



**Coimisiún na Scrúduithe Stáit
State Examinations Commission**

JUNIOR CERTIFICATE EXAMINATION, 2011

**MATERIALS AND TECHNOLOGY
METALWORK**

ORDINARY LEVEL - 100 Marks

Tuesday 21 June, Afternoon 2:00 - 3:30

**Centre
Number** 

**Examination
Number** 

INSTRUCTIONS

1. Answer **Question 1, Sections A and B** and **any three** other questions.
2. Write your answers in the spaces provided or tick the appropriate box.
3. Hand up this paper at the end of the examination.

For Examiner	
Total Mark	<input style="width: 80px; height: 40px;" type="text"/>
Question	Mark
1A	
1B	
2	
3	
4	
5	
6	
Total	
Grade	

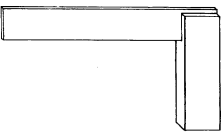
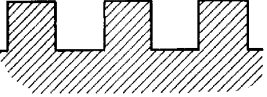
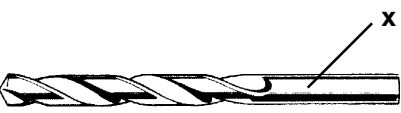
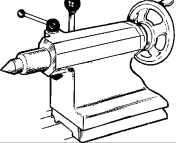


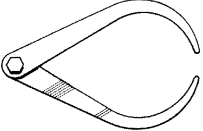
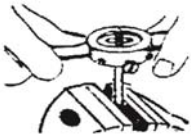


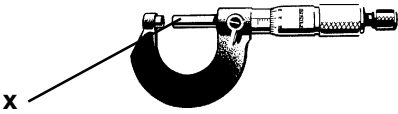
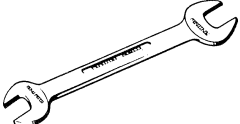
1. Total of end of page totals	
2. Aggregate total marks for all disallowed question(s)	
3. Total mark awarded (1 minus 2)	
4. Bonus mark for answering through Irish (if applicable)	
5. Total mark awarded if Irish Bonus (3+4)	
Note: The mark in row 3 (or row 5 if an Irish Bonus is awarded) must equal the mark in the Total Mark box on the script	

**MAKE SURE TO WRITE YOUR EXAMINATION NUMBER IN THE
BOX PROVIDED ON THIS PAGE**

Question 1.

