

LEAVING CERTIFICATE APPLIED 2001

# Vocational Specialism — Construction & Manufacturing (240 marks)

Tuesday, 12<sup>th</sup>, June 2001

Morning 9.30am to 11.00am

MARK

*For the Superintendent only*

## MARKING SCHEME

**General Directions**

1. Write your examination number in this space:

2. This paper has **TWO** Sections - A and B

**Section A:**

Answer Question 1 and Question 2

**Section B:**Answer **FOUR** Questions from this Section:

- ONE Question from Group 1
- ONE Question from Group 2
- ONE Question from Group 3
- ONE Question from any of the four Groups.

3. Write your answers in the spaces provided and include sketches where appropriate.

SECTION A.		
Answer Question 1 and		
Question 2		

SECTION B. Answer 4 Questions		
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Group 1. Answer ONE Question from this Group		
Q.3	Construction Studies	
Q.4	Painting	
Q.5	Plumbing in the Home	
Q.6	Electricity	

Group 2. Answer ONE Question from this Group		
Q.7	Timber Technology	
Q.8	Concrete Technology	

Group 3. Answer ONE Question from this Group		
Q.9	Graphic Communication	
Q.10	Computer Aided Design	

Group 4. Answer ONE question from this group <b>OR</b> Select ONE question from any of the above groups.		
Q.11	Woodcraft	
Q.12	Toymaking	
Q.13	Furniture Studies	
Q.14	Cabinet Making	
Q.15	Power Hand Tools	

<b>TOTAL</b>	
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**Section 1****(72 marks)**

1. Answer any EIGHT of the following ten questions in relation to the practical work (project) you prepared for interview.

- (a) Briefly describe the practical assignment you completed for this course.

\_\_\_\_\_

**3 Marks**

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (b) Name the module your practical work relates to.

**Any practical module - 3 Marks**

\_\_\_\_\_

- (c) Name **THREE** other modules you completed during this course.

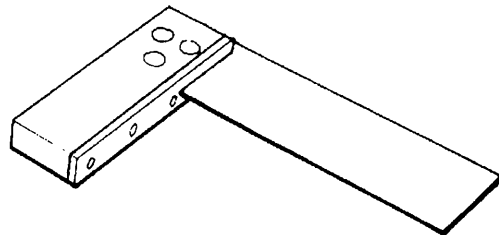
**Any three modules, excluding (b) above. - 3 Marks**

\_\_\_\_\_

- (d) Name the marking-out tool shown.

**Try square - 3 Marks**

Name: \_\_\_\_\_



- (e) Name **ONE** material used in your practical work.

**Any appropriate material suitable for practical work - 3 Marks**

\_\_\_\_\_

- (f) Describe **ONE** method of jointing wood that you learned during this course.

\_\_\_\_\_

**Any appropriate method - 3 Marks**

\_\_\_\_\_

\_\_\_\_\_

(g) List **ONE** safety procedure to be observed when using a tenon saw.

**Material securely held**

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**Saw held correctly; Correct stance and posture.**

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**Or any appropriate answer - 3 marks.**

(h) Suggest **ONE** change you would make in your project?

**3 marks**

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(i) Describe what planning you carried out before you made your project.

**Measured items; visited hardware/furniture shops; consulted people;**

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**Looked up books/magazines/internet; sketched ideas; modified ideas.**

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**Or any appropriate answer - 3 marks.**

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(j) List **TWO** reasons why planning is important.

**1.5 marks each.**

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**You MUST answer this Question**

**2. Answer any 16 of the following 20 questions.**

4

(a) Give **ONE** reason why there is a boom in the Construction Industry at present.

**Economic boom; young population; emigrants returning;**

**Or any appropriate answer - 3 marks.**

(b) Name **THREE** careers associated with the Construction Industry.

**1 mark each.**

(c) List **TWO** areas where computers have had an impact on the Construction Industry.

**Design; stock control/ordering; mortgages/finance; purchasing/viewing**

**Of houses online; or any appropriate answer.**

**1.5 marks each.**

(d) Why is timber-framed housing becoming popular in this country?

**Shortage of blocklayers; speed of erection; higher insulation values.**

**Or any appropriate answer - 3 marks.**

(e) Give **TWO** recommendations to prevent accidents occurring on building sites.

**Appoint a safety officer; safety training; safety gear to be worn at all times**

**Safety procedures to be adhered to; or any appropriate answer.**

**1.5 marks each.**

(f) What is the advantage of employing a contractor to build a house?

**One person with overall control and responsibility is accountable and**

**should ensure that regulations are followed and standards achieved.**

**Or any appropriate answer - 3 marks.**

(g) Approximately how long does it take a contractor to build a typical bungalow?

**Three months ( +/- 1 month) 3 marks.**

(h) Why should a new house be left to dry out before painting?

**To avoid problems with dampness, salts or alkali. 3 marks.**

(i) Name **ONE** material used to make window frames.

**Wood; uPVC; Aluminium. Any one - 3 marks.**

(j) A serviced site will usually cost more than a site that is not serviced. Explain what you understand by a 'serviced site'.

**A site that has water, sewage, electricity and telephone provided. 3 marks.**

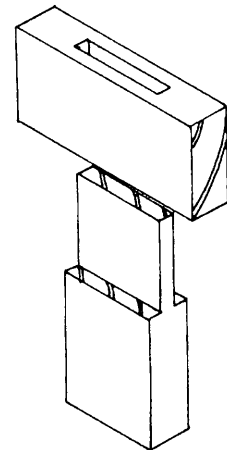
(k) Name **TWO** materials used in the building of a house to conserve energy.

**Aeroboard; fibre glass; mineral wool; lagging jacket; or any other**

**Appropriate material. 1.5 marks each.**

(l) Name the joint shown in the diagram.

Name: **Mortise and Tenon**



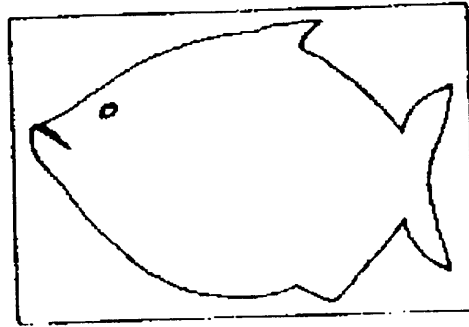
(m) Convert the following dimensions to millimetres.

2.85 m = **2850** mm

2.85 cm = **28.5** mm

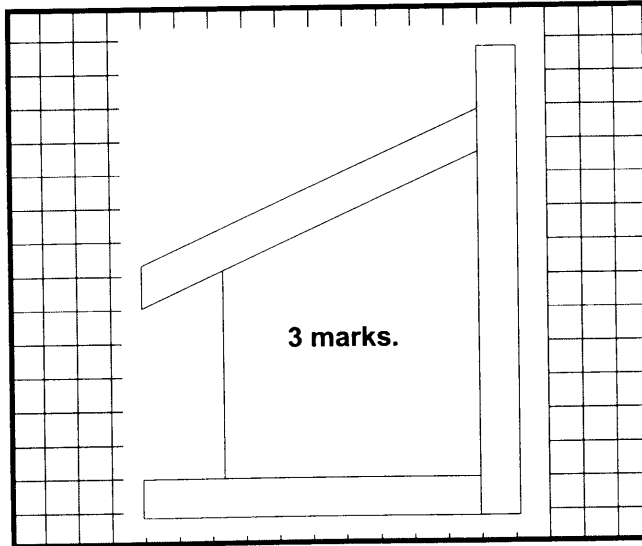
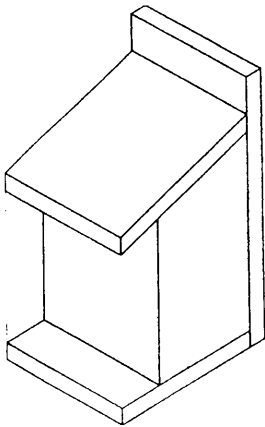
**1.5 marks each.**

(n) What hand tool should be used to cut out the chopping board shown?



