



National  
Qualifications  
2024

# **2024 Graphic Communication**

## **Advanced Higher**

### **Question Paper Finalised Marking Instructions**

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## General marking principles for Advanced Higher Graphic Communication

*Always apply these general principles. Use them in conjunction with the specific marking instructions, which identify the key features required in candidates' responses.*

- (a) Always use positive marking. This means candidates accumulate marks for the demonstration of relevant skills, knowledge and understanding; marks are not deducted for errors or omissions.
- (b) If a candidate response does not seem to be covered by either the principles or detailed marking instructions, and you are uncertain how to assess it, you must seek guidance from your team leader.
- (c) For 'Describe' questions  
Candidates must provide a statement or structure of characteristics and/or features, not just an outline or a list. For example they can refer to a concept, experiment, situation or facts in the context of and appropriate to the question. The number of marks available for a question indicates the number of factual/appropriate points required.
- (d) For 'Explain' questions  
Candidates must relate cause and effect and/or define relationships. This must be in the context of the question, or a specific area within the question.
- (e) For 'Compare' questions  
Candidates must demonstrate knowledge and understanding of the similarities and/or differences between things, methods, or choices. This must be in the context of the question, or a specific area within the question.
- (f) Candidates can respond to any question using text, sketching, annotations or combinations of these. Award marks for the information conveyed. Do not award marks for the quality of sketching.

## Marking instructions for each question

Question			Expected response	Max mark	Additional guidance
1.	(a)		<ul style="list-style-type: none"> <li>• Components can be checked to ensure they do not fail under specific loads/forces</li> <li>• Different materials can be tested to assess best option for the component</li> <li>• Strengthening supports can be added as required (eg webs, bosses, ribs etc.)</li> </ul>	2	<p>1 mark for each correct response</p> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>• New component must withstand other environmental conditions. eg heat, humidity etc</li> </ul>
	(b)		<ul style="list-style-type: none"> <li>• Ensure the new 3D printed pipe does not degrade due to the chemicals</li> <li>• Ensure the new pipe does not contaminate the chemicals</li> <li>• Ensure the same dimensions of the pipe as the original</li> <li>• Ensure the same surface finish of the pipe (interior) is the same</li> <li>• Same flow (characteristics) as original pipe</li> </ul>	2	<p>1 mark for each correct response</p> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>• New pipe must withstand the environmental conditions. eg heat, humidity etc</li> </ul>
	(c)		<ul style="list-style-type: none"> <li>• Convert the model to an STL file</li> <li>• Scale the model to ensure the volume of the print matches the volume available within the printer</li> <li>• Setup any structural/support requirements ie adding meshes to strengthen walls or stop the model collapsing in on itself</li> <li>• Ensure the models centre of mass is balanced correctly to avoid it toppling</li> <li>• Ensure the correct surface finish/print speed is selected to achieve the desired result</li> <li>• Model must be orientated/ manipulated correctly (to minimise scaffolding etc...)</li> <li>• Ensure the correct filament is used for the print</li> <li>• Ensure the temperature for the bed is correct for adherence</li> <li>• Ensure the correct temperature for the choice of filament</li> </ul>	4	<p>1 mark must be from conversion to STL format</p> <p>1 mark awarded thereafter for each correct response</p> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>• Including in-fills for rafting</li> <li>• The term 'scaffolding' instead of meshes bullet point 3 or 4.</li> <li>• Selecting the correct path for laying down the filament</li> <li>• Model mass to ensure correct amount of filament is used</li> </ul>

Question			Expected response	Max mark	Additional guidance
1.	(d)		<ul style="list-style-type: none"> <li>• Print material from a recycled/sustainable source</li> <li>• Print material can be recycled</li> <li>• Minimal print material while maintain strength/rigidity</li> <li>• Choice of print time appropriate for function/surface finish (eg an early prototype may not require a high-quality finish)</li> </ul>	2	1 mark for each correct response  Only accept changes to the component not the conditions/environment
	(e)	(i)	<ul style="list-style-type: none"> <li>• Symbol A refers to a surface that is not to be cut/milled/reduced in dimension/no material should be removed</li> </ul>	1	
		(ii)	<ul style="list-style-type: none"> <li>• Symbol B refers to all surfaces being produced the same/finished in the same way</li> </ul> <p><b>OR</b></p> <ul style="list-style-type: none"> <li>• That material is to be removed from all surfaces</li> </ul>	1	Must include the word 'all' in the answer