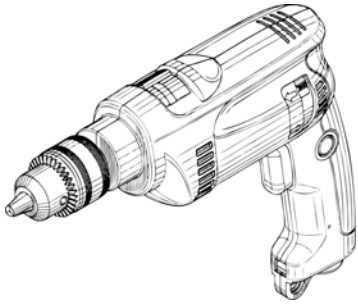
SECTION A - 20 MARKS
ANSWER ANY TEN QUESTIONS FROM THIS SECTION

40 Marks

<p>(a) </p>	<p>The tool is a:</p>	<table border="1"> <tr><td>Centre Square</td><td></td></tr> <tr><td>Try Square</td><td></td></tr> <tr><td>Protractor</td><td></td></tr> <tr><td>Bevel</td><td></td></tr> </table>	Centre Square		Try Square		Protractor		Bevel	
Centre Square										
Try Square										
Protractor										
Bevel										
<p>(b) </p>	<p>The thread form is a(n):</p>	<table border="1"> <tr><td>Acme Thread</td><td></td></tr> <tr><td>Square Thread</td><td></td></tr> <tr><td>ISO Metric Thread</td><td></td></tr> <tr><td>Buttress Thread</td><td></td></tr> </table>	Acme Thread		Square Thread		ISO Metric Thread		Buttress Thread	
Acme Thread										
Square Thread										
ISO Metric Thread										
Buttress Thread										
<p>(c) </p>	<p>Part 'X' is called the:</p>	<table border="1"> <tr><td>Flute</td><td></td></tr> <tr><td>Land</td><td></td></tr> <tr><td>Flank</td><td></td></tr> <tr><td>Shank</td><td></td></tr> </table>	Flute		Land		Flank		Shank	
Flute										
Land										
Flank										
Shank										
<p>(d) </p>	<p>A lathe tailstock can also be used for:</p>	<table border="1"> <tr><td>Knurling</td><td></td></tr> <tr><td>Drilling</td><td></td></tr> <tr><td>Undercutting</td><td></td></tr> <tr><td>Facing</td><td></td></tr> </table>	Knurling		Drilling		Undercutting		Facing	
Knurling										
Drilling										
Undercutting										
Facing										
<p>(e) </p>	<p>This file is:</p>	<table border="1"> <tr><td>Single Cut</td><td></td></tr> <tr><td>Double Cut</td><td></td></tr> <tr><td>Three Square</td><td></td></tr> <tr><td>Half-Round</td><td></td></tr> </table>	Single Cut		Double Cut		Three Square		Half-Round	
Single Cut										
Double Cut										
Three Square										
Half-Round										
<p>(f) </p>	<p>Part 'X' is a:</p>	<table border="1"> <tr><td>Bick Iron</td><td></td></tr> <tr><td>Hatchet Stake</td><td></td></tr> <tr><td>Folding Bars</td><td></td></tr> <tr><td>Groove Punch</td><td></td></tr> </table>	Bick Iron		Hatchet Stake		Folding Bars		Groove Punch	
Bick Iron										
Hatchet Stake										
Folding Bars										
Groove Punch										
<p>(g) </p>	<p>This instrument is a(n):</p>	<table border="1"> <tr><td>Odd-Leg Calipers</td><td></td></tr> <tr><td>Outside Calipers</td><td></td></tr> <tr><td>Inside Calipers</td><td></td></tr> <tr><td>Vernier Calipers</td><td></td></tr> </table>	Odd-Leg Calipers		Outside Calipers		Inside Calipers		Vernier Calipers	
Odd-Leg Calipers										
Outside Calipers										
Inside Calipers										
Vernier Calipers										
<p>(h) </p>	<p>Stocks and dies are used to make:</p>	<table border="1"> <tr><td>Blind Holes</td><td></td></tr> <tr><td>Internal Threads</td><td></td></tr> <tr><td>External Threads</td><td></td></tr> <tr><td>Countersunk Holes</td><td></td></tr> </table>	Blind Holes		Internal Threads		External Threads		Countersunk Holes	
Blind Holes										
Internal Threads										
External Threads										
Countersunk Holes										
<p>(i) </p>	<p>This fastener is a:</p>	<table border="1"> <tr><td>Spring Washer</td><td></td></tr> <tr><td>Split Pin</td><td></td></tr> <tr><td>Grub Screw</td><td></td></tr> <tr><td>Set Screw</td><td></td></tr> </table>	Spring Washer		Split Pin		Grub Screw		Set Screw	
Spring Washer										
Split Pin										
Grub Screw										
Set Screw										
<p>(j) </p>	<p>This technique is called:</p>	<table border="1"> <tr><td>Planishing</td><td></td></tr> <tr><td>Hollowing</td><td></td></tr> <tr><td>Punching</td><td></td></tr> <tr><td>Mottling</td><td></td></tr> </table>	Planishing		Hollowing		Punching		Mottling	
Planishing										
Hollowing										
Punching										
Mottling										
<p>(k) </p>	<p>Part 'X' is called the:</p>	<table border="1"> <tr><td>Spindle</td><td></td></tr> <tr><td>Ratchet</td><td></td></tr> <tr><td>Thimble</td><td></td></tr> <tr><td>Anvil</td><td></td></tr> </table>	Spindle		Ratchet		Thimble		Anvil	
Spindle										
Ratchet										
Thimble										
Anvil										
<p>(l) </p>	<p>This tool is a(n):</p>	<table border="1"> <tr><td>Open Spanner</td><td></td></tr> <tr><td>Ring Spanner</td><td></td></tr> <tr><td>Adjustable Spanner</td><td></td></tr> <tr><td>Box Spanner</td><td></td></tr> </table>	Open Spanner		Ring Spanner		Adjustable Spanner		Box Spanner	
Open Spanner										
Ring Spanner										
Adjustable Spanner										
Box Spanner										

SECTION B - 20 MARKS
ANSWER ALL QUESTIONS FROM THIS SECTION

(m)



Complete the chart by listing **four** other items used in the home that contain electric motors.

1.	
2.	
3.	
4.	