Hand tool: Coping saw - 3 marks.

(o) The diagram shows a pictorial view of a bird house. Sketch, in the space provided, an elevation looking in the direction of the arrow A.

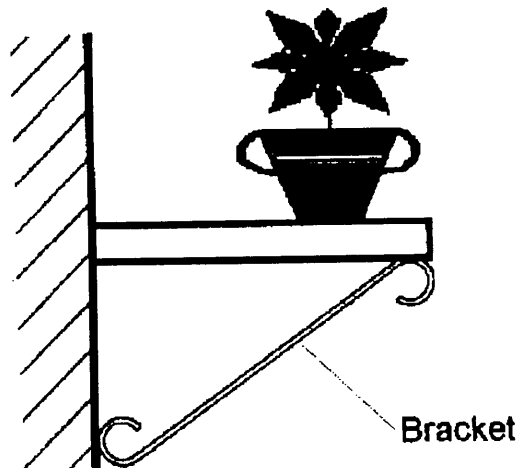


(p) Name **TWO** safety precautions to be observed when using a wood turning lathe.

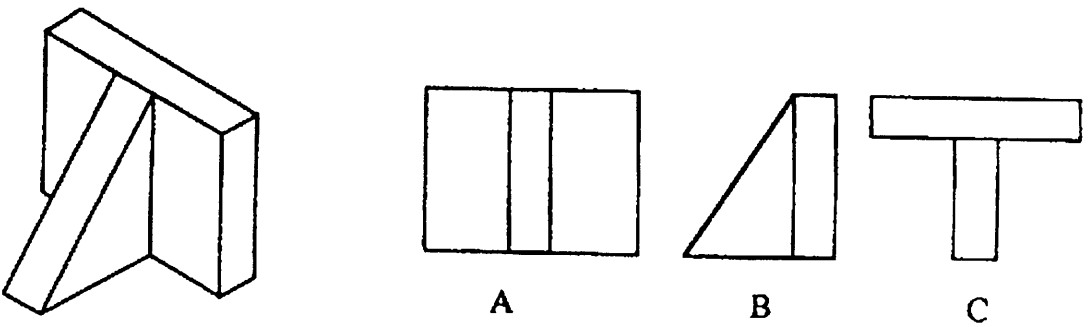
**Goggles/visor; apron/smock; no loose clothing/jewellery/hair. 1.5 marks each**

(q) Is the bracket shown in tension or compression?

Answer: Compression - 3 marks.



(r) Which **ONE** of the views A, B or C is the plan view of the object shown?



Answer: **C - 3 marks.**

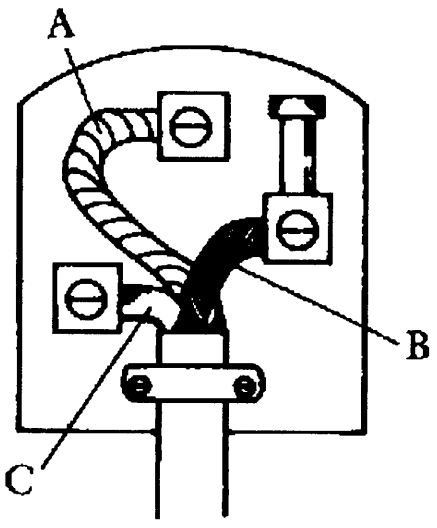
(s) Name the colours of the electrical wires in the plugtop.

A = **Green/yellow**

B = **Brown**

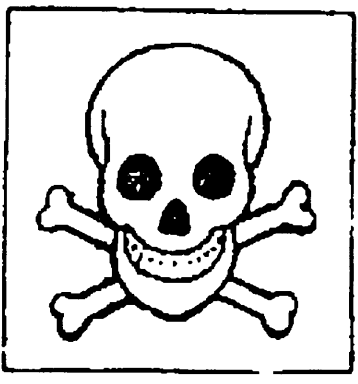
C = **Blue**

1 mark each



(t) Name the warning symbol shown.

Answer: **Poisonous - 3 marks**



## Section 2

(168 marks)

8

Answer **FOUR** questions from this section.

### GROUP ONE

You must answer **ONE** question from Group One.

There are **FOUR** questions in Group One:

3. Construction Studies.
4. Painting.
5. Plumbing in the Home.
6. Electricity.

#### 3. Construction Studies.

- (a) (i) Name the components over the window and door openings.

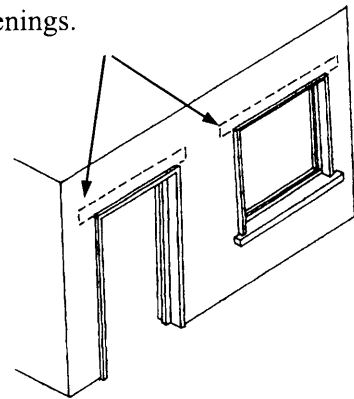
Name: Lintels    5 marks

- (ii) Give **ONE** reason why they are necessary.

To carry the load and transmit it to the wall

on either side of the opening.    5 marks

Neatness/accuracy 0.5 mark.



- (b) In flat-roof construction tapered pieces are usually placed on top of the joists as shown.

- (i) What is the correct name for these tapered pieces?

Name: Furring pieces    5 marks.

- (ii) Why are they used?

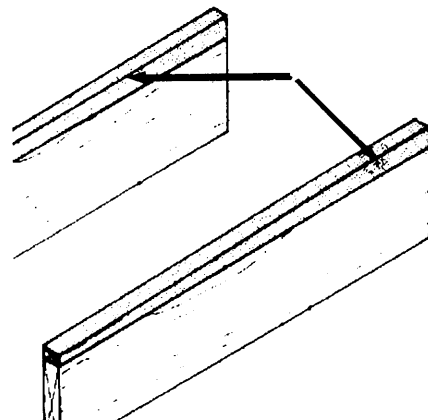
To create a fall in a flat roof to remove water.

5 marks.

\_\_\_\_\_

\_\_\_\_\_

Neatness/accuracy 0.5 mark.

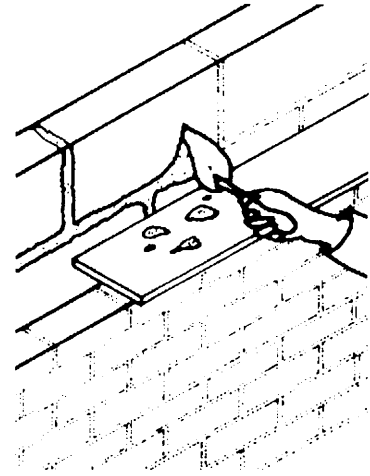




(c) When constructing cavity walls, why is it necessary to collect the excess mortar as shown in the diagram?

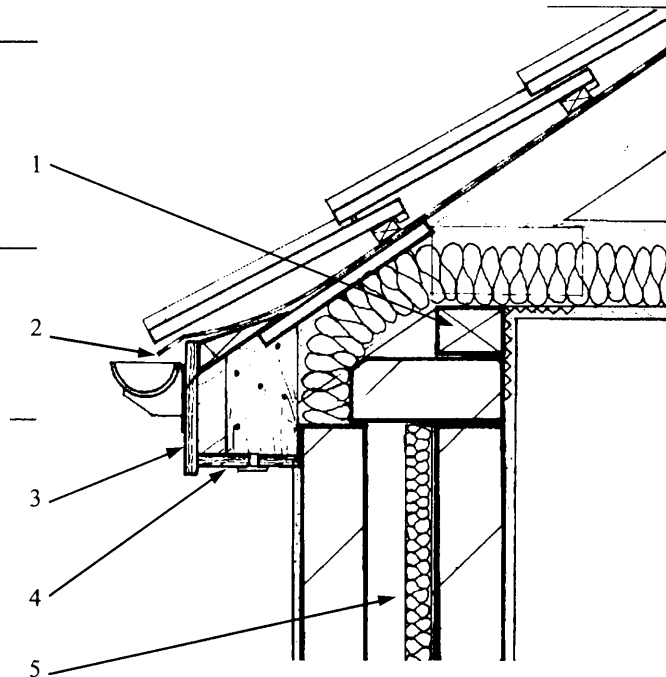
To prevent the droppings accumulating at the  
Bottom and resting on the wall ties which, could  
Lead to dampness travelling from the outer leaf  
To the inner leaf. Or any appropriate answer.