Question			Expected response	Max mark	Additional guidance
2.	(a)		<ul style="list-style-type: none"> <li>The boxes/squares/rectangles on the front of key card have been sized/positioned/proportioned to reflect the golden ratio (to ensure a well-balanced graphic item is produced)</li> <li>The boxes on the rear of the card in terms of size/position/proportion reflect the golden ratio</li> <li>The <u>images</u> on both sides of the key card are scaled according to the golden ratio with images gradually getting larger</li> <li>The text is distributed and sized according to the golden ratio going from small at the bottom to large at the top</li> </ul>	2	<p>1 mark for each correct response</p> <p>Answers must detail exactly how the ratio is applied and where, to gain marks</p>
	(b)	(i)	<ul style="list-style-type: none"> <li>The highland cow logo is dominant and instantly draws the eye into the hotel brand</li> <li>On the reverse side the key items are positioned according to the rule of thirds creating focal points at key position eg the '2' in the room number, the centre of the piper image</li> <li>The large '210' on the reverse draws your eye to the room number</li> <li>The '210' on the front is a focal point from its location in the golden section</li> </ul>	2	<p>1 mark for each correct response</p> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>the words 'taigh-osta' provide a focal point due to their central location</li> </ul> <p>The same feature may relate to more than one element/principle, but the description must be distinct</p>
		(ii)	<ul style="list-style-type: none"> <li>The cut-outs/white areas in the highland cattle logo create the effect of hair making the logo look realistic</li> <li>The piper cut into blue background enhances the theme of the brand/relates to the location of the hotel</li> </ul>	2	<p>1 mark for each correct response</p> <p>The same feature may relate to more than one element/principle, but the description must be distinct</p> <p><b>Do not accept:</b></p> <ul style="list-style-type: none"> <li>Responses related to white text/numbers as this is 'reverse'</li> <li>Responses related to the white areas in the images (on the back of the business card) as these are part of a graphic</li> </ul>

Question			Expected response	Max mark	Additional guidance
2.	(b)	(iii)	<ul style="list-style-type: none"> <li>• The silhouette of the city emphasises this is a city hotel</li> <li>• The silhouettes of different tones/transparency create depth</li> <li>• The silhouette on the reverse of the business card provides an easy to interpret icon for social media etc</li> <li>• The silhouette of the (distinctive) buildings indicates the location of city hotel</li> </ul>	2	<p>1 mark for each correct response</p> <p>The same feature may relate to more than one element/principle, but the description must be distinct</p> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>• The silhouette of the cow creates unity with the negative space image</li> </ul>
	(c)		<ul style="list-style-type: none"> <li>• To ensure the graphics are not used at an inferior hotel chain</li> <li>• To ensure the graphics are not used on inferior quality merchandise</li> <li>• The company/image producers are paid for the use of their graphics</li> <li>• The company's brand is legally protected</li> </ul>	3	
	(d)		<ul style="list-style-type: none"> <li>• Paper opacity will ensure the images on the back cannot be seen through from the front and vice versa</li> <li>• Crop marks will ensure each business card is cut to the correct size</li> <li>• Crop marks will need to be the same on both prepress sheets/print rollers, to ensure business card margins/bleeds are correct</li> </ul>	2	1 mark for each correct response

Question			Expected response	Max mark	Additional guidance
2.	(e)		<p>Illustration techniques in image:</p> <p><b>Materials</b></p> <ul style="list-style-type: none"> <li>Materials could be applied to furniture/walls/surfaces enhance the realism of the design and demonstrate what it could look like</li> </ul> <p><b>Texture Mapping</b></p> <ul style="list-style-type: none"> <li>Texture could be applied to the flooring or texture finishes to ensure the scale of chosen materials is suitable for the environment</li> </ul> <p><b>Bump Mapping</b></p> <ul style="list-style-type: none"> <li>Bump mapping is used/could be used on features such as the rug or bedding to give it more depth/texture/ make it appear more realistic/appropriate for the item</li> </ul> <p><b>Reflection</b></p> <ul style="list-style-type: none"> <li>Reflective surfaces could be added for realism by reflecting the scene or individual elements features within the scene</li> </ul> <p><b>Specularity</b></p> <ul style="list-style-type: none"> <li>Additional highlights added to gloss/metallic/reflective surfaces to enhance reflective material and/or emphasise direction of lighting</li> </ul> <p><b>Ambience</b></p> <ul style="list-style-type: none"> <li>Ambient mood/feeling produced by light/colour schemes to create a welcoming/positive environment</li> </ul> <p><b>Volumetrics</b></p> <ul style="list-style-type: none"> <li>Inclusion of air-born particles (for example dust) within the volume of room.</li> </ul> <p><b>Depth of Field</b></p> <ul style="list-style-type: none"> <li>Use of blurred image for landscape behind the window to emphasise scale/distance of outdoor area</li> </ul>	4	<p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>any answer that shows understanding of a relevant technique and can be/has been clearly applied to enhance the model</li> <li>'materials' or 'applying materials' will create the room's colour scheme</li> <li>displacement mapping with appropriate description</li> </ul> <p>1 mark for each correct technique stated from the list provided</p> <p>1 mark for any relevant description of the change applied</p> <p>Do not accept lighting techniques or HDRI</p>