(n)



List **three** design features of a modern bicycle.

1.	
2.	
3.	

(o) (i) The guitar strings shown are normally in:

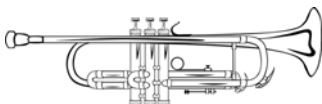


Tension	
Torsion	
Compression	
Shear	

(ii) Name a metal used for roof flashing.

--

(p) (i) Brass is an alloy of:



Copper and Steel	
Copper and Zinc	
Copper and Aluminium	
Copper and Tin	

(ii) Name **one** other alloy.

--

(q) (i) Household cutlery is made from:



Cast Iron	
Silver Steel	
Stainless Steel	
Galvanised Steel	

(ii) What is galvanised iron?

Question 2.

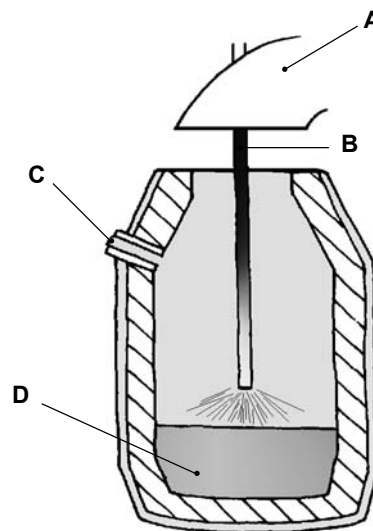
20 Marks

(a) Answer the following by ticking the correct box:

(i) Is cutting a design into metal with a sharp tool called engraving?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(ii) Does aluminium have a good resistance to corrosion?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iii) Do thermosetting plastics soften when heated?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(iv) Is the Electric Arc Furnace used to make pig iron?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(v) Is copper a non-ferrous metal?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(vi) Is the melting of a plastic material onto metal called lacquering?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(vii) Is ductility the ability of a metal to resist wear?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>
(viii) Is aluminium ore called bauxite?	Yes	<input type="checkbox"/>
	No	<input type="checkbox"/>

(b) The diagram shows a Basic Oxygen Furnace.
Name **any three** of the parts labelled.

Part	Name
A	
B	
C	
D	



Basic Oxygen Furnace

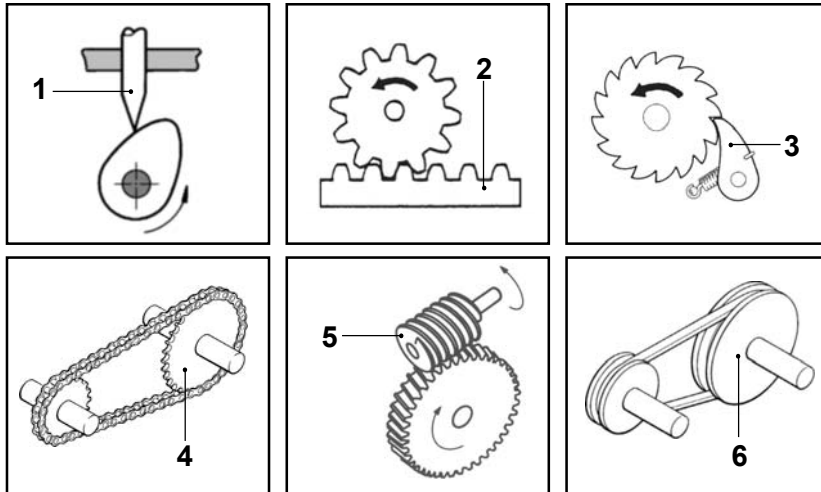
(c) Complete the chart by listing a tool for each task.

Task	Tool
To draw a line on a piece of metal.	Scriber
To flatten copper sheet without causing damage.	
To check drill bit sizes.	
To prevent damage caused by the jaw faces of a bench vice.	
To cut thin sheet metal by hand.	
To cut a 25 mm mild steel pipe.	

Question 3.

