3.2 WOOD WORK (444)

The 2012 KCSE examinations for wood work consisted of two papers namely Paper 1 (theory) and Paper 2 (Practical Project). The theory was worth 60% while practical was worth 40% of the final mark. The revised syllabus was tested for the first time but the format and weighting of the two papers was the same as in the previous years.

Candidates General Performance

The table below shows candidates' overall performance for the period 2008 to 2012

Table 9: Candidates Overall Performance in the Years 2008, 2009, 2010, 2011 and 2012

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
2008	1		60	27.84	9.23
	2		40	18.61	4.93
	Overall	**98**	**100**	**46.45**	**12.89**
2009	1		60	28.27	10.30
	2		40	18.84	6.07
	Overall	**424**	**100**	**47.12**	**15.49**
2010	1		60	30.18	8.31
	2		40	20.18	4.55
	Overall	**375**	**100**	**50.01**	**12.27**
2011	1		60	21.24	9.46
	2		40	14.28	5.18
	Overall	**447**	**100**	**35.49**	**13.93**
2012	1		60	27.66	9.81
	2		40	18.42	5.14
	Overall	**393**	**100**	**46.01**	**14.13**

From the table above, the following observations can be made:

(i) The mean score for the year 2012 improved compared to that of the year 2011. This is an indication that the paper was performed better in 2012 compared to 2011.

(ii) The candidature for the year 2012 decreased from 447 in 2011 to 393.

3.2.1 Woodwork Paper 1 (444/1)

The questions which were reported to have been poorly responded to have been analyzed with a view to pointing out candidates' weaknesses and propose suggestions on some remedial measures that would be taken in order to improve performance in future. The questions for discussions include 10, 11 and 12.

Question 10

Figure 1 shows a wooden block drawn in first angle orthographic projection

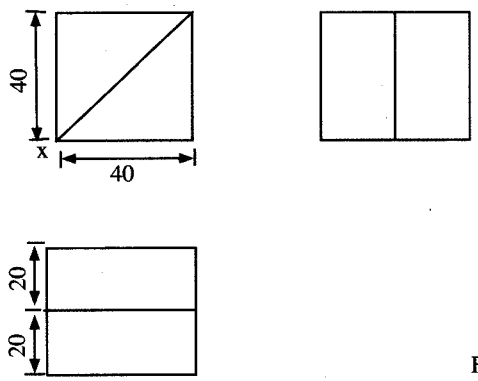


Figure 1

Sketch an isometric view of the block making X the lowest point. (4 marks)

Candidates were expected to draw an isometric projection of a wooden block by interpreting the views given in orthographic projection.

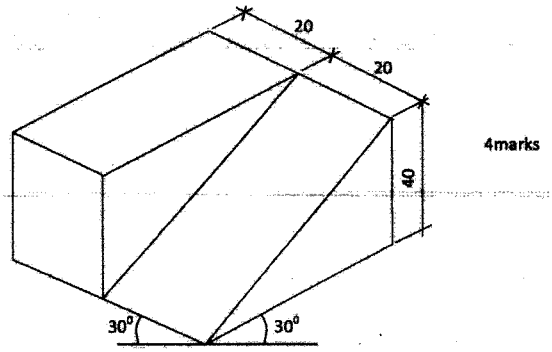
Weaknesses

Many candidates could not interpret the given orthographic views and come up with the isometric projection.

Advice to Teachers

They should give the students more practice in orthographic and isometric drawings.

Expected response



Question 11

Figure 2 shows a pictorial view of a shaped block.
Draw full size in third angle projection the three views of the block. Insert six major dimensions. Use A3 drawing paper provided.

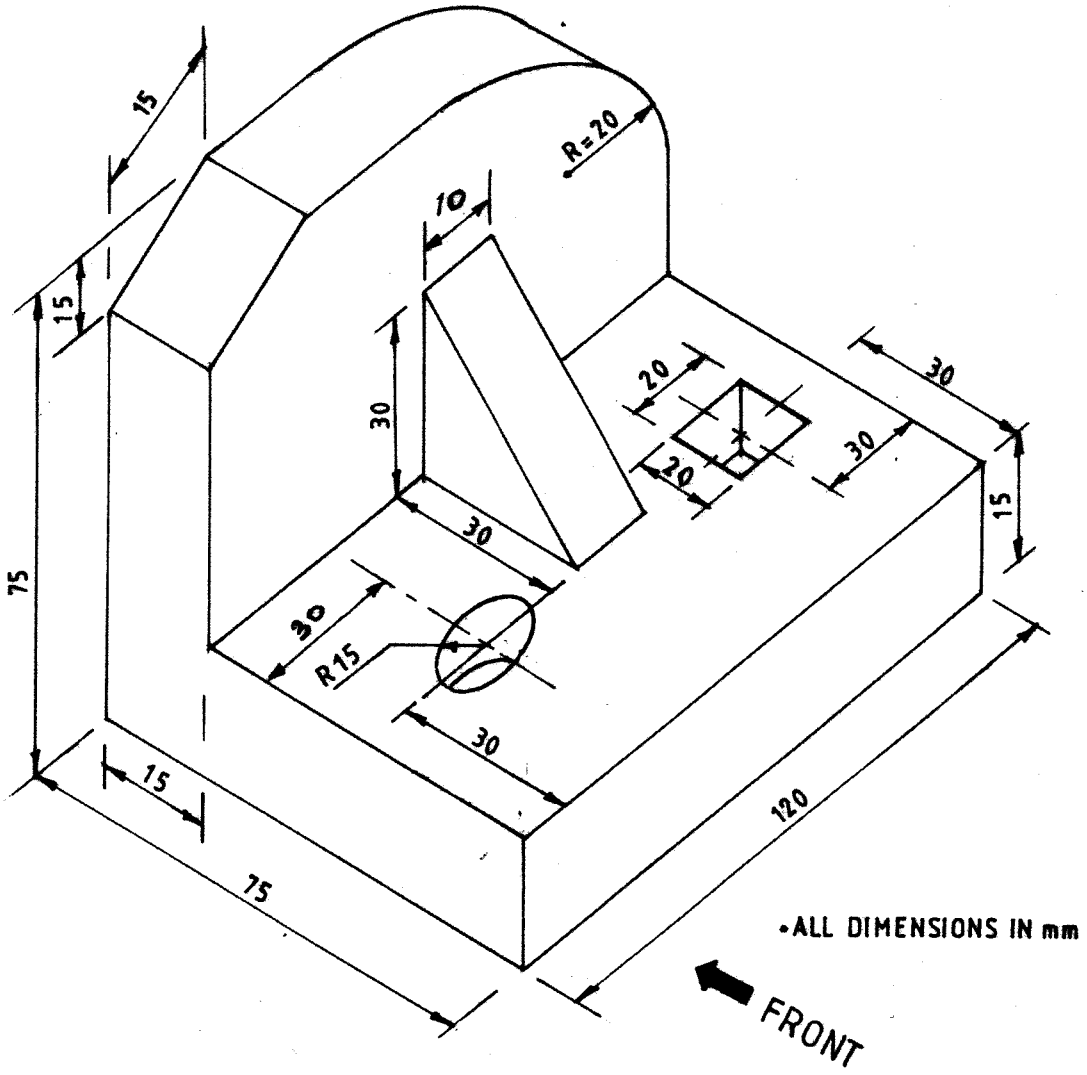


Figure 2

Candidates were expected to draw the views of the given block in third angle projection.