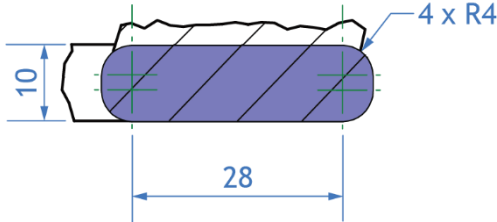
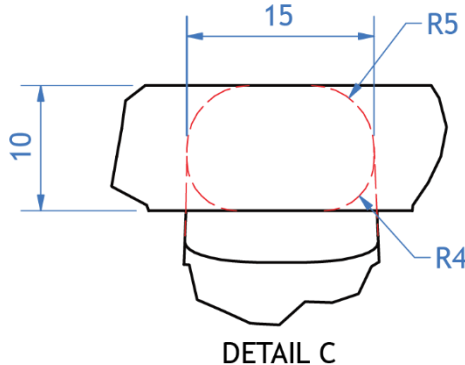
Question			Expected response	Max mark	Additional guidance
2.	(f)		<p><b>Directional Lighting</b></p> <ul style="list-style-type: none"> <li>• Could be used to provide directional sunlight coming through the window to show how the external environment/ position of the building would affect the lighting in the room</li> </ul> <p><b>Ambient light</b></p> <ul style="list-style-type: none"> <li>• Could be used to produce an overall light with no specific direction to ensure all areas have general illumination</li> </ul> <p><b>Spotlight/Point Light/Local Light</b></p> <ul style="list-style-type: none"> <li>• Could be used/has been used to show how the bedside wall lights would illuminate the area immediately below or above the light shade or produce cones of light</li> <li>• Could be used/has been used to show how the ceiling spotlights would illuminate the walls</li> </ul> <p><b>Area Light</b></p> <ul style="list-style-type: none"> <li>• Could be used to create an area of directional light emitting from the window</li> </ul> <p><b>Image Based Lighting/IBL</b></p> <ul style="list-style-type: none"> <li>• Used to simulate how the surrounding environment affects the lighting of objects</li> </ul>	4	<p>1 mark for the type of light 1 mark for the description</p> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>• Point Light (but only as an alternative to spotlight) used within the ceiling/wall to create a multi-directional light (in this case the light is inhibited by the lamp shade)</li> </ul> <p><b>Accept:</b></p> <ul style="list-style-type: none"> <li>• HDRI to change balance of the lighting to improve clarity</li> </ul>

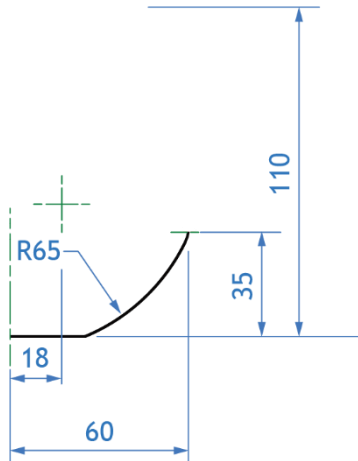
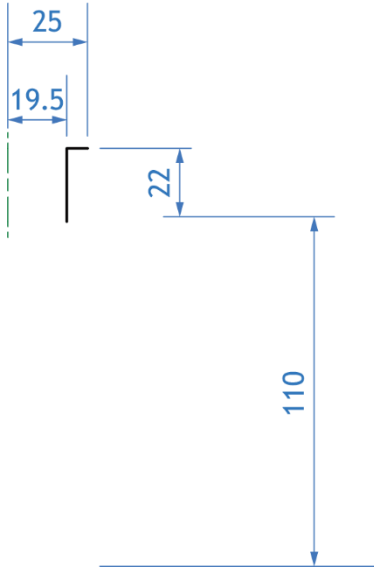