10.5 marks.



(d) The diagram shows a standard eaves detail of a roof. Name any **THREE** of the labelled components.

1. **Wall plate** \_\_\_\_\_
2. **Felt.** \_\_\_\_\_
3. **Fascia.** \_\_\_\_\_
4. **Soffit.** \_\_\_\_\_
5. **Insulation/Aeroboard.** \_\_\_\_\_



3 x 3.5 marks each.

#### 4. Painting.

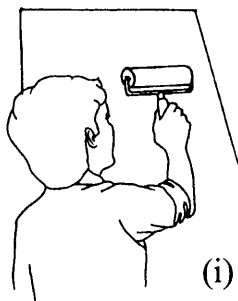
- (a) Two methods of painting are shown. Name each method and state one advantage of each method.

(i) Roller - covers large areas

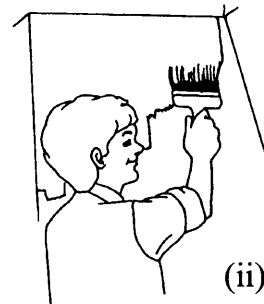
(ii) Brush - useful for cutting-in.

5 marks each.

Neatness/accuracy 0.5 mark.



(i)



(ii)

- (b) Describe the steps involved in preparing an external plastered wall for painting.

Old, unpainted plaster should be washed and, when thoroughly dry, sealed with masonry sealer. Previously painted surfaces need washing with a mild solution of household detergent and water. This must be thoroughly rinsed and allowed to dry. Any flaking paint should be scraped back to a firm edge.

Or any appropriate answer.

10.5 marks

- (c) (i) Describe the difference between (a) Oil based paints and (b) Water based paints.

(ii) Where would each type of paint be used?

Oil-based paint is thinned with white spirit and is used on wood and metal.

It can also be used on walls and ceilings. It is available in matt, eggshell, and gloss finishes.

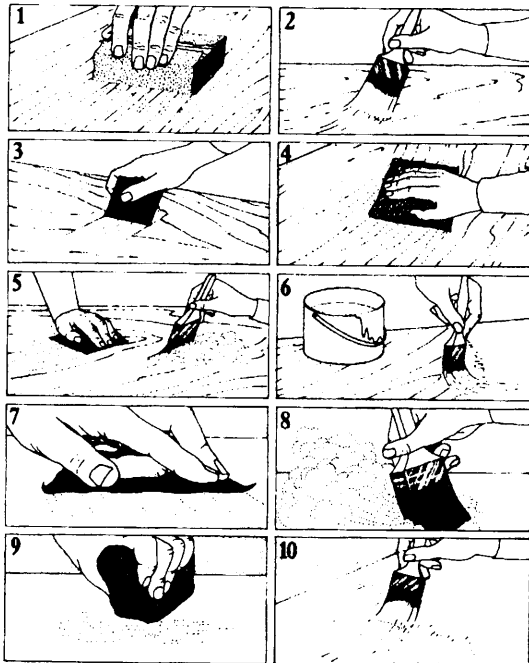
5 marks.

Water-based paints are a vast range of emulsions for interior and exterior use on plaster, brick and cement. It is available in matt and silk finishes.

5 marks

Neatness/accuracy 0.5 mark.

(d) Steps involved in painting a timber surface are depicted in the diagrams 1-10. A description of the steps, in random order, is given in the table. Match the correct description with the correct diagram. The first step is completed as an example.



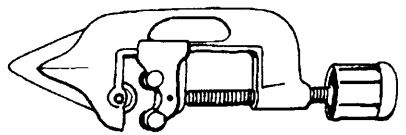
- A - Lightly sand to remove any fibres
- B - Apply the finish coat
- C - Rub smooth, working with the grain
- D - Dust off with a brush or a cotton cloth.
- E - Pick up any remaining dust with tacky cloth
- F - Apply knotting to wood knots
- G - Apply wood primer, then undercoat
- H - Work filler into cracks and gaps
- I - Use clean brush to dust the surface
- J - When set, rub smooth

<b>1 = C</b>	<b>2 = F</b>	<b>3 = H</b>	<b>4 = J</b>	<b>5 = D</b>
<b>6 = G</b>	<b>7 = A</b>	<b>8 = I</b>	<b>9 = E</b>	<b>10 = B</b>

Any 7 correct @ 1.5 marks each.

### 5. Plumbing in the Home

(a) Name **THREE** of the plumbing tools shown



Pipe cutter

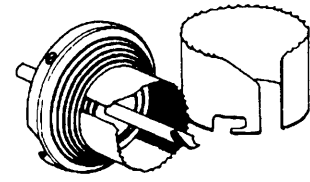


Basin wrench

3 @ 3.5 marks each.



Bending spring

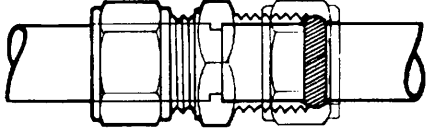


Hole saw

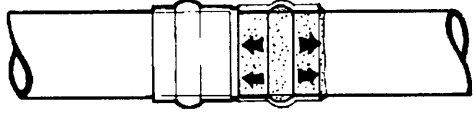
(b) Two methods of joining copper are shown.

(i) Name each method.

(ii) Select **ONE** of the methods and describe how the joint is made.



(i)



(ii)

(i) **Compression fitting**      **3.5 marks**

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(ii) **Capillary solder fitting**      **3.5 marks.**

**Description**      **3.5 marks.**

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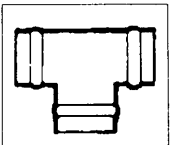
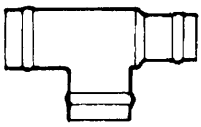
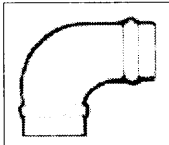
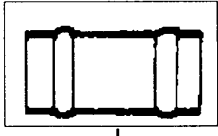
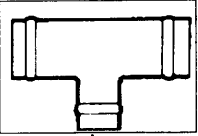


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(c) Name **THREE** of the pipe fittings shown

Equal tee

Reducing tee (end)

Elbow

Straight coupling

Reducing tee (branch)

**3 @ 3.5 marks each**

(d) The diagram shows the plumbing required to connect a washing machine. Briefly, describe the steps involved in the plumbing in of the machine.

**Tee into the hot and cold water supply pipes**

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**servicing the kitchen sink. Connect washing machine**

---

**stop-cocks to the short branch pipes taken from**

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**these tees. Tackle one pipe at a time. Cut off the**

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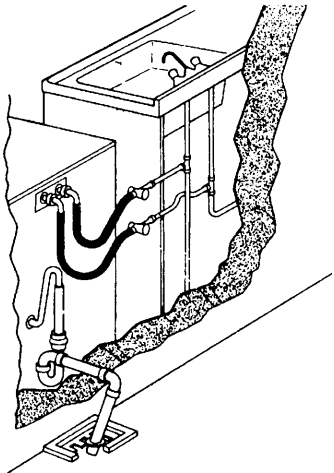
**water supply and drain the pipe. Make sure that the**

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**pipe ends are square. With all fittings made, turn on**

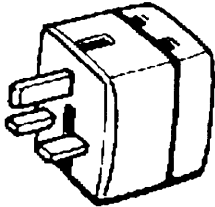
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**the water and check for leaks.      10.5 marks.**



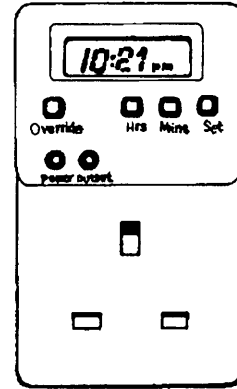
**6. Electricity in the Home.**

(a) Name **THREE** of the following items associated with electricity.