20 Marks

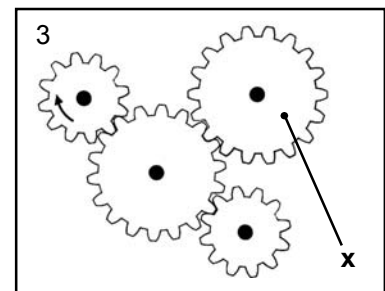
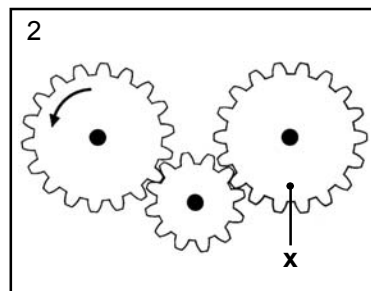
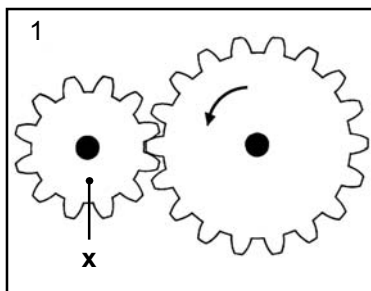
(a) (i) Match the number to the correct mechanism part.



Mechanism Part	No.
Rack	
Sprocket	
Pawl	
Follower	
Pulley	
Worm	

(ii) Name a machine that uses bevel gears.

(b) (i) Use an arrow to indicate the direction of gear 'X' in each of the following:



(ii) Name any **two** mechanisms that could be used in the operation of a lawn-mower.



1.

2.

(iii) Name a machine that uses a rack and pinion.

(c) Name a use for each of these mechanisms:

Use: _____

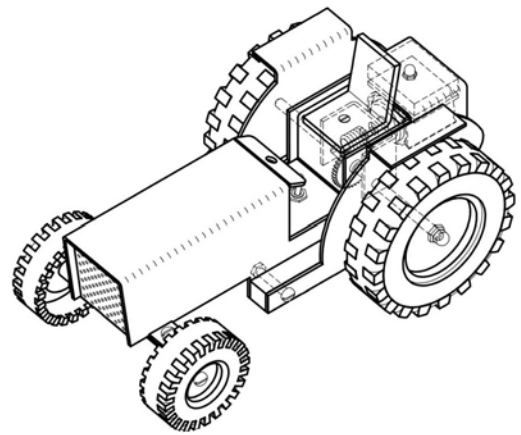
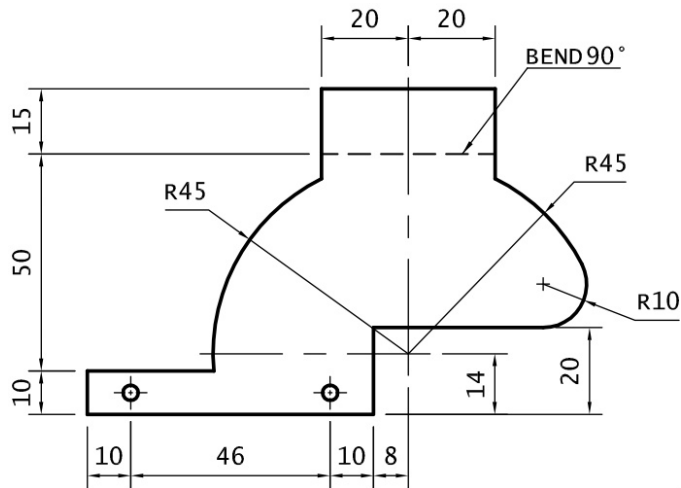
Use: _____

Use: _____

Question 4.

20 Marks

Details of a mudguard used in the manufacture of a model vintage tractor are shown.



(i) With reference to the drawing above, describe how you would accurately mark out the R45 curve.

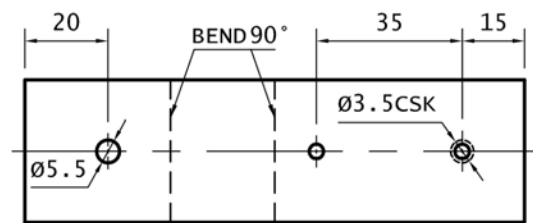
(ii) What is the overall length and width of the piece of metal used to make the mudguard?

