Coimisiún na Scrúduithe Stáit
State Examinations Commission

Junior Certificate 2018

Marking Scheme

Materials Technology Wood

Higher Level

Note to teachers and students on the use of published marking schemes

Marking schemes published by the State Examinations Commission are not intended to be standalone documents. They are an essential resource for examiners who receive training in the correct interpretation and application of the scheme. This training involves, among other things, marking samples of student work and discussing the marks awarded, so as to clarify the correct application of the scheme. The work of examiners is subsequently monitored by Advising Examiners to ensure consistent and accurate application of the marking scheme. This process is overseen by the Chief Examiner, usually assisted by a Chief Advising Examiner. The Chief Examiner is the final authority regarding whether or not the marking scheme has been correctly applied to any piece of candidate work.

Marking schemes are working documents. While a draft marking scheme is prepared in advance of the examination, the scheme is not finalised until examiners have applied it to candidates' work and the feedback from all examiners has been collated and considered in light of the full range of responses of candidates, the overall level of difficulty of the examination and the need to maintain consistency in standards from year to year. This published document contains the finalised scheme, as it was applied to all candidates' work.

In the case of marking schemes that include model solutions or answers, it should be noted that these are not intended to be exhaustive. Variations and alternatives may also be acceptable. Examiners must consider all answers on their merits, and will have consulted with their Advising Examiners when in doubt.

Future Marking Schemes

Assumptions about future marking schemes on the basis of past schemes should be avoided. While the underlying assessment principles remain the same, the details of the marking of a particular type of question may change in the context of the contribution of that question to the overall examination in a given year. The Chief Examiner in any given year has the responsibility to determine how best to ensure the fair and accurate assessment of candidates' work and to ensure consistency in the standard of the assessment from year to year. Accordingly, aspects of the structure, detail and application of the marking scheme for a particular examination are subject to change from one year to the next without notice.

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Junior Certificate Examination 2018

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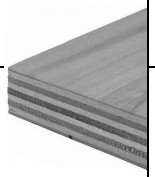
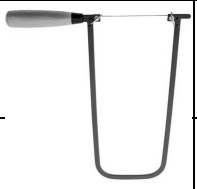
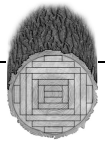
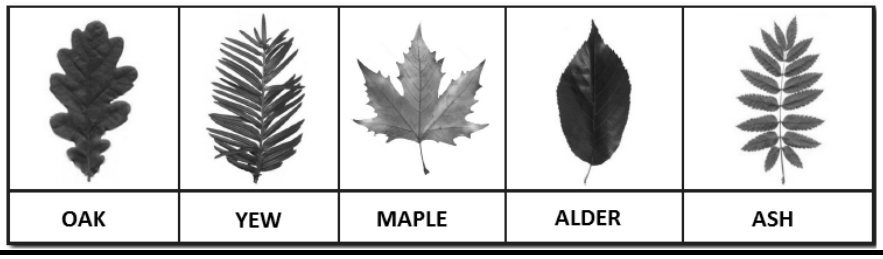
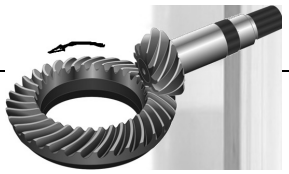
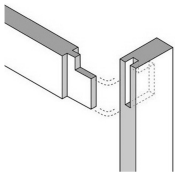
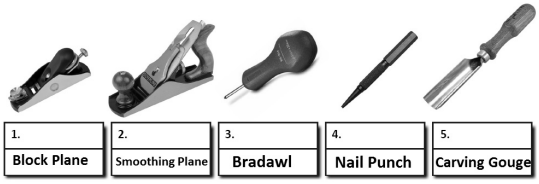
The Sample solutions shown are presented as example answers. All other valid solutions are acceptable and are marked accordingly.

SECTION A

Mark for best 16 answers. Disallow marks for any questions/parts of questions in excess of 16 as per instructions to Examiners.