Plug adaptor

Mains tester



Timeswitch



Cable clips

3 @ 3.5 marks each.

(b) Suggest **THREE** means of conserving electricity in the home.

Low energy light bulbs \_\_\_\_\_

Timers for central heating \_\_\_\_\_

Thermostatic valves fitted to radiators. \_\_\_\_\_

Common-sense use of appliances and lighting. \_\_\_\_\_

Night rate electricity for cooking/washing. \_\_\_\_\_

Or any appropriate answer. \_\_\_\_\_

\_\_\_\_\_

3 @ 3.5 marks each. \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- (c) Typical electrical symbols found on appliances are shown.  
Name any **THREE** of the symbols.



Double insulated



Live



Earth



Neutral

3 @ 3.5 marks each

- (d) The table below shows an estimate of the annual electricity cost for a range of fridge-freezers.

FRIDGE FREEZER	A	B	C	D	E	F	G
ANNUAL COST £	13	16	21	27	34	36	39

Calculate:

- (i) The annual saving in changing an old F rated MODEL to a new A rated one.

Saving:  $36 - 13 = \text{£}23$                       **5 marks**

- (ii) The old machine breaks down and a new one will cost £69 more than the repair cost. If the old machine is G rated and the new one is B rated, in how many years will you recoup the outlay for the new machine?

Answer:        **3**    \_ years.

**5 marks**

$39 - 16 = \text{£}23$  (annual saving)

$69/23 = 3$

**Neatness/accuracy 0.5 mark**

## GROUP TWO

**You must answer ONE question from Group Two.**

There are TWO questions in Group Two:

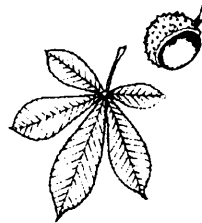
7. Timber Technology
8. Concrete Technology

### 7. Timber Technology

(a) The diagrams show the leaves of four common Irish trees. Identify **THREE** of the trees from which the leaves come.



Oak



Horse chestnut



Holly



Ash

**3 @ 3.5 marks each.**

(b) (i) Name **TWO** manufactured boards

**Any two manufactured boards @ 3 marks each.**

**6 marks**

(ii) Select **ONE** manufactured board and describe how it is manufactured.

**Accurate description**

**4.5 marks**

(c) (i) List **TWO** species of tree which are grown commercially in this country.  
**Sitka spruce, Lodgepole pine.                  2 marks each.                  4 marks**

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(ii) Approximately what percentage of this country is covered by forests?  
**7% (+/- 3)    2 marks**

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(iii) Briefly, explain what causes acid rain and what effect it has on our forests.  
**The rain becomes acidic because of gases which dissolve in the rain water to form various acids.**

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**Conifers appear to be particularly affected, with needles dropping off, and seedlings failing to produce new trees. The acid also reacts with many nutrients the trees need, such as calcium, magnesium and potassium, which starves the trees. The trees are then much more susceptible to other forms of damage, such as being blown down, or breaking under the weight of snow.**

**4.5 marks.**

(d) (i) The diagram shows the end of a plank which has split while seasoning. Describe **ONE** method which could be used to prevent this occurring.  
**Paint the ends of the plank.** \_\_\_\_\_  
**Tack a cleat on to the end of the plank.** \_\_\_\_\_  
**Or any appropriate answer.** \_\_\_\_\_

**4.5 marks.**

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(ii) State **TWO** advantages that kiln seasoning has over air seasoning.  
**Faster, can be controlled, specific moisture contents can be achieved.** \_\_\_\_\_  
**Not susceptible to weather conditions.** \_\_\_\_\_  
**Or any appropriate answer.** \_\_\_\_\_

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**2 x 3 marks each.                                  6 marks.**

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**8. Concrete Technology**

(a) (i) Give **TWO** advantages of mixing concrete by machine.

**Any two advantages @ 3 marks each.**

**6 marks.**

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(ii) Explain why it is important to have the correct water/cement ratio when mixing concrete.

**To ensure that the concrete reaches the specified strength.**

**Or any appropriate answer.**

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**4.5 marks.**

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(b) What is meant by the curing of concrete?

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**Allowing time for concrete to set.**

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**Initial set takes place in the first 24 hours.**

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**It takes 28 days for the curing process to complete.**

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**10.5 marks.**

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- (c) Select **TWO** of the following admixtures used in concrete and explain why they are used.

**Air-entraining agents; Accelerators; Retarders; Pigments.**

**Air-entraining agents improve workability by making concrete more lubricant.**

**Accelerators speed-up the time it takes the concrete to set, useful in frost conditions.**

**Retarders slow down the curing process, useful in very hot conditions.**

**Pigments add colour to the concrete for decorative purposes.**

**Any two @ 5 marks each.**

**Neatness/accuracy 0.5 mark.**

- (d) You are required to order ready-mixed concrete for a yard surface at the rear of a house.

The yard measures 30 m x 10 m and the specified depth is 0.2 m.

- (i) Calculate the number of cubic metres ( $m^3$ ) you need to order.

$$30 \times 10 \times 0.2 = 60m^3$$

**5 marks**

- (ii) If a ready-mix lorry will carry  $8m^3$  of concrete, how many loads of concrete will be required for the yard?

Answer:  $60/8 = 7.5$  **Approximately 8 loads. 5 marks.**

**Neatness/accuracy 0.5 mark.**

## GROUP THREE

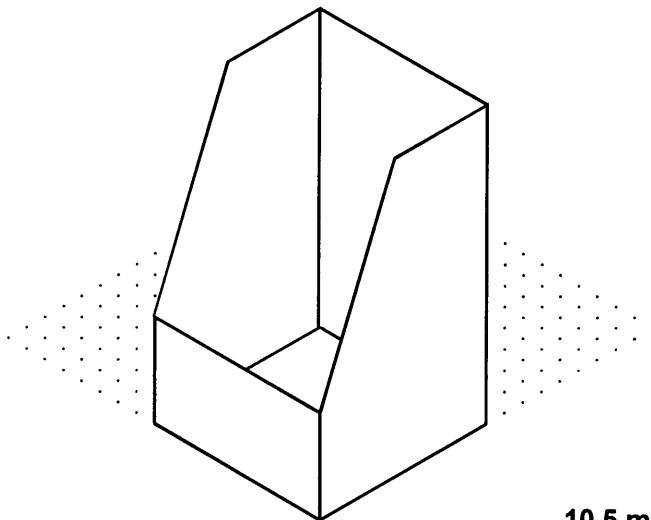
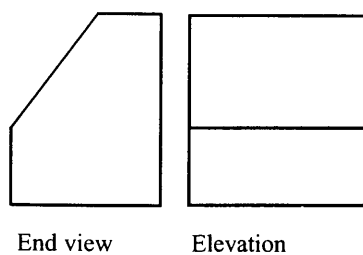
**You must answer ONE question from Group Three.**

There are TWO questions in Group Three:

9. Graphic Communication.
10. Computer Aided Design.

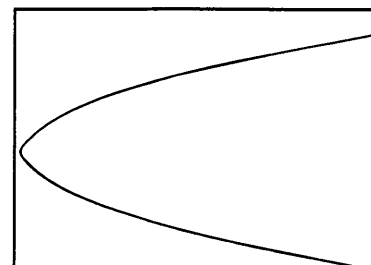
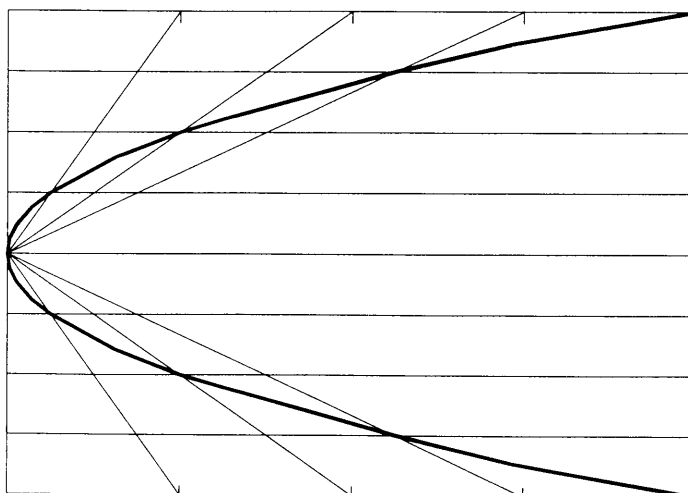
### 9. Graphic Communication

- (a) The elevation and end view of a compact disk holder are shown. Complete the isometric view of the holder.