Question			Expected response	Max mark	Additional guidance
3.	(a)		<ul style="list-style-type: none"> <li>• Stop frame animation is easy to understand/pick up for inexperienced users of animation techniques</li> <li>• Stop frame animation can be done on a range of media devices with camera capabilities, making it accessible</li> <li>• Stop frame animation doesn't require specialist hardware/software making it appealing to new users</li> </ul>	2	<b>Accept:</b> <ul style="list-style-type: none"> <li>• There are multiple apps/software programs that assist users in making stop frame animations</li> <li>• Cost effective with justification, eg, because of the low cost of raw materials</li> </ul>
	(b)		<ul style="list-style-type: none"> <li>• Stop frame can be difficult to achieve due to the small accurate movements that need to be made</li> <li>• Stop frame animation can be very time consuming. For this market target market may result in them losing interest</li> <li>• User may struggle to get lighting/setup correct which will result in a poor-quality video</li> </ul>	2	
	(c)		<p>Resolution</p> <ul style="list-style-type: none"> <li>• Images need to be at least 72 PPI to ensure videos can be produced to a good quality</li> </ul> <p>Colour space</p> <ul style="list-style-type: none"> <li>• Image will need to be provided in RGB colour formatting to ensure they work well the app and produce good results</li> </ul>	2	<b>Accept:</b> <ul style="list-style-type: none"> <li>• if candidates suggest printing the images and using these behind the physical characters then response will be 300 dpi for resolution and CYMK for colour space</li> <li>• the resolution would need to be correct for the size of the cardboard background if printed and the size of screen if digital</li> </ul>

Question			Expected response	Max mark	Additional guidance
3.	(d)		<b>Advantages</b> <ul style="list-style-type: none"> <li>• Wide range of images to select from giving providing options for the designer</li> <li>• Images will be of a high quality</li> <li>• Saves times as you do not have to create the images yourself</li> </ul> <b>Disadvantages</b> <ul style="list-style-type: none"> <li>• May not be able to find the desired image (could be in relation to content/style/size, resolution/file type)</li> <li>• There will be subscription/one-off payments costs to use the images which could result in higher prices for the client</li> <li>• Images may come with certain conditions around editing/using them for particular purposes</li> </ul>	4	<p>Answers must contain any 2 from advantages and 1 from disadvantages or vice versa</p> <p>Do not accept 'saves time' without relevant description/justification</p> <p>For disadvantages in bullet point one, a maximum of 1 mark can be awarded</p>
	(e)		<ul style="list-style-type: none"> <li>• Vector files are easy to edit</li> <li>• Scaling parts of the logo will not reduce quality of shape/curve/line definition/resolution</li> <li>• It embeds colour info and type face into a single file</li> <li>• It can be saved as another vector file type or as a pdf</li> <li>• Vector file format allows for precise modifications of curves</li> </ul>	2	<p>A specific advantage of the vector file format or ai file type must be mentioned</p> <p>1 mark for each correct response</p>
	(f)		<b>Descriptions</b> <ul style="list-style-type: none"> <li>• The gradient fill would be complex to reproduce using vector graphics, as gradients are usually controlled by pixels. Using vector software would require the designer to significantly alter the change between each individual shape to create the gradient</li> <li>• Drop shadow is also typically controlled by pixels in a raster image making it difficult to reproduce as vector</li> </ul>	2	<p>1 mark for identifying a correct issue and 1 mark for a valid description</p> <p><b>Accept:</b> Similar terms to 'gradient' and 'drop shadow' that reference these features</p>

Question			Expected response	Max mark	Additional guidance
3.	(g)		<p><b>Contrast</b></p> <ul style="list-style-type: none"> <li>• Orange buttons/text/slide bar against blue identifies something has been actioned/selected</li> <li>• Text/icon changing from white to yellow and small/thin to large/thick lines indicates SFX has been selected screen 4</li> <li>• Complex shape of the ‘bots’ contrasts with the geometric buttons/screen</li> <li>• Contrast between the circular and the rectangle</li> </ul> <p><b>Shape</b></p> <ul style="list-style-type: none"> <li>• Simple shapes make buttons easily identifiable and simplify understanding for the user</li> <li>• Icon shapes make it clear what each button does</li> </ul> <p><b>White space</b></p> <ul style="list-style-type: none"> <li>• Sparse layout of items makes it easier for the user to navigate the screens and identify functions/operation</li> </ul> <p><b>Balance</b></p> <ul style="list-style-type: none"> <li>• Use asymmetrical balance on screen one creates visual interest and naturally draw your eye to the buttons on the right</li> <li>• Largely symmetrical balance across Screen 2-4 creates an organised layout that is easy to follow and understand</li> </ul>	4	<p>1 mark for each correct response</p> <p><b>Accept:</b> Any other acceptable response related to these elements and principles that has been identified on one or more of the screens</p> <p>Candidates must refer to symmetrical or asymmetrical balance</p>