QUESTION		ANSWER	MARKS
1.	(i)	Correct name for the tool... ***Sliding Bevel*** 	**3 marks**
	(ii)	Specific use for this tool… ***To mark/check lines and angles…***	**2 marks**
2.	(i)	Manufactured board... ***Plywood, multiply, marine ply.*** 	**3 marks**
	(ii)	Advantage… ***Stronger, cheaper, available in large sheets, less defects, more eco friendly…***	**2 marks**
3.	(i)	Deep throat fret saw advantage… ***Finer cut, greater access…*** 	**3 marks**
	(ii)	Force… ***Tension***	**2 marks**
4.	(i)	Power tool… ***Biscuit Jointer*** 	**3 marks**
	(ii)	Specific Use… ***Joining wood, cutting slots…***	**2 marks**
5.	(i)	Conversion method… ***Tangential/Box/Flat*** 	**3 marks**
	(ii)	Grain… ***End, edge, face***	**2 x 1 mark**
6.	(i)	Tool… ***(Hot) Glue gun*** 	**3 marks**
	(ii)	Advantage… ***Easy to use, glue sets quickly, long shelf life…*** Disadvantage… ***Sets too quickly, weak bond, burn risk…***	**1 mark** **1 mark**
7.	(i)	CAD… ***Computer Aided Design*** 	**3 x 1 mark**
	(ii)	Advantage… ***Faster, easy to edit, reproduceable, more accurate…***	**1 x 2 marks**
8.	(i)	Reason to season wood… ***Easier to work, more stable, stronger, more resistant to insects and fungi…*** 	**2 marks**
	(ii)	E.M.C.… ***Equilibrium Moisture Content***	**3 x 1 mark**

9.	(i)	Tree Identification…  	**5 x 1 mark**
10.	(i)	Name of machine… ***Bench sander, sanding machine, belt sander, disk sander.*** 	**3 marks**
	(ii)	Processes at A… ***Sanding side grain and concave curves*** Processes at B… ***Sanding end grain and convex curves***	**1 mark** **1 mark**
11.		Shakes…  CUP SHAKE  HEART SHAKE	**1 x 3 marks** **1 x 2 marks**
12.	(i)	Bevel gears… ***Anti-clockwise*** 	**3 marks**
	(ii)	RPM… ***16 RPM***	**2 marks**
13.		Conditions for dry rot… ***Moisture, food source, stagnant air, warmth, spores.*** 	**2 x 2 marks** **1 x 1 mark**
14.		Precautions using a pillar drill… ***Wear PPE, read SOP, tie up hair, remove loose jewellery, remove chuck key, secure workpiece, lower safety guard, use appropriate drill speed…*** 	**5 x 1 mark**
15.		Haunched Mortice and Tenon… ***Mortice*** ***Tenon*** 	**1 x 3 marks** **1 x 2 marks**
16.		Chemical… ***Chlorophyll*** 	**5 marks**
17.		Woodworking tools… ***1. Block Plane*** ***2. Smoothing Plane*** ***3. Bradawl*** ***4. Nail Punch*** ***5. Carving Gouge***  	**5 x 1 mark**

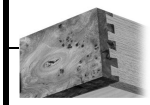
18.

Metals…

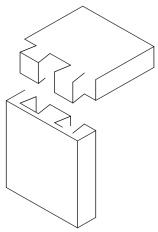
Metal	Ferrous	Non-Ferrous
Copper		✓
Cast Iron	✓	
Zinc		✓
Brass		✓
Mild Steel	✓	

5 x 1 mark

19. (i)



Exploded lap dovetail sketch…



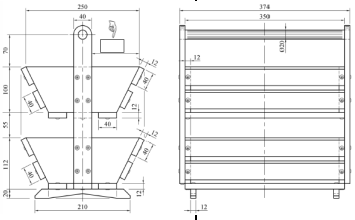
2 x 2 marks

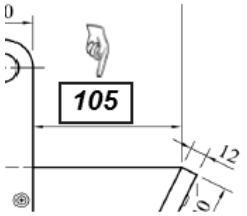
(ii) Colour or shade…

1 mark

20.

Cutting List...