**10.5 marks**

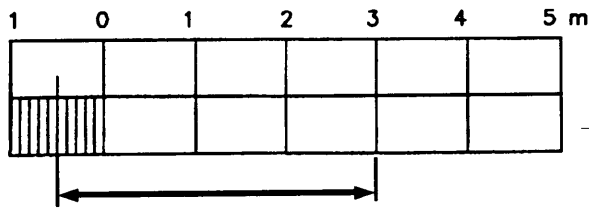
- (b) Redraw the parabola in the given rectangle.



**Construction lines 5 marks**

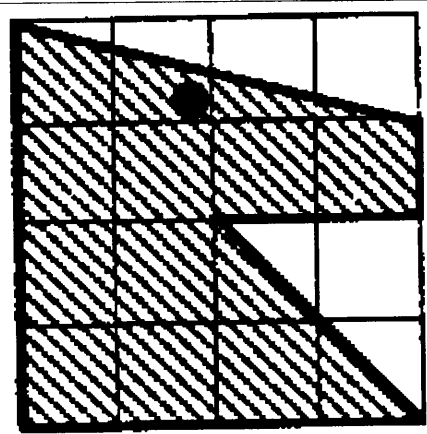
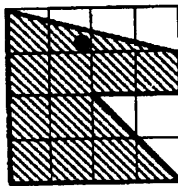
**Curve: 5.5 marks.**

(c)(i) In the scale provided, show the following length: [ 3.50 m ] **5 marks**

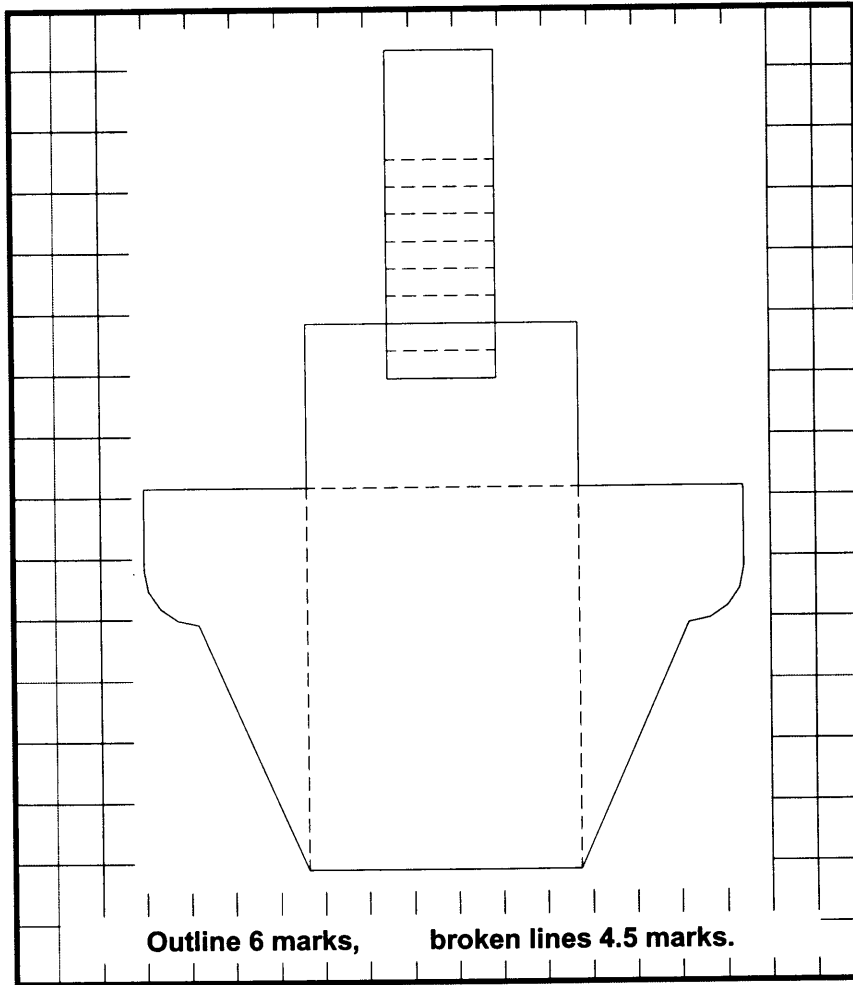
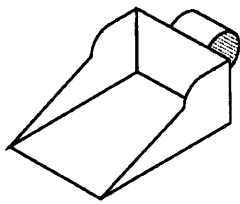


(ii) Redraw the given shape in the enlarged grid.

**5.5 marks**



(d) Sketch the development of the base and sides of the scoop in the space provided.



**Outline 6 marks, broken lines 4.5 marks.**

## 10. Computer Aided Design

- (a) The drawing shown in the diagram is to be created using a CAD package. Write down the relative co-ordinates for points 1 - 5.

1. = @160,0

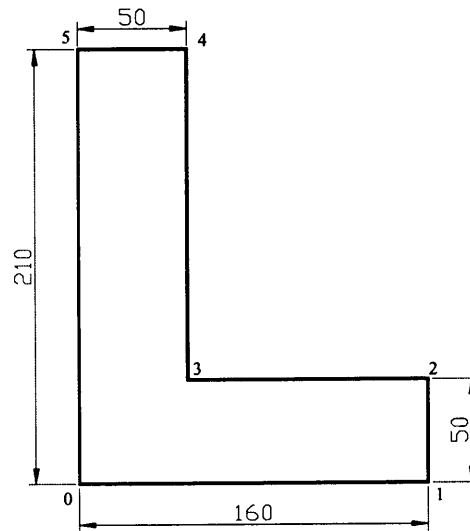
2. = @0,50

3. = @-110,0

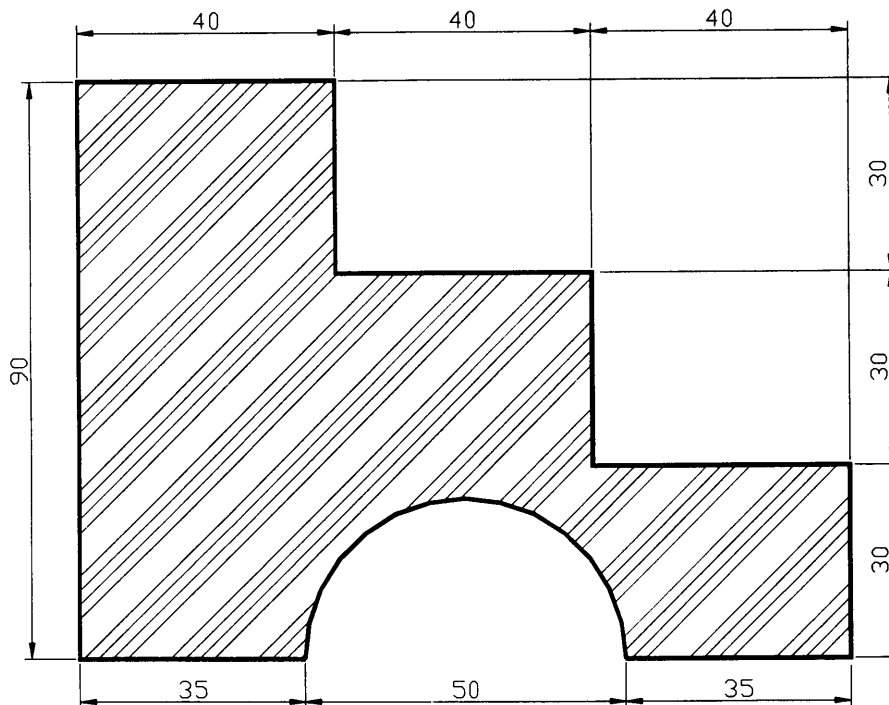
4. = @0,160

5. = @-50,0

**Any 3 correct @ 3.5 marks each.**

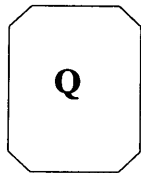
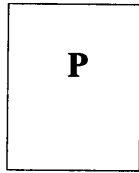


- (b) Taking each grid space to represent 10 mm, dimension the given drawing as if it were done using a CAD package.