Question			Expected response	Max mark	Additional guidance
4.	(a)		<ul style="list-style-type: none"> <li>Profile for top feature with all dimensions and extrude 10mm (1 mark)</li> <li>Profile for stem and positioned 2mm from back of top feature (1 mark)</li> <li>Path for stem with all dimensions (1 mark)</li> <li>Extrude along a path with 8-degree taper applied (1 mark)</li> <li>Profile for base feature with all dimensions and path profile with all dimensions (1 mark)</li> <li>Extrude along a path (1 mark)</li> <li>All 4mm fillets applied to top piece and base (1 mark)</li> </ul>	7	<p><b>Top feature:</b> Where top piece is modelled using extrude along a path where path and profile are correct (1 mark) or correct use of revolve an extrude (1 mark)</p> <p><b>Base feature:</b> Where base is revolved: profile dimensions and distance to centre axis centre axis is correct (1 mark) revolved to 240 degrees (1 mark) or correct use of extrude (2 marks)</p> <p><i>Profile for Base feature revolve :</i></p>  <p><b>Stem feature:</b> Where candidates attempt to use loft a mark can still be awarded for 'path' if all these dimensions are provided but cannot obtain the mark for extrude along a path/taper</p> <p><i>Profile for stem extrude along a path:</i></p>  <p>DETAIL C</p>
	(b)		<ul style="list-style-type: none"> <li>Stage 2: Create a free form with 12 × 6 mesh</li> <li>Stage 3: Apply an axis of symmetry</li> <li>Stage 4: Edit the form using point/edges/faces to create the desired form.</li> <li>Stage 5: Convert the form into a solid</li> </ul>	4	<p>1 mark for each correct technique stage 2 to 5</p> <p>For stage 2 the size of the mesh must be stated</p>

Question			Expected response	Max mark	Additional guidance
4.	(c)		<ul style="list-style-type: none"> <li>Profile*, position centre axis and revolve for bottom profile of the beaker (1 mark)</li> <li>Geometry of diameter 120 circle, offset plane 75mm and ellipse profile with major axis 90 and minor axis 78 (1 mark)</li> <li>Loft command (1 mark)</li> <li>Surface revolve 360 degree the top profile* of the beaker (1 mark)</li> <li>Fillet R7 applied between the lofted and revolved sections (1 Mark)</li> <li>Model thickened to 2mm (1 mark)</li> </ul>	6	<p>Bullet points can be completed in any order</p> <ul style="list-style-type: none"> <li>All dimensions must be included for award of marks for revolved profiles - bullet points 1 and 4 (note the 110 dimension - shown in the profiles below- is not required).</li> </ul> <p>*bottom profile</p>  <p>*top profile</p>  <p><b>Accept:</b> All possible solutions that produce the same result provided <b>surface modelling is used</b></p>

Question			Expected response	Max mark	Additional guidance
4.	(d)		<ul style="list-style-type: none"> <li>• Along with MP4 it is the most widely used video format so is compatible with a wide range of devices/software/hardware</li> <li>• Produces high quality video/audio</li> <li>• Even compressed video maintains the required quality</li> <li>• MPEG can be compressed increasing download speed</li> <li>• Allows text files (such as subtitles) to easily added</li> <li>• Widely used on video sharing websites such as YouTube</li> <li>• Embedded links can be included in mpeg</li> <li>• Language setting can be added to/changed</li> </ul>	2	1 mark for each correct response
	(e)		<ul style="list-style-type: none"> <li>• More accessible as can be shared on various digital media</li> <li>• Audio instructions can be added to enhance clarity</li> <li>• The ability to zoom in to make instructions clearer</li> <li>• Easy to get access again if lost or paper instructions become damaged</li> <li>• Reduces environmental impact as there is no need to print instructions</li> <li>• Company can create an online library to support users</li> </ul>	2	1 mark for each correct response  <b>Accept:</b> Responses that show how the clarity of the assembly process is improved with justification
	(f)		<ul style="list-style-type: none"> <li>• Set up the correct frame rate/ number of steps in the animation to enhance the quality of movement</li> <li>• Set up the correct path so that the components move efficiently to their assembled positions</li> <li>• Set up correct speed so that parts move more quickly or slowly into position</li> <li>• Choose a path that minimises the crossing or interference of parts</li> <li>• Choose camera positions/level of zoom that maximise clarity of part movements/part positions/ assembly details</li> </ul>	2	1 mark for each correct response  <b>Accept:</b> set up the most appropriate start and end points