Length:	
Width:	

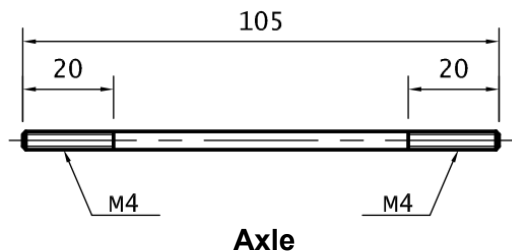
(iii) List **four** tools used in the manufacture of the mudguard.

1.	
2.	
3.	
4.	

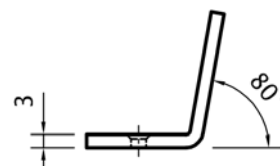
(iv) What does 'Ø3.5 CSK' mean?



(v) Describe how to cut the M4 threads on the axle.



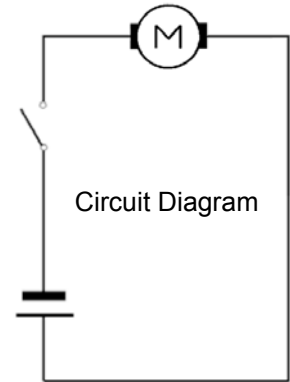
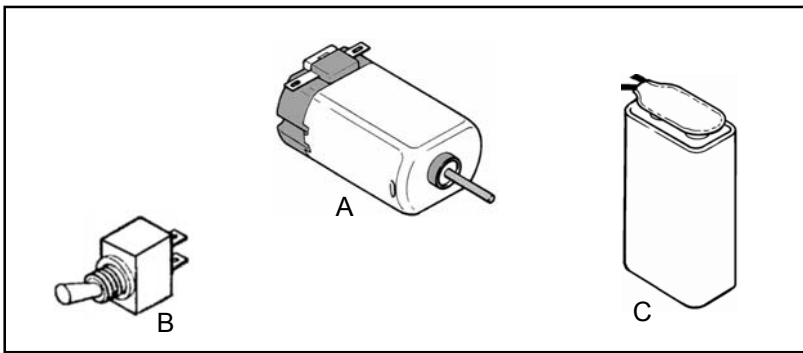
(vi) What precautions would you need to take when drilling the acrylic seat?



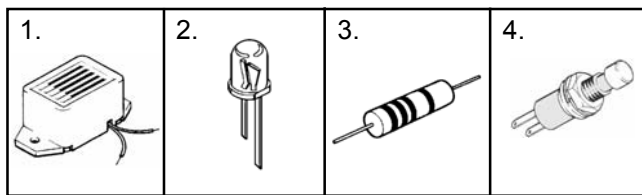
Question 5.

20 Marks

(a) (i) Using the circuit diagram as a reference, draw the connecting wires between the components in the box below.



(ii) Match the number to the component in the table opposite.



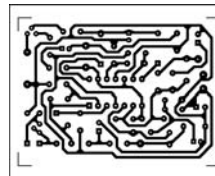
Component	No.
Resistor	
LED	
Push Switch	
Buzzer	

(b) (i) An electric kettle converts electrical energy into:



Mechanical Energy	
Light Energy	
Heat Energy	

(iv) This is a(n):



Printed Circuit	
Integrated Circuit	
Strip Board	

(ii) Mobile phone keypads use:



Slide Switches	
Toggle Switches	
Push Switches	

(v) A game controller is a(n):



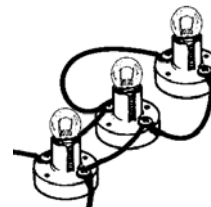
Output Device	
Input Device	
Process Device	

(iii) Which of these devices stores the largest amount of computer data?



USB drive	
CD ROM	
Floppy Disk	

(vi) These bulbs are connected in:



Parallel	
Series	
Parallel and Series	

(c) Name one famous Engineering inventor. Write a brief note about this person's invention.

Inventor's Name:
Invention:

Question 6.