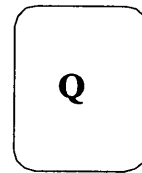
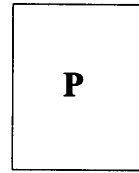


**Any 7 @ 1.5 marks each.**

- (c) Identify the editing commands used to change **THREE** of the shapes from 'P' to 'Q' in the diagrams below.

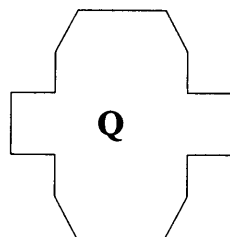
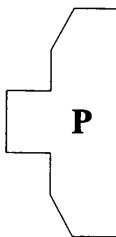


**Chamfer**

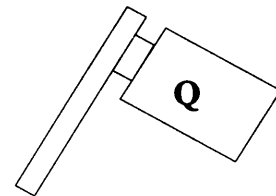
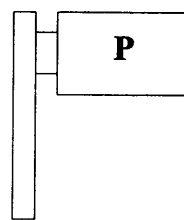


**Fillet**

Any 3 @ 3.5 marks each.



**Mirror**

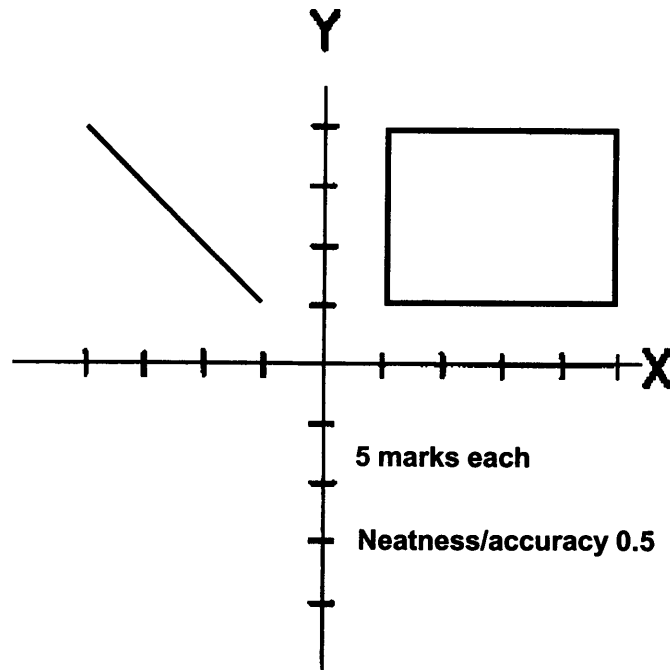


**Rotate**

- (d) Using a CAD package a line and a rectangle are to be drawn in the following order at (i) and (ii). Show the resulting shapes from the commands on the diagram below. (Axes marked at intervals of 10)

(i)  
**Command:** Line  
**From point:** -10,10  
**To point:** @-30,30  
**To point:** ↵

(ii)  
**Command:** Rectangle  
**From point:** 10,10  
**To point:** @40,30  
**To point:** ↵



# GROUP FOUR

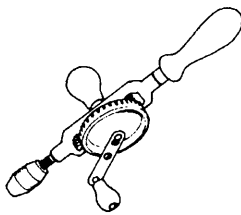
The fourth question may be taken from any of the four groups.

There are FIVE questions in Group Four:

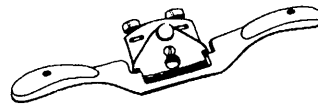
- 11. Woodcraft.
- 12. Toymaking.
- 13. Furniture Studies.
- 14. Cabinetmaking.
- 15. Power Hand Tools.

## 11. Woodcraft

(a) Name the **THREE** tools shown.

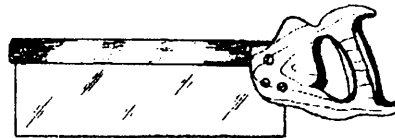


Hand drill



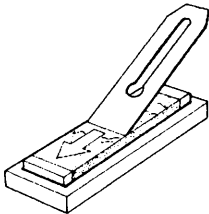
Spokeshave

3 @ 3.5 marks each

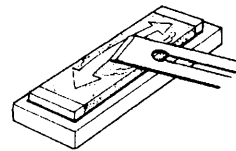


Tenon saw

(b) Name the processes being applied to the plane iron at (i) and (ii) below.



(i)



(ii)

Neatness/accuracy 0.5 mark.

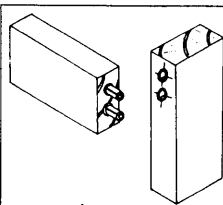
(i) \_\_\_\_\_

Honing 5 marks

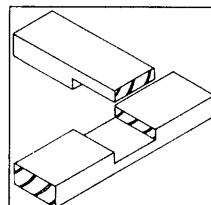
(ii) \_\_\_\_\_

Backing-off, burr removal 5 marks

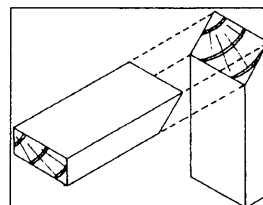
(c) Name **THREE** of the following wood jointing techniques.