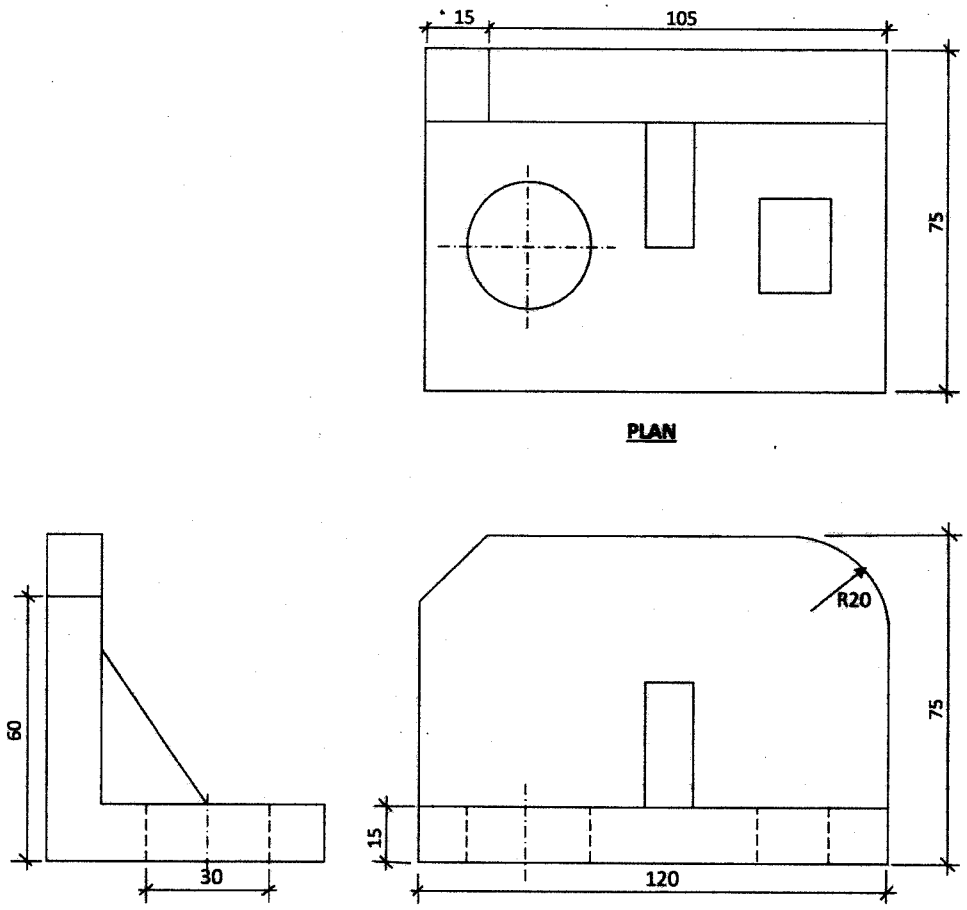
Weaknesses

Most candidates could not draw the block in third angle projection.

Advice to Teachers

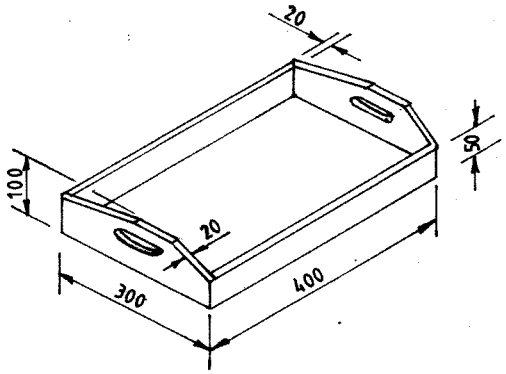
They should give the students more practice in both first angle and third angle projection.

Expected response



Question 12

Figure 4 shows a wooden tray made of cypress and a 3mm thick plywood bottom.



Make a cutting list for the finished sizes of the tray.

Candidates were expected to prepare a cutting list for the tray given in the question.

Weaknesses

A number of candidates could not give the cutting list as asked for in the question.

Advice to Teacher

They should give students more practice on procedures of making simple items in the workshop.

Expected response:

Item	Description	No off				Materials
			L(mm)	W(mm)	T(mm)	
1	Side pieces	2	400	50	20	Cypress
2	End pieces	2	300	100	20	Cypress
3	Bottom piece	1	400	300	3	Plywood

3.2.2 Woodwork Paper 2 (444/2)

As in the previous years, the council designed a suitable project for this level together with a comprehensive marking scheme. The subject teachers used the working drawings to supervise the fabrication of the project and the marking scheme to mark the candidates' projects. The marks were then sent to the council through the D.E.O's offices.

4.3 WOODWORK (444)

4.4.1 Woodwork Paper 1 (444/1)

SECTION A (40 marks)

*Answer **ALL** the questions from this section in the spaces provided.*

1 (a) State **four** safety measures to be observed while using hand tools in a workshop. (2 marks)

(b) List **two** benefits of learning woodwork. (1 mark)

2 Explain the difference between a compass saw and a keyhole saw. (4 marks)

3 (a) Sketch and label pictorial view of a marking gauge. (4 marks)

(b) List the steps required to prepare a timber surface to receive polish. (2 marks)

4 Explain the functions of each of the following parts of a lathe machine:

(a) head stock; (1½ marks)

(b) tail stock. (1½ marks)

5 (a) With the aid of a sketch, differentiate between the grinding angle and the sharpening angle of a jack plane blade. (2 marks)

(b) State **four** advantages of using a wooden handle on a claw hammer. (2 marks)

6 (a) Differentiate between paring and chopping as used in chiselling. (2 marks)

(b) Describe the following terms as used in woodwork:

(i) counter sinking; (1½ marks)
(ii) counter boring. (1½ marks)

7 (a) Make sketches to show the following methods of matching veneers:

(i) side to side pattern; (1 mark)
(ii) diamond pattern. (1 mark)

(b) State **two** safety precautions to be observed while using contact glue. (1 mark)

8 (a) Sketch and label an exploded view of a mitred angle briddle joint. (3 marks)

(b) State **two** reasons for considering the direction of the grain before planing a piece of timber. (1 mark)