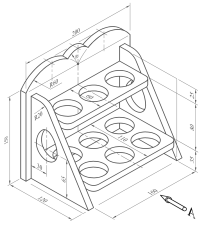
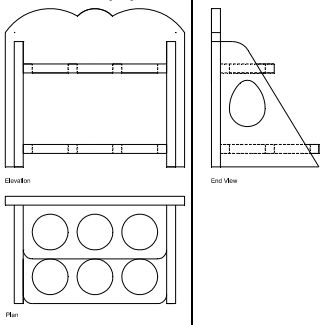
Description	Quantity	Length	Width	Thickness
Basket Ends	4	250	☞ 100	12
Horizontal Rails	14	☞ 350	40	12
Uprights	2	☞ 345	40	12
Supporting Legs	2	210	20	12
Dowel	1	374	Ø20	
Brass Screws	50	☞ 20-25	Ø4	
Screw Cups	50	Ø10		

5 x 1 mark

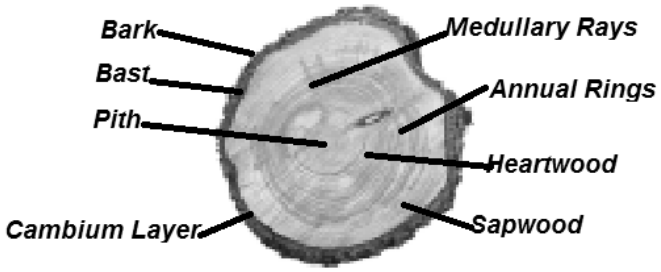
Running total of allowed questions for this section to be recorded and shown as indicated at the marking conference.

SECTION B

Mark for best 3 answers. Check <u>all</u> stationery and indicate running total and disallowed marks as indicated at the marking conference.

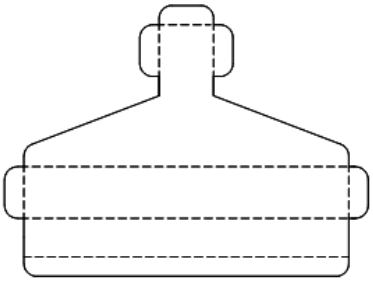
QUESTION	ANSWER	MARKS	
(i)	Preparation of working drawing …		
	**Elevation -**		
	Setting out overall height (150 without curve)	**1 mark**	
	Showing overall width (200)	**1 mark**	
	Showing position, thickness (10) and height of sides	**3 x 1 mark**	
	Showing position and thickness of bottom/top shelf	**2 x 1 mark**	
	Showing hidden detail for holes in shelves (8+ lines)	**1 mark**	
	Locating centre and drawing back arc (60) either side	**1 mark**	
	Locating centre and drawing centre arc	**1 mark**	**10**
(ii)	**End View -**		
	***Setting out/transferring height (with curve)***	**1 mark**	
	Setting out depth (120)	**1 mark**	
	Drawing corner of arc on back (150)	**1 mark**	
	Showing thickness of back	**1 mark**	
	Position thickness and width of either shelf	**2 x 1 mark**	
	Locating height of side	**1 mark**	
	Drawing angle of side	**1 mark**	
	Locating centre and drawing radius on side (20)	**1 mark**	
	Drawing egg cut out (4 arcs)	**2 x 1 mark**	**11**
(iii)	**Plan -** ***Setting out overall width (200)***	**1 mark**	
	Setting out overall depth (120)	**1 mark**	
	Thickness of back (10)	**1 mark**	
	Position and thickness of either side (10)	**2 x 1 mark**	
	Width of shelves (60/110)	**2 x 1 mark**	
	Find centre and draw holes (3+)	**2 x 1 mark**	
	Drawing of fillets (any)	**1 mark**	**10**
	General - ***Draughtsmanship, presentation…***	**2 marks**	**2**
	**NOTE:** **1.** If isometric drawing presented, mark as per scheme and divide by 2 at end. **2.** If the wrong scale is used, no marks for height or width in elevation. **3.** If sketched, mark as per instructions at conference**.**		
(iv)	Joining the shelves to the ends…		
	Mortice and tenon, Housed joint ***Dowelling/Biscuits, Domino*** ***Screws, sunk and plugged/concealed (and cups)***	**5 + 2 marks**	
	Description/name only	**2 marks**	**7**