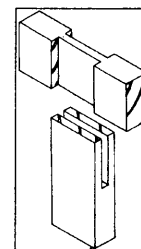
Dowelled joint



T-halving joint



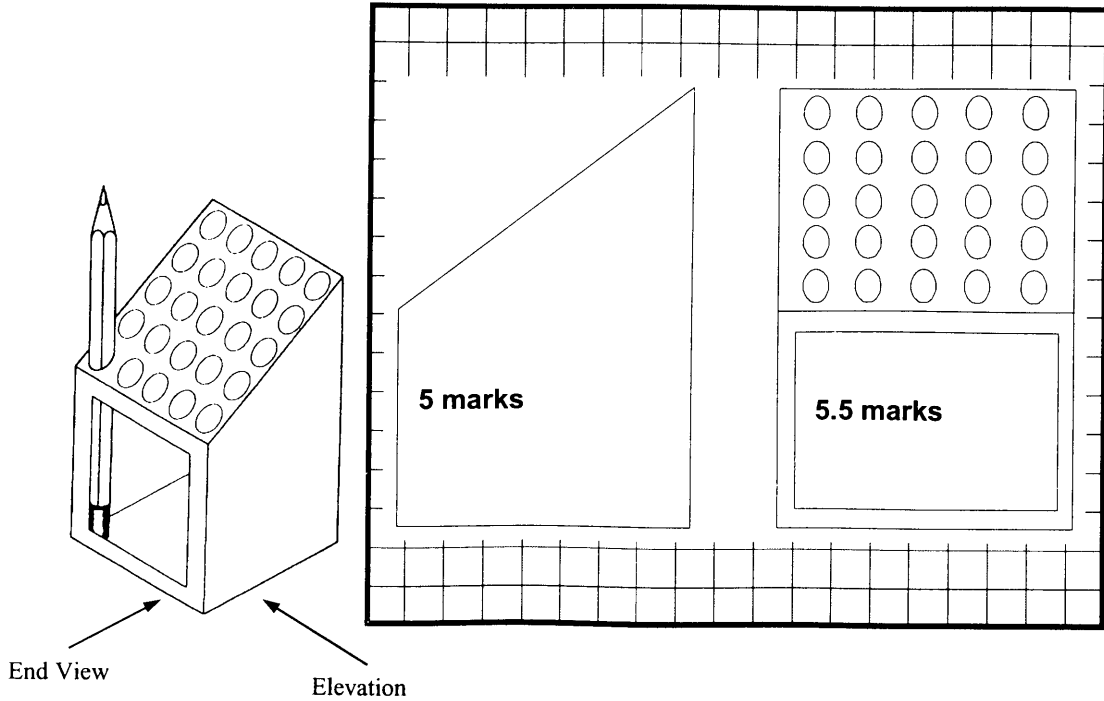
Mitre joint



T-bridle joint

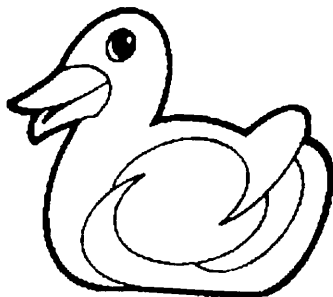
3 @ 3.5 marks each

(d) A display box for souvenir pencils is shown. Sketch, in the space provided an elevation and an end view of the box.



**12. Toymaking**

(a)  
 You are required to manufacture a pull-along toy based on the design shown.  
 Describe how you would mark-out this design on the wood.



Use of carbon paper

Tape photocopy of design onto wood

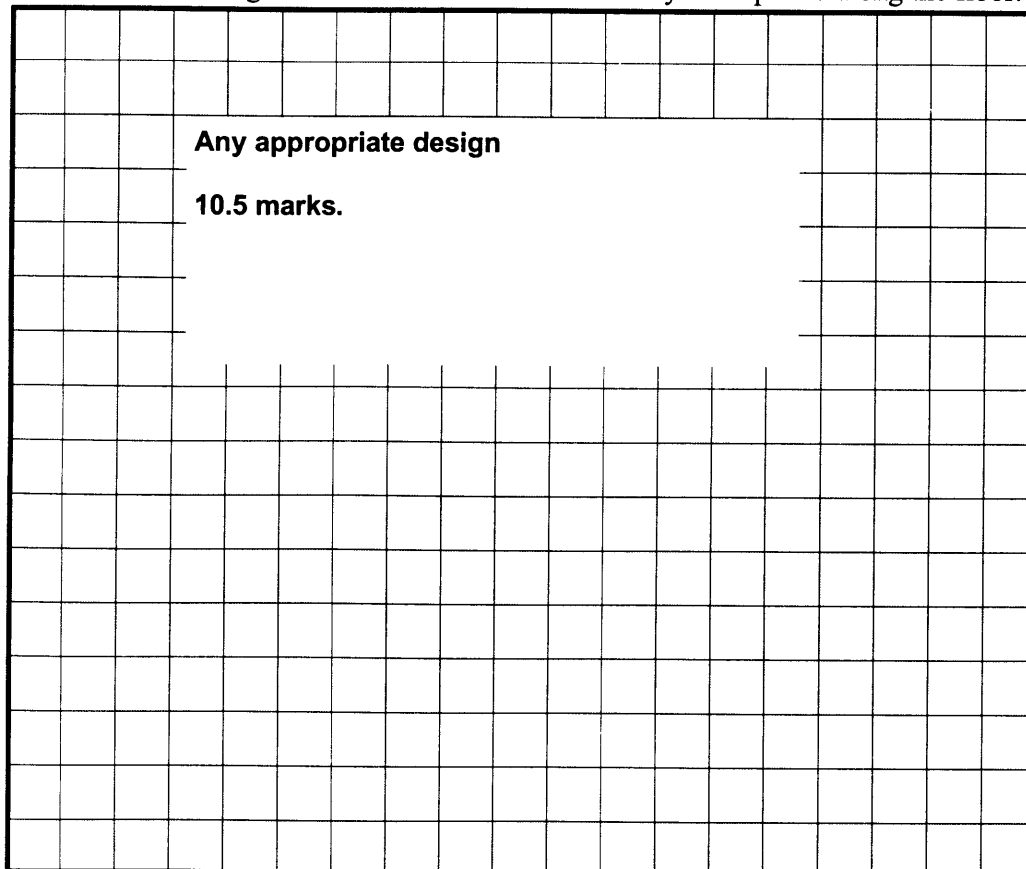
Or any appropriate answer

10.5 marks



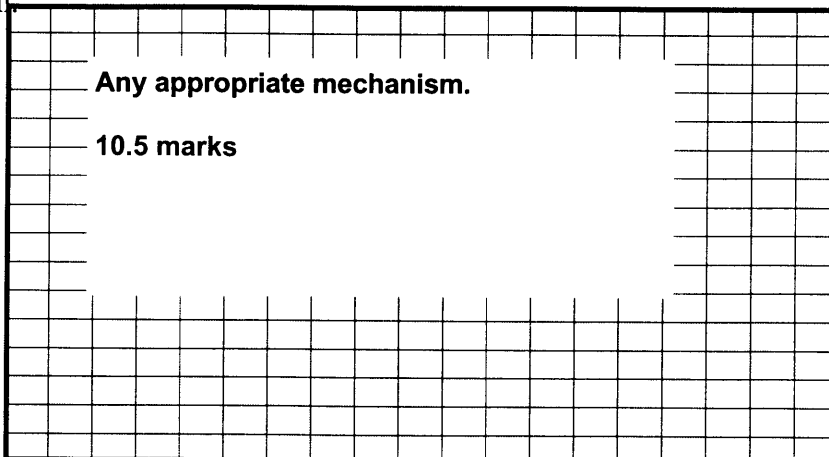
(b) Sketch **ONE** design solution that would allow the toy to be pulled along the floor.

Any appropriate design  
10.5 marks.



(c) Sketch a suitable mechanism to produce secondary motion, for example, a moving beak, wing or tail.

Any appropriate mechanism.  
10.5 marks



(d) List **TWO** safety factors that should be considered when making and finishing wooden toys.

**Non-toxic paint/finish; no sharp edges; no loose parts**

**Or any appropriate answer. 5 marks each. Neatness/accuracy 0.5 mark**

**13. Furniture Studies**

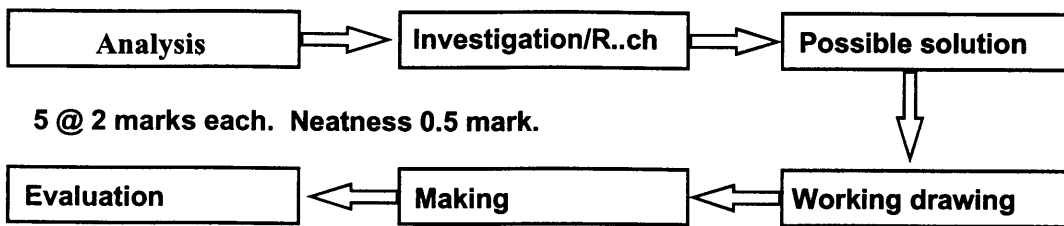
(a) Name **THREE** of the following woodworking machines.

3 @ 3.5 marks each

Band saw      Circular saw      Lathe      Pillar drill

(b) Six stages of the 'design process' are listed in random order in the table. Starting with Analysis, organise the stages in a logical sequence.

**Analysis; Making; Possible Solution; Evaluation; Working Drawing; Investigation/Research**



(c) Name **THREE** of the following fixings.