9 State **two** advantages and **two** disadvantages of using paint on a wooden surface. (4 marks)

10 Figure 1 shows a wooden block drawn in first angle orthographic projection.

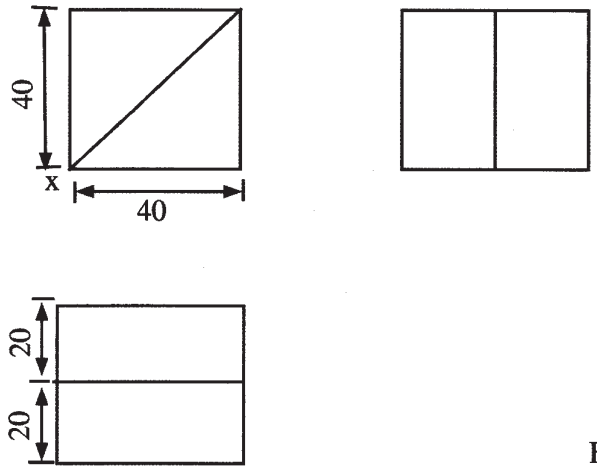


Figure 1

Sketch an isometric view of the block making X the lowest point. (4 marks)

SECTION B (60 Marks)

*Answer **question 11** on A3 paper provided and any other **THREE** questions from this section in the spaces provided after question 15.*

*Candidates are advised **NOT** to spend more that **25 minutes** on question 11.*

11 Figure 2 shows a pictorial view of a shaped block.

Draw full size, in third angle projection the three views of the block. Insert **six** major dimensions. Use A3 drawing paper provided. (15 marks)

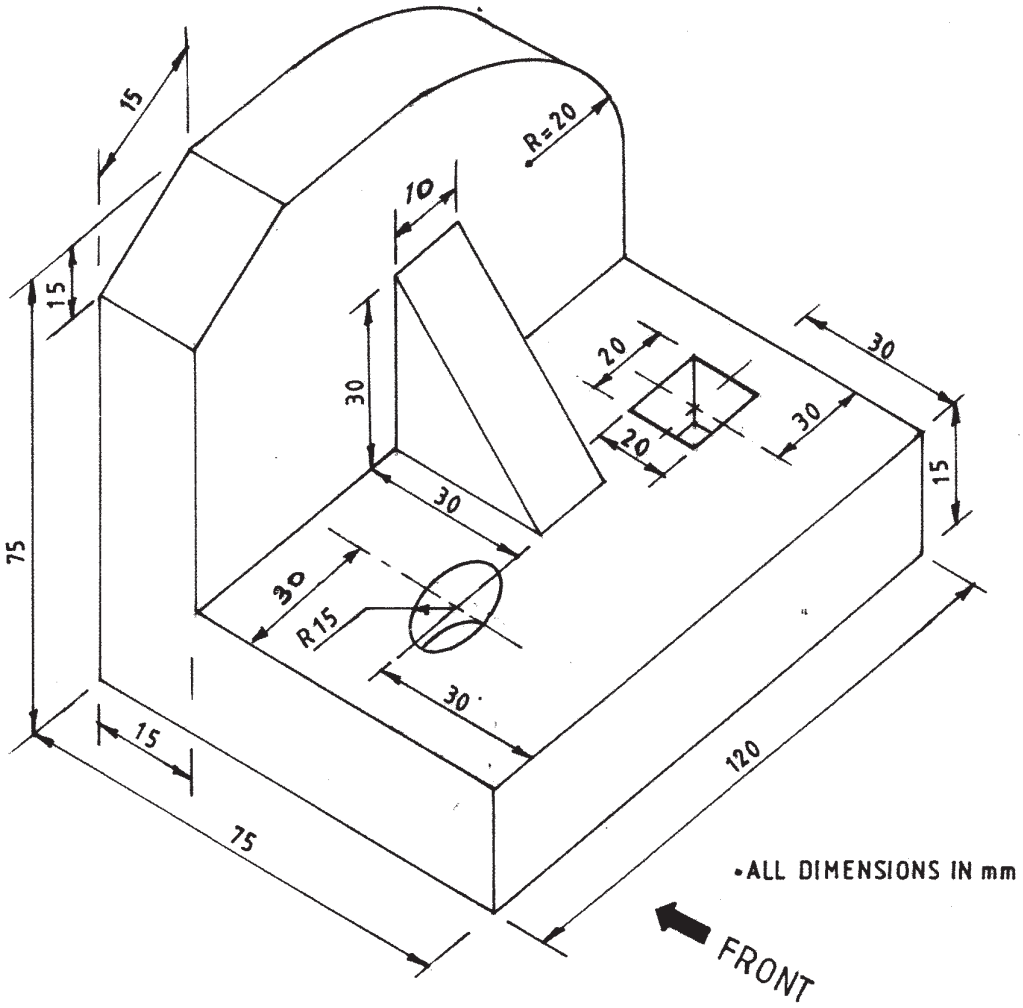


Figure 2

12 (a) Name **two** types of saw sets. (1 mark)

(b) Figure 3 shows a wooden block with a rebate 45 mm width and 15 mm depth.

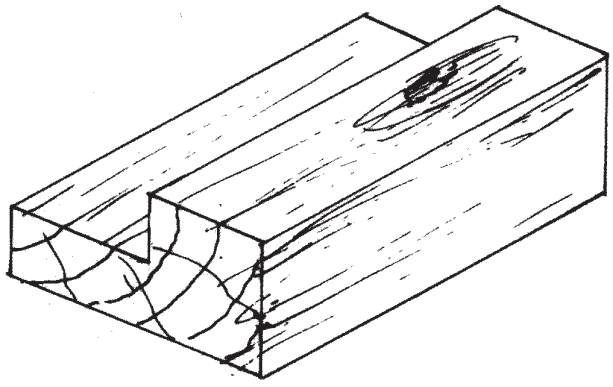


Figure 3

Outline the procedure of cutting the rebate using a rebate plane. (7 marks)

(c) Figure 4 shows a wooden tray made of cypress and a 3 mm thick plywood bottom.

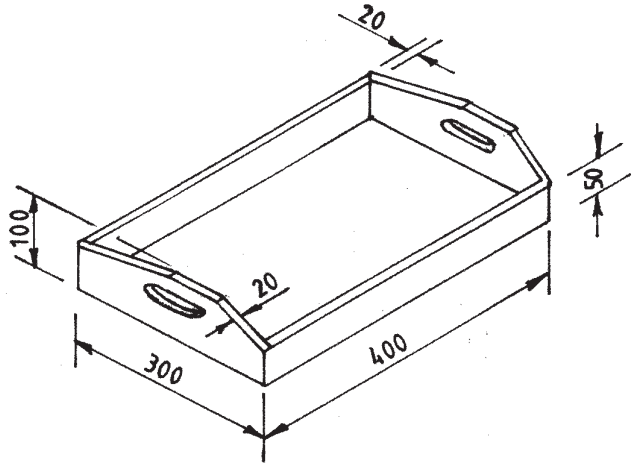


Figure 4

Make a cutting list for the finished sizes of the tray. (7 marks)

13 (a) List **four** items that should be in a First Aid Kit. (2 marks)

(b) Figure 5 shows a cupboard lock:

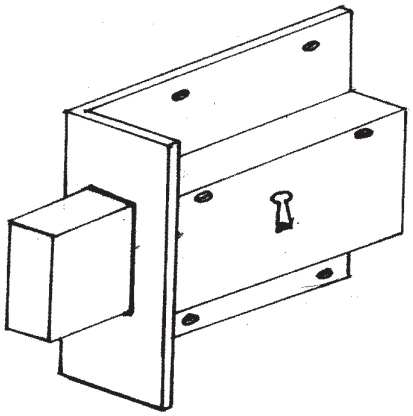


Figure 5

(i) outline the procedure of fixing the lock on the shutter; (7 marks)

(ii) list **four** tools used in the procedure in (b)(i) above. (2 marks)

(c) State **four** characteristics of timber that has been attacked by dry rot. (4 marks)

14 (a) Define conversion of timber. (1 mark)

(b) (i) Sketch a cross section of a tree trunk and label the following parts:

(I) cambium layer;
(II) sapwood;
(III) heartwood;
(IV) bark. (4 marks)

(ii) Explain the function of each of the parts in (b)(i) above. (4 marks)

(c) Outline the procedure of applying a clear varnish on a wooden surface using a brush. (6 marks)

15 (a) Differentiate between inlaying and overlaying. (3 marks)

(b) With the aid of labelled sketches, explain the following methods of cutting veneers:
(i) rotary methods;
(ii) plain slicing. (8 marks)

(c) State **two** faults that occur on doors hung with butt hinges and give one cause of each fault. (4 marks)

4.2.2 Woodwork Paper 2 (444/2)

Using the materials provided, make the COFFEE STOOL as shown on the working drawings.

NOTES:

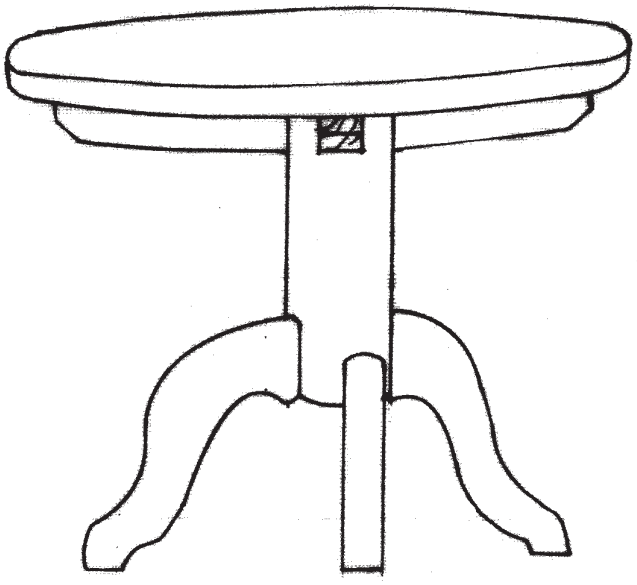
1. The project should be made using **HAND TOOLS** only.
2. All dimensions are in millimetres unless otherwise stated.

   GENERAL TOLERANCES

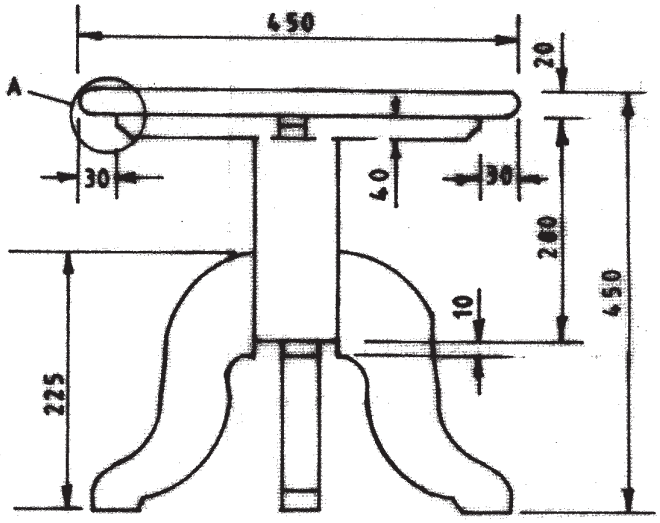
   (a) ± 0.1 mm on all dimensions greater than 250 mm.

   (b) ± 0.5 mm on all dimensions less than 250 mm.

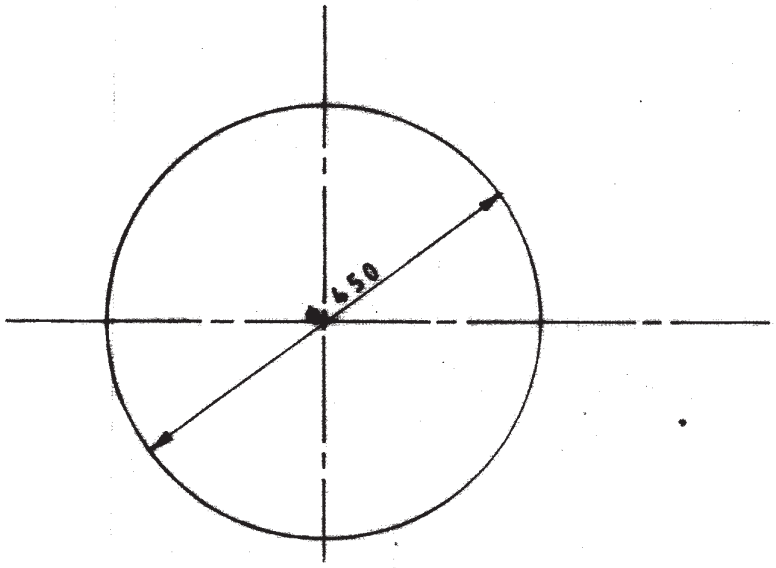
   (c) 0.5 mm on all joints.
3. Use your discretion to determine dimensions not shown.
4. Assemble the project using glue and screws as appropriate.
5. Apply clear finish on the project.
6. Write your index number on the project.
7. **This paper consists of 5 printed pages.**
8. **Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**