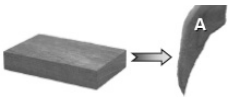
QUESTION	ANSWER	MARKS	
2. (i)	Explanation of steps in design process… **Investigation/Research** ***Gather information that will allow you to arrive at possible design solutions. Investigating items and locations relating to design. Looking for ideas, studying similar artefacts, etc.*** **Working Drawings -** ***Dimensioned drawings to include plan, elevation and end elevation and/or a pictorial view of the proposed artefact and sketches relating to its manufacture. Appropriate detailing and a materials list should be included***.	**5 marks** **5 marks**	**10**
(ii) 	Design solution for corner shelf... ***Basic unit/box without any design features (sketch only.)*** ***Fair attempt to store items in an attractive, suitable, unit. (Must include notes.)*** ***Good, well balanced, well sketched design, showing some innovation and creativity. (Must be in 3D or 2 orthographic views and include notes.)*** ***A <u>quality</u> 3D sketch of an original innovative and creative design. The sketch must be rendered or shaded and include relevant notes.***	**6 marks** ↓ **9 marks** ↓ **12 marks** ↓ **16 marks**	**16**
(iii)	Incorporating Lighting… ***Appropriate method of incorporating light.***	**3 + 3 marks**	**6**
(iv)	Woodwork Joint and description… ***Mortice and tenon, Housed/dovetail housing Dowelling, Biscuit joint, Bridle Plugged/concealed screws*** ***Accept a joint appropriate to the design presented.***	**4 + 4 marks**	**8**

QUESTION		ANSWER	MARKS	
3.	(i)	Cross section of tree trunk…  	**8 x 1 + 4 marks**	**12**
	(ii)	Description of any four features… ***Bark:*** ***Thick corky outer layer, serves to protect tree, prevents evaporation.*** ***Bast:*** ***Carries food to growing parts of the tree (phloem and xylem). Replenishes the bark.*** ***Cambium Layer:*** ***The layer of cells responsible for the growth of the tree. Transport also through xylem and phloem.*** ***Heartwood:*** ***The inner more mature part of the tree, responsible for support.*** ***Sapwood:*** ***The lighter-coloured outer part of the tree. It stores and transports minerals and water from the roots to the leaves.*** ***Pith:*** ***This is a soft spongy tissue at the centre of the tree.*** ***Medullary Rays:*** ***Distribute and store excess food across the tree.*** ***Annual Rings:*** ***A layer of wood that is formed in one growing season. The age of the tree can be determined by counting the rings.***	**4 x 3 marks**	**12**
	(iii)	Hardwoods and Softwoods...		
			8 x 1 mark	
		Examples	**2 x 1 mark**	**10**
	(iv)	Chemical Reaction…		
		Photosynthesis	**3 marks**	
		Three Raw Materials…		
		CO2, Water, Minerals, Sunlight, Chlorophyll.	**3 x 1 mark**	**6**

Headings	*Hardwoods*	*Softwoods*
Leaves	***Broad. Deciduous. Shed in Winter.***	***Needle. Evergreen. Retain in Winter.***
Seeds	***In a fruit, berry or nut.***	***In cones.***
Timber	***Hard, darker, durable, more expensive.***	***Softer, paler, less durable, cheaper.***
Climate	***Temperate to tropical.***	***Cooler to temperate.***