3 @ 3.5 marks each

Rising butt hinge      Counter hinge      Concealed hinge      Double cranked hinge

(d) Briefly describe any **THREE** of the following items:

**Davenport, Gate-leg, Carver, Ladder-back.**

**Davenport:** a small ornamental writing desk with drawers & a hinged lid.

**Gate-leg:** a table with a hinged leaf and a hinged leg to support the leaf.

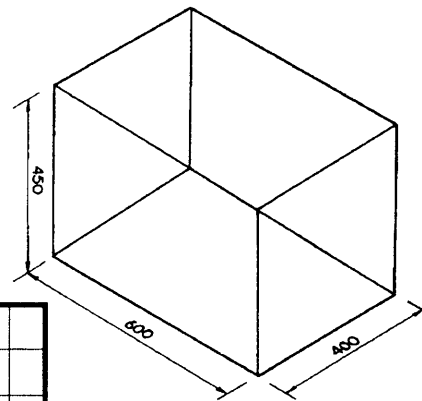
**Carver:** the chair with arms, in a set for dining, to be used by the person carving

**Ladder-back:** chair with horizontal slats, like rungs of a ladder.

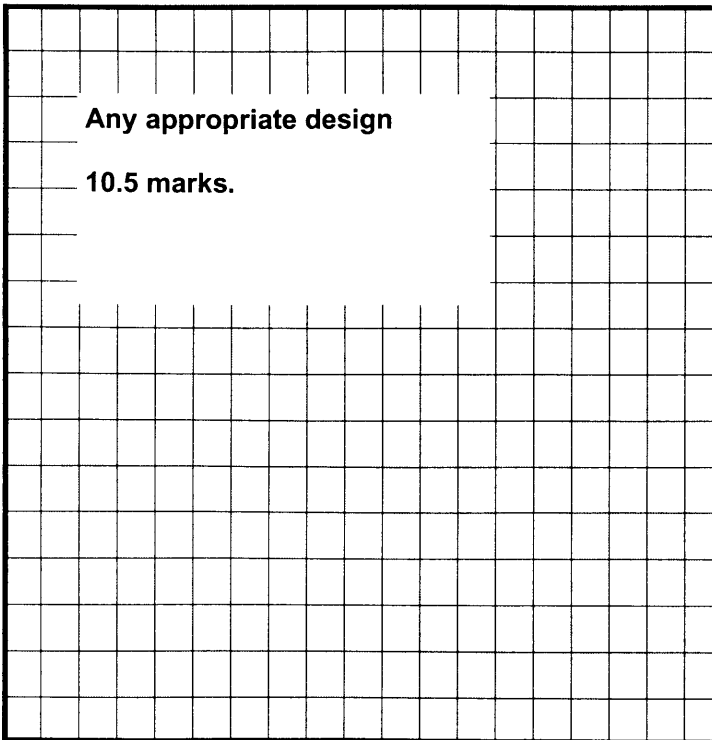
3 @ 3.5 marks each.

**14. Cabinetmaking.**

(a) The drawing shows the overall sizes of a stool for use in a bedroom.  
Sketch a suitable design for this stool.



Any appropriate design  
10.5 marks.



(b) Sketch, in detail, **ONE** joint you would use in this stool.

**Any appropriate joint**

**10.5 marks.**

(c) (i) List the materials from which the stool may be made.

**Red deal, or any appropriate material**

**3.5 marks**

(ii) State a suitable finish for the stool.

**Varnish, oil, paint or any appropriate finish**

**3.5 marks**

(iii) Suggest a suitable material for the seat of the stool.

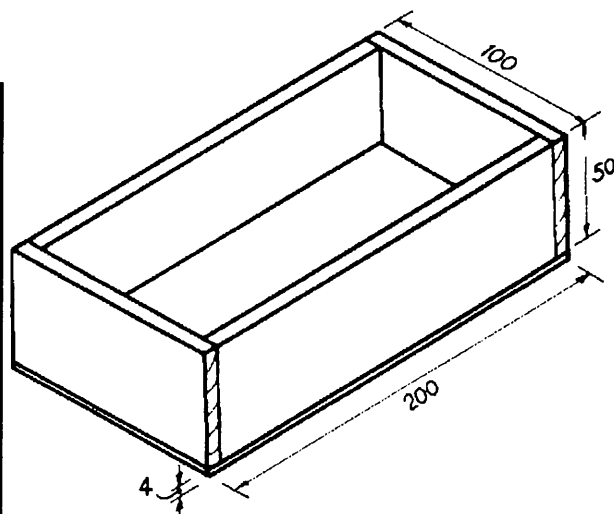
**Foam cushion or any appropriate material**

**3.5 marks**

(d) The drawing shows a small box made from 12 mm thick wood. Complete the cutting list.

**3.5 marks for each correct row.**

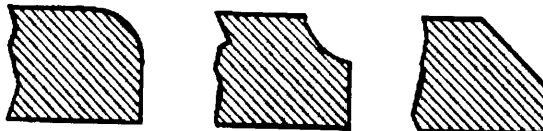
Quantity	Length (mm)	Width (mm)	Thickness (mm)
2	176	50	12
2	100	50	12
1	200	100	4



**15. Power Hand Tools.**

(a) (i) Name the power tool that would be used to create the sections shown.

Name: Router 4 marks

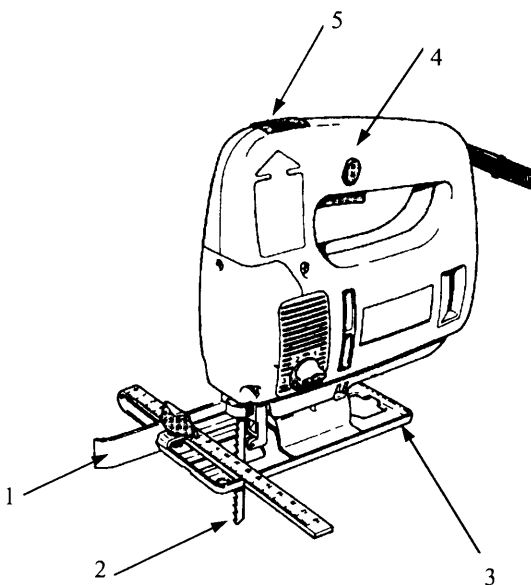


(ii) Sketch the profile of the cutter required to create any **ONE** of the sections.

Correct profile 6.5 marks

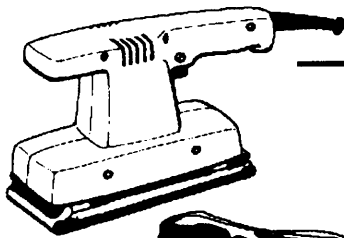
(b) Name **THREE** of the parts of the jig saw shown.

1. Parallel fence
2. Blade
3. Base plate
4. Locking button
5. Two speed switch

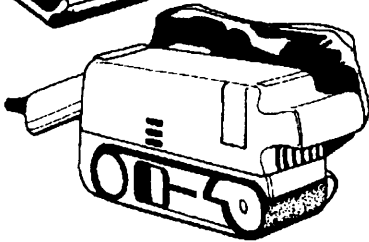


3 @ 3.5 marks each

(c) (i) Name the **TWO** types of sander shown.



Orbital sander      2 marks



Belt sander      2 marks

(ii) Describe how each sander operates.

**Orbital sander:** the base moves in tiny circles as the tool is moved.

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**Belt sander:** a continuous belt moves over rollers to give rapid wood removal

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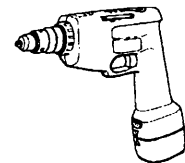
**2 @ 3 marks each = 6 marks**

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**Neatness/accuracy: 0.5 mark.**

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(d) (i) Give **TWO** advantages of a cordless drill.



Advantage 1. **2 marks**

---

Advantage 2. **2 marks**

---

(ii) List **THREE** safety precautions that should be observed when using power hand tools.

**3 @ 2 marks each = 6 marks**

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**Neatness/accuracy: 0.5 mark.**

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