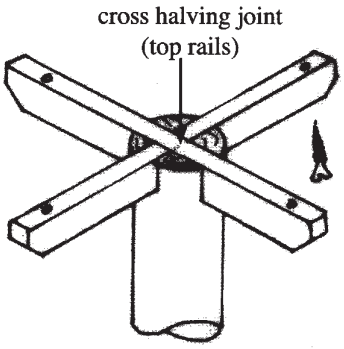
PICTORIAL VIEW



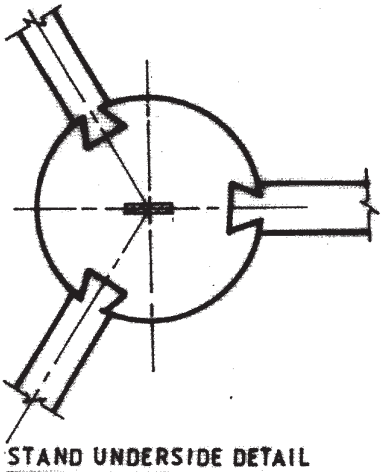
FRONT ELEVATION



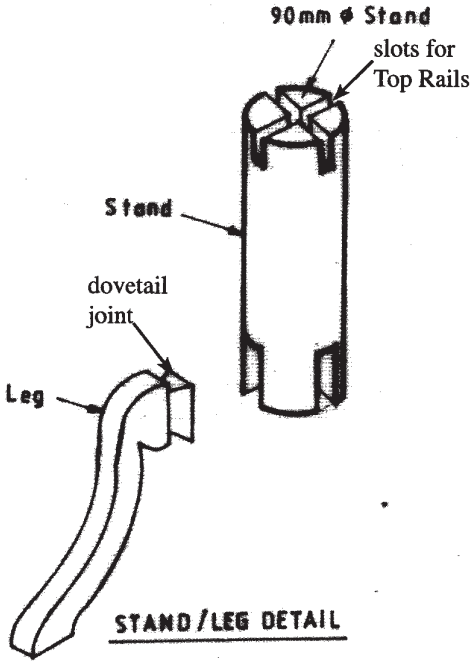
ROUND TOP



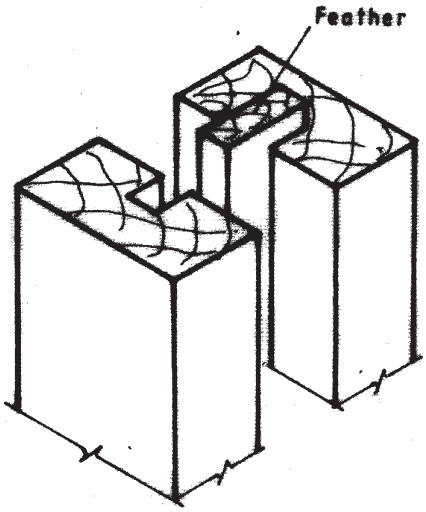
TOP RAIL AND STAND DETAIL



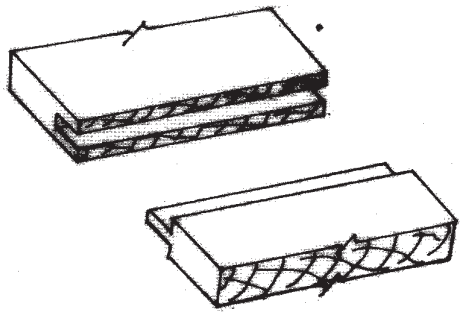
STAND UNDERSIDE DETAIL



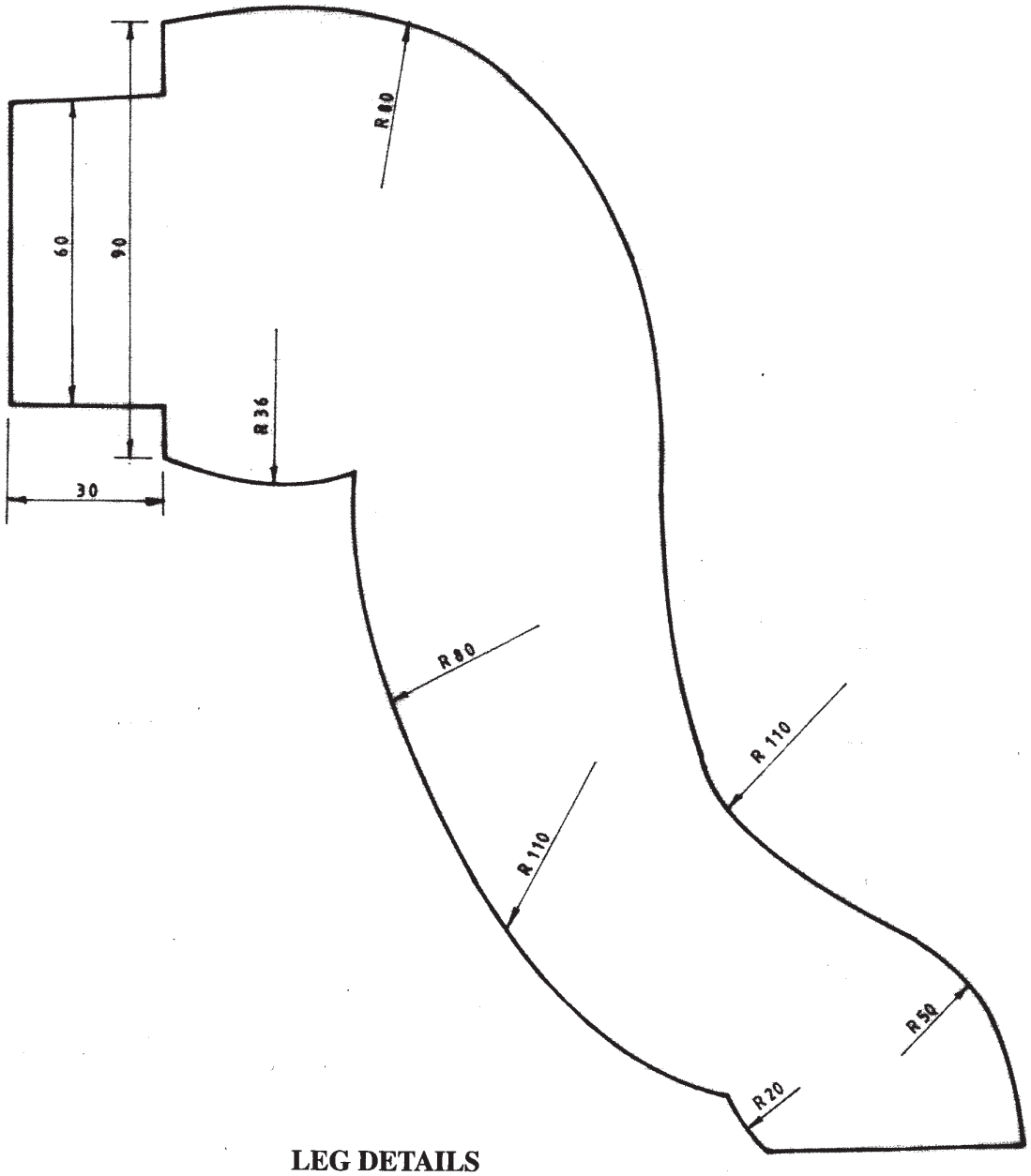
STAND/LEG DETAIL



50 x 100 JOINED WITH FEATHER
JOINT AND SHAPED INTO STAND



TONGUED AND GROOVED FOR TOP



LEG DETAILS

- Keep the work under control by holding it firmly with the vice or clamps so that both hands are free to guide the tool.
- Do not use dull tools, they can slip and cause accident.
- make certain that handles are securely fastened on planes, hammers and files.
- Do not blow dust or chips off the work from the mouth of the plane.
- Always cut away from your body when using a knife or chisel.