Question			Expected response	Max mark	Additional guidance
5.	(a)		<p>User and Creators</p> <ul style="list-style-type: none"> <li>• <b>Construction trades</b> can use drawing and surveys to plan the build and ensure the correct contractors are employed. To ensure correct position and size of the exterior wall</li> <li>• <b>Quantity surveyors</b> can identify the quantity of items required for the build and the cost attached to these eg the correct steel beams are ordered for the load bearing walls, number of bricks required, number of sockets/switches, amount of insulation etc</li> <li>• <b>Architects</b> could plan the design and advise the client on the best design for their extension. To ensure the correct size, materials, compliance of the building to regulations eg the cladding meets fire resistance standards</li> <li>• <b>Interior designers</b> could advise on the best options for the design features within the inside of the building, eg position of sink, space between units, or position of lights or material/colour finishes</li> <li>• <b>Landscape architects</b> could advise of the best way to plan the landscape around the extension. Boundaries can be established using the location plan to ensure design to not encroach on neighbouring properties</li> <li>• <b>Building surveyors</b> could advise on the condition of the current building and the best way to approach the extension. To ensure the two buildings are integrated eg the same quality of foundations is used, connection of water supply, drainage, electrical supply are planned for</li> </ul>	8	<p>Candidates do not need to accurately name the profession the description however must be appropriate and relevant to the extension</p> <p>Construction trades can be broken down into specific roles eg plumber. Theoretically 4 construction trades with appropriate descriptions could gain full marks</p> <p>More detailed responses including the role of the professional in two different aspects of the project could gain 2 marks</p> <p>The response must clearly link to how creators will be needed to plan/build the design</p> <p>The response must clearly link to how planning drawings will enable the success of the extension design</p>

Question			Expected response	Max mark	Additional guidance
5.	(a)	(continued)			
			<ul style="list-style-type: none"> <li>• <b>Town planners/conservation bodies</b> can advise of whether or not the extension is suitable for the existing community/ environment/surrounding site eg if the correct finish and materials are used or proximity to boundaries</li> <li>• <b>Structural engineers</b> to get the position, size, strength of the weight bearing parts/beams/ steelwork for the removal of the load bearing partition, and the position and type of foundations. Also specify joints between beams, walls and foundations</li> <li>• <b>Electrical engineers</b> to ensure correct cabling, sockets, fuses are used to meet regulations</li> </ul>		
	(b)		<ul style="list-style-type: none"> <li>• Start and finish dates can be allocated for when different work needs to be completed to ensure everyone remains on track</li> <li>• Regular reviews can be conducted to assess if items are on/off track and schedules revised to suit the build</li> <li>• Allocation of resources as required for key tasks can be allocated at the right time to ensure the project remains on track to avoid incurring additional costs etc</li> </ul>	2	1 mark for each response



Question			Expected response	Max mark	Additional guidance
6.	(a)		<ul style="list-style-type: none"> <li>• Solid inks are provided without any additional packaging reducing waste</li> <li>• There are no cartridges to dispose of after printing reducing waste</li> <li>• Solid inks are made from bio-degradable natural materials meaning they significantly reduce the impact on the environment</li> </ul>	2	1 mark for each correct response
	(b)		<ul style="list-style-type: none"> <li>• Ensure designs maximise the space available on the substrate to reduce waste after trimming</li> <li>• Make use of substrates that can be disposed sustainably/ recycled</li> <li>• Make use of eco-friendly electronics/systems for the production and printing of the packaging</li> <li>• Purchase the most energy efficient printing equipment</li> </ul>	4	<b>Accept:</b> Environmentally friendly energy sources used for print machinery

[END OF MARKING INSTRUCTIONS]