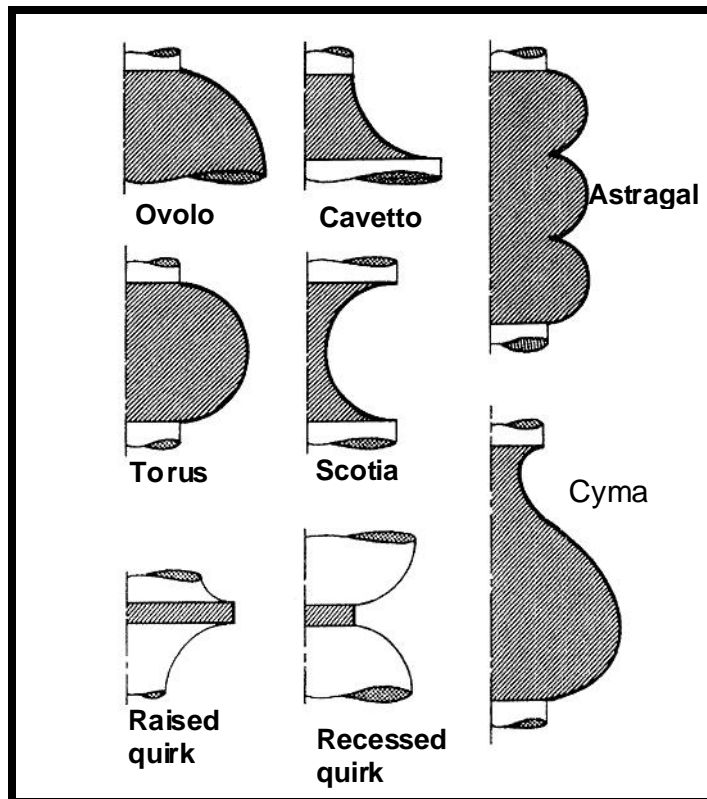


Figure 5.3(b)

Use a pencil and ruler and design and draw to a scale of 1:5 a turned leg for the table by using the following criteria:

- (a) The thickness of the leg is 75 x 75 mm
- (b) Make use of at least 4 basic turning profiles from **Figure 5.3(b)**.
- (c) The piece where the rails join should not be turned.

Note: Marks will be allocated for the correct use of the basic turning profiles as well as the ratio thereof. (10)

5.3.2 Use a pencil and ruler and design and draw to a scale of 1:1 an edge pattern for the tabletop. Show only a part of the top. (2)

5.3.3 How is the height of the table determined? (2)

5.4 Furniture styles:

Copy the table below and write the following characteristics in the applicable column:

| THE CAPE FURNITURE STYLE | CONTEMPORARY FURNITURE |
|--------------------------|------------------------|
| | |

5.4.1 Board products

5.4.2 Solid wood

5.4.3 Riempies chair

5.4.4 Machine made

5.4.5 Animal glue

(5)
[40]

TOTAL: 200÷2=100