Any 4 x $\frac{1}{2}$ = (2 marks)

(b) **Benefits of learning woodwork.**

- Able to repair and maintain wooden items.
- Able to construct wooden items/furniture.
- Create job after school/employment.
- For leisure.

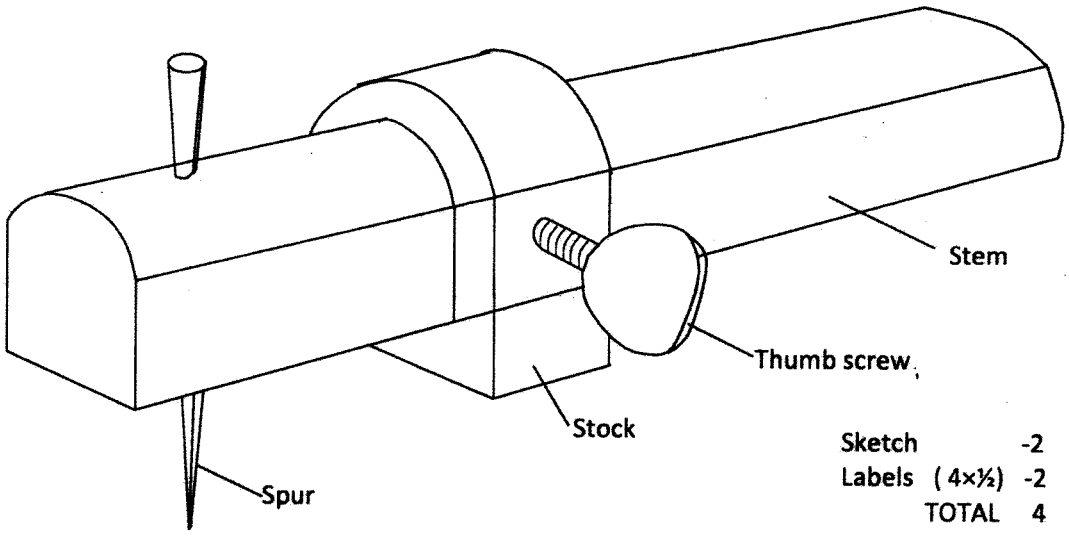
Any 2 x $\frac{1}{2}$ = (1 mark)

2. **Saw differences**

Keyhole - has a narrow and shorter blade - 300 mm long and has ten(10) teeth per 25 mm.

Compass - has a wider and longer blade (1) 360 mm long with eight (8) teeth per 25 mm. (1)

3. (a) **Sketching a marking gauge**



Sketch -2
Labels (4×½) -2
TOTAL 4

(b) **Steps required in surface preparation**

- Smoothen the surface.
- Sand
- Fill and raise the dents
- Sand

4 x $\frac{1}{2}$ = (2 marks)

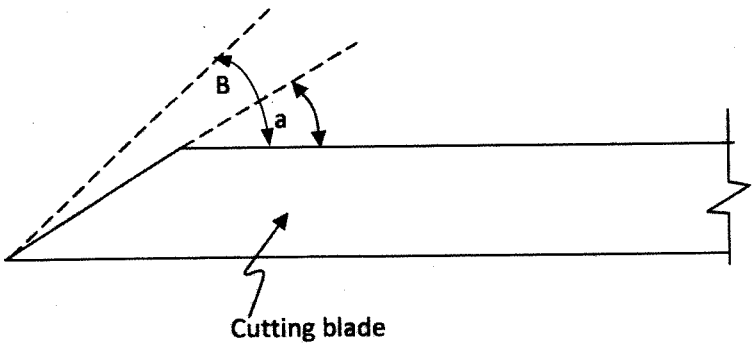
4. **Functions of parts of a lathe**

(i) Tail stock - supports the work by means of the cone shaped centre
- to drill holes by means of a taper shank drill inserted in the hollow spiddle.

$1 \times 1\frac{1}{2} = (1\frac{1}{2}$ marks)

(ii) Head stock - carries the top set of pulley wheels.
- accommodates the driving centre which rotates on the work.

5. (a) **Grinding angle/sharpening angle**



Sketch - 1
Differences - 1
TOTAL 2

(b) **Reasons for using wooden handle**
- It provides a good grip
- It is light in weight
- It absorbs shock
- Does not generate too much heat due to friction

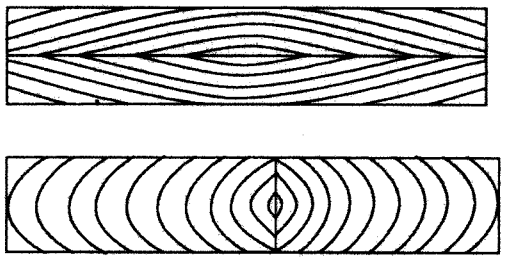
Any 4 x $\frac{1}{2}$ = (2 marks)

6. (a) **Paring/ chopping**
- Paring is the act of cutting thin sizes of wood either across or along the grains of wood using a paring chisel. (1 mark)
- Chopping is cutting across the grain to make an opening to cut a mortise to receive a tenon using a mortise chisel. (1 mark)

(b) **Counter sinking/counter boring**
Counter boring
- act of enlarging an already existing hole to accommodate (1) wood screw head and bolts ($\frac{1}{2}$)
- done on top of a shank to receive a (1) countersunk or raise head screw. ($\frac{1}{2}$)

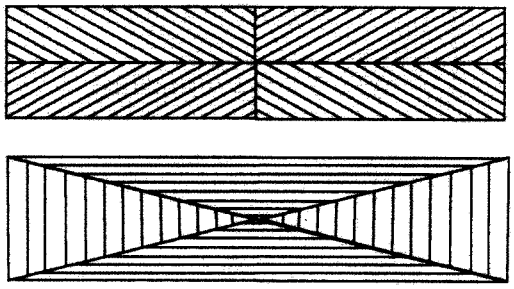
7. (a) **Matching of veneers**

Side to side pattern



Sketch 1×1 -1

diamond pattern



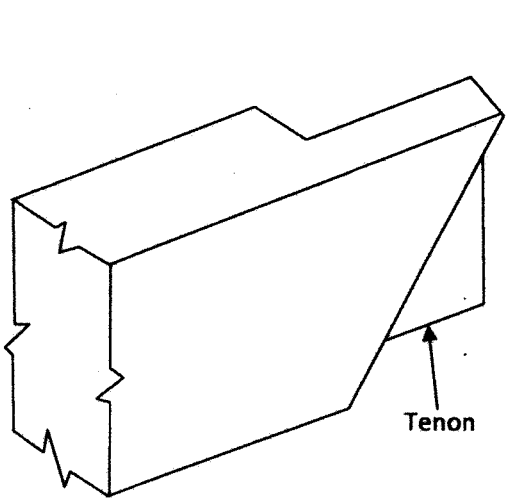
Sketch 1×1 -1

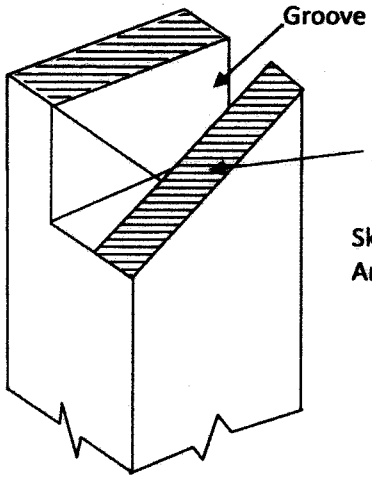
(b) **Safety precautions when using contact glue**

- keep away from fire as it is highly flammable.
- use nose mask to avoid inhaling
- ensure it does not come into contact with the body and cloth.