QUESTION		ANSWER	MARKS	
4.	(i)	Names of power saws…  ***A = Jig saw*** ***B = Scroll saw*** ***C = Mitre saw/Chop saw*** ***D = Band saw***	**4 x 3 marks**	**12**
	(ii)	Table Comparison… **SAW** | **SAW SIZE** | **SAW CUT TYPE** | **ACCURACY** | **PORTABILITY** | **CUTTING DEPTH** | **SAFETY** **JIGSAW** | Small | Straight or curved | Medium-Poor | Excellent | 50 mm approx | Good **SCROLL SAW** | Small | Straight or curved | Good | Good | 50mm max | Very Good **MITRE SAW** | Medium | Straight | V Good | Good | 75mm approx | Good **BAND SAW** | Large | Straight or curved | V Good | Poor | 300mm | Good	**4 x 3 marks**	**12**
	(iii)	Adjustment features of the Band saw… ***Fence*** ***Blade Height*** ***Table Angle*** ***Mitre Guide*** ***Blade type for curves or ripping*** ***Tension and Tracking***	**3 x 2 marks** **3 x 2 marks**	**12**
	(iv)	Teeth… ***Saw set*** Reason… ***This prevents the blade from binding in the wood.***	**2 marks** **1 + 1 mark**	**4**

QUESTION	ANSWER	MARKS	
5A. (i)	Development… ***Neat well-proportioned sketch of development showing correct cutting pattern and fold lines*** ***Surfaces (3/6/9)*** ***Fold Lines (4/6/8)*** ***Fillets (7/14)*** ***Quality of sketch*** 	**3 x 2 marks** **3 x 1 mark** **2 x 1 mark** **2 marks**	**13**
(ii)	Drilling two large holes... • ***Mark centres for holes*** • ***Place waste wood beneath acrylic/place tape on front and back of acrylic*** • ***Secure acrylic in vice or cramp*** • ***Using a hole saw set drill to low speed*** • ***Drill through slowly (from each side)*** Or • ***Find centres and draw circles on acrylic*** • ***Drill series of holes inside the circumference with waste wood beneath*** • ***File acrylic to line with (half) round file*** Or • ***Find centres and draw circles on acrylic*** • ***Drill hole on circumference with waste wood beneath*** • ***Insert scroll saw, fretsaw blade through hole*** • ***Hold acrylic securely and saw to the line*** • ***Finish with appropriate file***	**3 + 6 marks**	**9**
(iii)	Process of bending the acrylic… • ***Fold line marked with non-permanent pen*** • ***Fold lines places over strip heater*** • ***Heat along fold line until acrylic is adequately soft*** • ***Bend to the correct angle using a 90° former.***	**3 + 6 marks**	**9**
(iv)	Attaching acrylic to wood…… • ***Mark centres for holes in the acrylic*** • ***Select appropriate sized drill bit for screw size*** • ***Secure acrylic in vice with waste wood underneath/place tape on front and back of acrylic*** • ***Using low speed and slow feed drill through the acrylic*** • ***Using a countersink bit to allow the screw head to sit flush with the surface of the acrylic*** • ***Using a screwdriver fix the screw through the acrylic into the wood*** • ***Twist in the chrome cap into the screw head until it meets the surface of the acrylic.***	**3 + 6 marks**	**9**

QUESTION	ANSWER	MARKS	
5B. (i) 	Identify 4 woods… ***Four named woods*** ***Brief description…*** ***Correct description of grain, colour, texture workability…***	**4 x 1 mark** **4 x1 mark**	**8**
(ii)	Transferring design outline to wood **...** • ***Tape the drawing to one side of the wood.*** • ***Insert a sheet of carbon paper underneath the drawing.*** • ***Trace over the design.*** • ***Check all lines are visible on the wood before removing sheets.***	**6 + 6 marks**	**12**
(iii)	Cutting Part A… • ***Cut the shape of the outline using a scroll saw.*** • ***Put on safety glasses. Switch on scroll saw or band saw*** • ***Place piece on table of saw.*** • ***Carefully cut around the outline of the shape.***  ***Or*** • ***Secure wood in vice and using a coping saw or fret saw cut around the outline of the shape.*** • ***Sand the piece using a bench sander if required.***	**6 + 6 marks**	**12**
(v)	Rounding the edges… • ***Mark the depth of the round on the shaped piece.*** • ***Using drum sander, sand a round edge to the required depth.*** ***Or*** • ***Secure the wood in a vice and using a spokeshave shape a roundover on the edge of the piece.*** • ***Hand sand to finish.***	**4 + 4 marks**	**8**