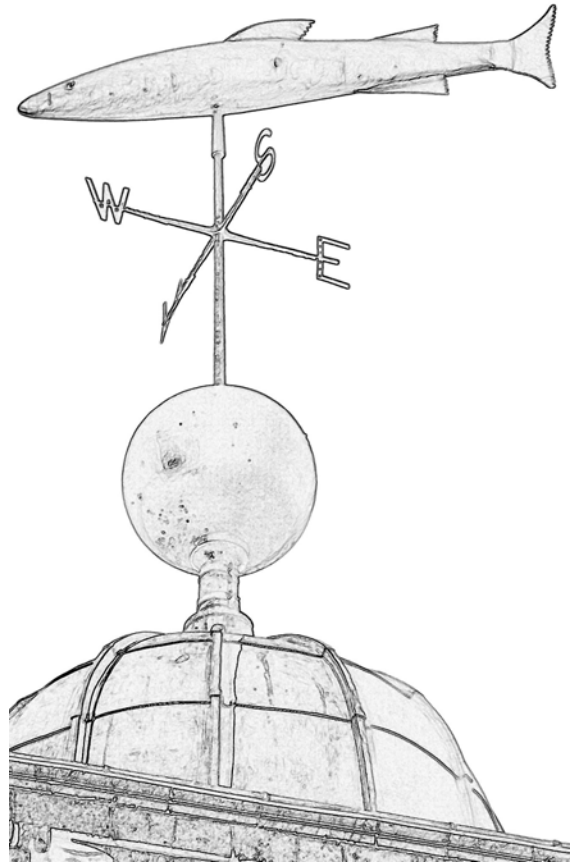
20 Marks

(i) The design shows a weather vane. List **three** workshop processes involved in making the letter 'E'.

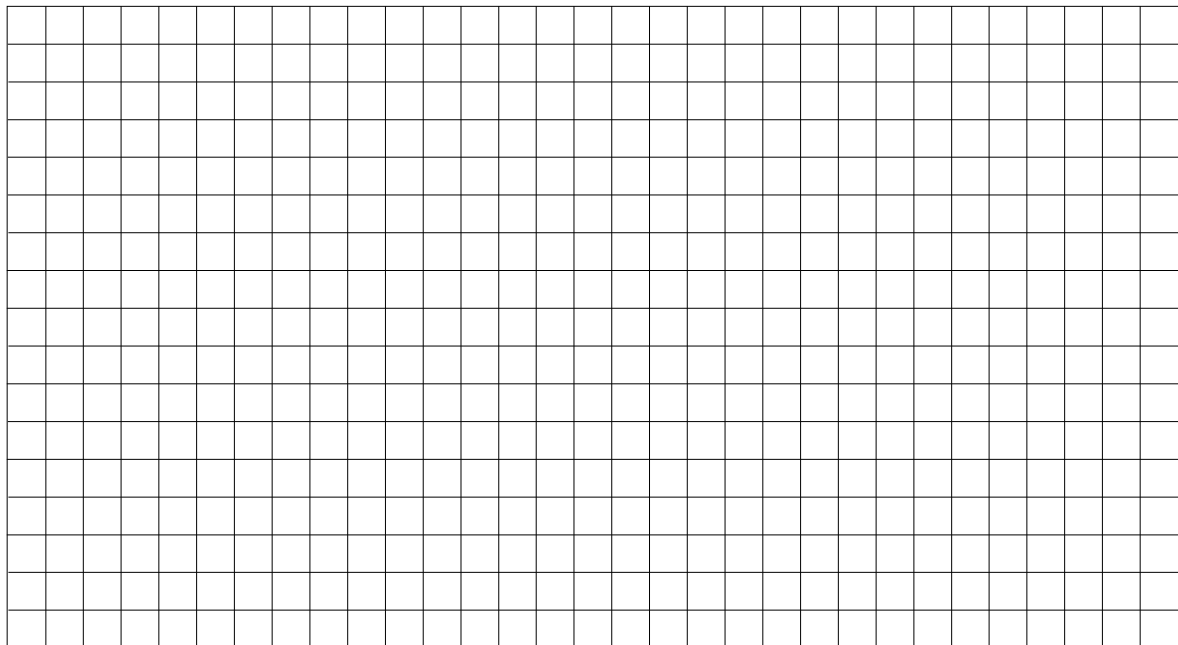
1.	
2.	
3.	

(ii) All the letters are to be made from mild steel. State how best to protect the letters from corrosion.

(iii) What method should be used to permanently attach the letters to the weather vane?



(iv) Using the grid below draw an alternative design to replace the salmon on top of the weather vane.



(v) What materials and processes would you use to make this alternative design?