Any 2 x $\frac{1}{2}$ = (1 mark)

8. (a) Exploded corner bridle joint





Sketch -2
Any 2×½ -1
TOTAL 3

(b) **Reasons for considering direction of grain**

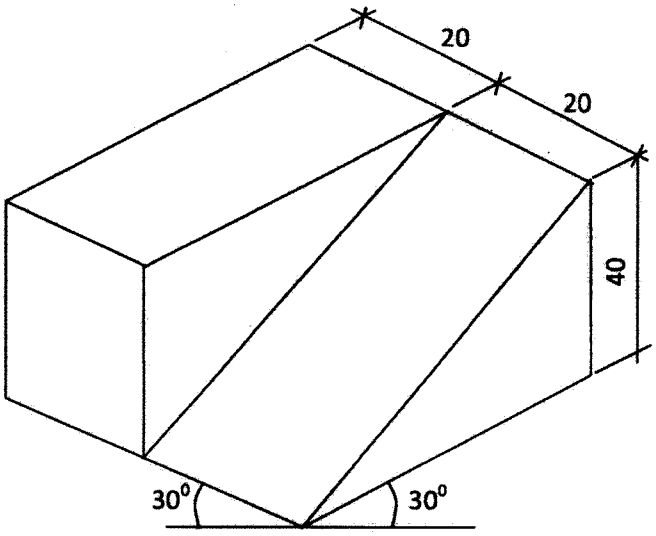
- Planing along the grains is easy
- Surface of wood becomes rough if planed against the grains
- The wood tears up and chokes the plane if planed against the grains.

Any 2 x $\frac{1}{2}$ = 1 mark

9. Advantages and disadvantages of using paint

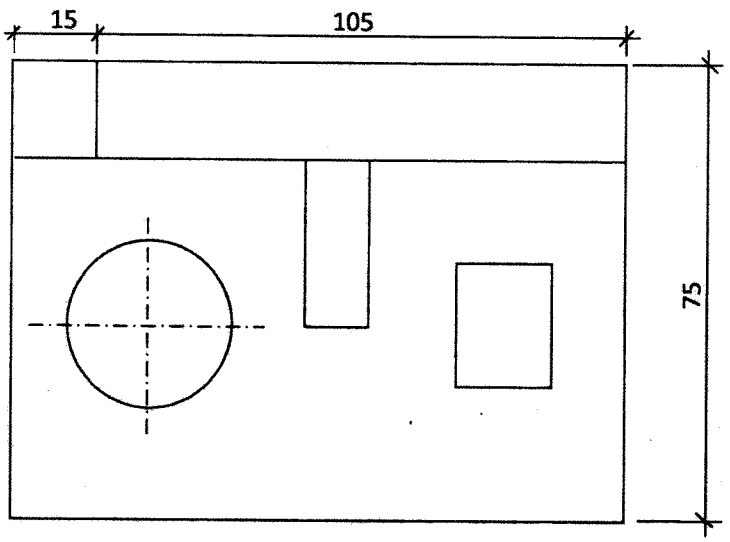
Advantages	Disadvantages
1. Hides defects	1. Does not expose timber texture
2. Gives a uniform colour	2. Does not give a high class finish
3. Variety of colours	3. Not absorbed by timber cells and may peel off
Any 2 x 1 = (2 marks)	Any 2 x 1 = (2 marks)

10. **Isometric view of block**

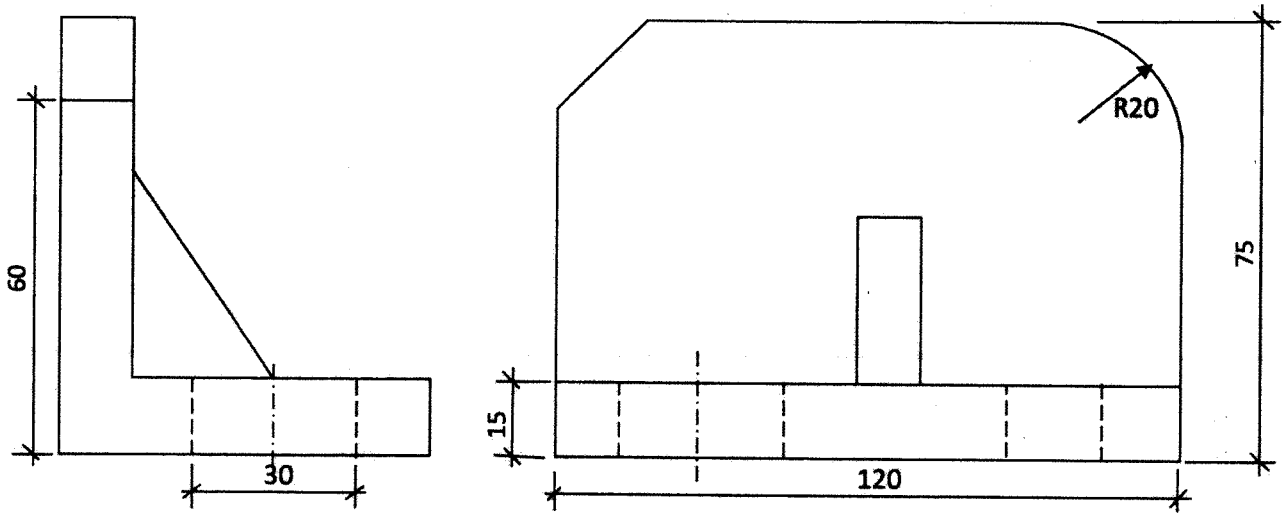


4marks

11.



PLAN



Elements:

Front elevation	5 x $\frac{1}{2}$	= $2\frac{1}{2}$ marks
End elevation	3 x $\frac{1}{2}$	= $1\frac{1}{2}$ marks
Plan	6 x $\frac{1}{2}$	= 3 marks
Hidden details	3 x $\frac{1}{2}$	= $1\frac{1}{2}$ marks
Dimensioning	any 6 x $\frac{1}{2}$	= 3 marks
Correct intepretation		= $1\frac{1}{2}$ marks
Neatness		= 1 mark
Centre line		= 1 mark
	Total	= 15 marks

12. (a) **Types of saw set**

- plier type $\frac{1}{2}$ mark
- notch type $\frac{1}{2}$ mark

(b)
- Mark the pieces to the required sizes of rebate
- Set the plane to the required width
- Set the required depth
- Fix the pieces of timber on the vice/or hold the piece firmly on the bench
- Start planing the rebate using slight strokes
- Make full strokes until you reach to the required depth
- Ensure uniform pressure is applied throughout

(7 marks)

(c)

Item	Description	No.				Materials
			L	W	T	
1	Side pieces	2	400	50	20	Cypress
2	End pieces	2	300	100	20	Cypress
3	Bottom piece	1	400	300	3	Plywood

(7 marks)

13. (a) **Items for a first aid kit**
- Bandages
- Scissors
- Antiseptics
- Cotton wool
- Pain killer
- Razor blade

Any 4 x $\frac{1}{2}$ = 2 marks

(b) (i) **Procedure of fixing lock**
- Mark the position of the lock
- Mark the position of the key hole
- Make recess for the lock
- Drill the key hole
- Extend the key slot using the key hole saw
- Locate the position of the lock screws
- Make pilot holes for the screws using the oval brad awl
- Fix the lock using the screws

(7 marks)

(ii) **Tools used for fixing lock**
- try square
- Marking gauge
- pencil/ cutting knife
- hand drill/brace
- keyhole saw
- screw driver
- Brad awl

Any 4 x $\frac{1}{2}$ = (2 marks)

(c) **Characteristics of timber with dry rot**

(i) Smell - a distinct mushroom like odour (damp and musty)

(ii) Distorted wood surface - warped, sunken (concave) and/or with shrinkage cracks. Tapping with a hammer produces a hollow sound, and the wood offers no resistance when pieced with a knife.

(iii) The appearance of fruiting bodies (sporophores) in the form of a plate(skin) or 'bracket'.

(iv) The presence of fine rust-red dust, which is the spores from a fruiting body.

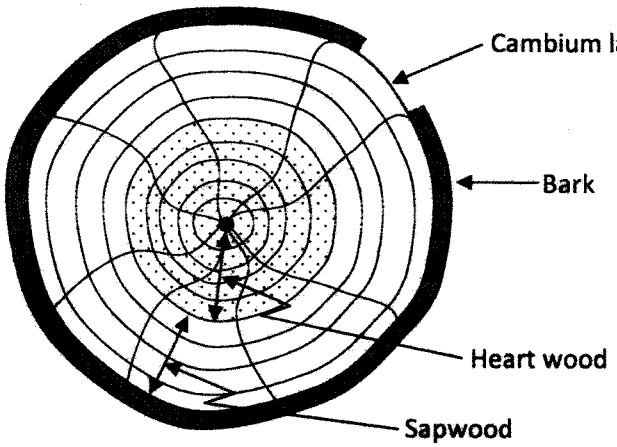
1 x 4 = (4 marks)

14. (a) **Conversion definition**

- Sawing of logs of wood to marketable sizes. (1 marks)

(b) **Cross-section of a tree trunk**:

Showing parts



Sketch -2
Labels (4×½) -2
TOTAL 4

(b) (ii) **Function of parts**

Bark - Protect the inner parts of a tree against:
- extreme temperature changes
- insects, fungi and animal attack
- moisture evaporation from the tree

Cambium layer - develops cells that form the bark

Heart wood - storage for waste products, provides support for the tree

Sap wood - Conveys water and mineral salts from the roots to the leaves

4 x 1 = (4 marks)

(c) **Procedure of applying a varnish**

(i) Prepare surface seal grain with thin coat of shellac if required.

(ii) Apply first coat of varnish thinned to the correct consistency using long strokes of the brush along the grain.

(iii) Dry for 18 - 24 hours, sand along the grain lightly with Nº glass paper and dust off.

(iv) A second coat is applied and allowed to dry for 24 - 48 hours.

(v) The workpiece is sanded as in step three above using sand paper Nº 400 waterproof dry paper.

(vi) A third coat is applied and allowed to dry for 24 - 48 hours.

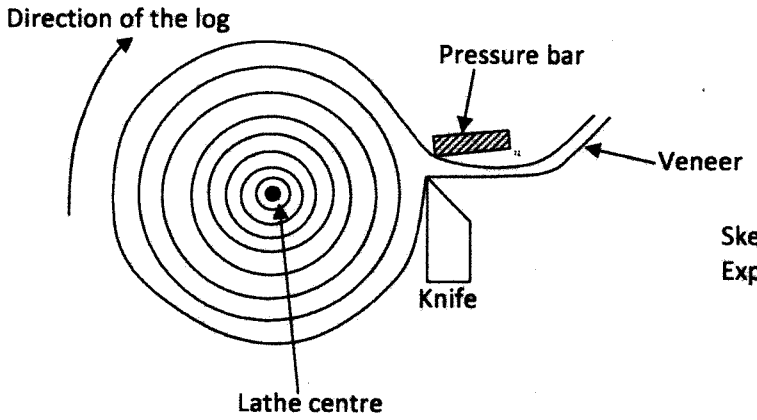
6 x 1 = (6 marks)

15. (a) Inlay is a method used in decorating furnisher by embedding wood or other kind of

material on the surface of wood i.e. making recess while overlaying is the method of decorating wood furnisher by gluing ornamental shapes made of wood, metal or plastic on to the surface of an article. (3 marks)

(b) Rotary method

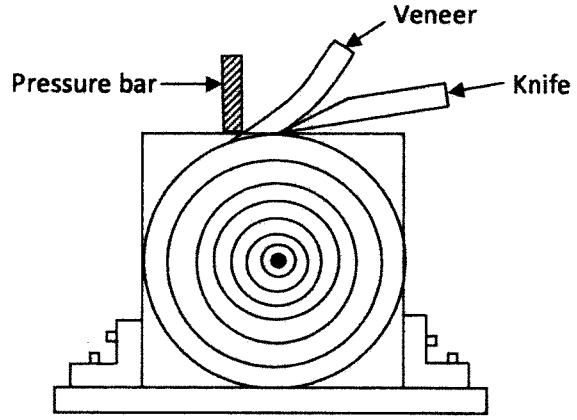
- rotate softened log in a peeling lathe
- strong and sharp knife fed into log till log is a perfected cylinder.
- continuous sheet of veneer is peeled from log.



Sketch -2
Explanation -2
TOTAL 4

(b) Plain slice method

- cut log into a square or rectangular section.
- secure timber to a machine bed.
- slice veneers by passing knife back and forth.



Sketch -2
Explanation -2
TOTAL 4

(c)

	Fault on a door	Cause of fault
1.	Door not closing	(i) Recess too shallow (ii) Protruding screwheads
2.	Door leaf not fitting	Recess too deep
3.	Leaf slamming onto the frame	Hinge recesses not of the same depth
	Any 2 x 1 = 2 marks	Any 2 x 1 = 2 marks