



National  
Qualifications  
2022

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# **2022 Graphic Communication**

## **Advanced Higher**

### **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.

Question			Expected response	Max mark	Additional guidance
1.	(a)		<ul style="list-style-type: none"> <li>The gold (colour/texture) indicates luxury</li> <li>the camera and/or film graphics link to the golden age of film</li> <li>Black and gold colour scheme creates contrast to create an eye-catching layout</li> <li>Gold/glitter textures contrasts with the flat solid colour background</li> <li>'Embossed effect' camera (front) in contrast with flat text/camera (back)</li> <li>the title/logo '50th' links to the anniversary celebration</li> <li>the highlight on the embossed logo suggests gloss texture, the flash bar indicates glitter texture, the black logo on the front suggests matt</li> <li>the use of a san-serif font indicates the invitation is modern/contemporary</li> </ul>	4	<p>Accept:</p> <ul style="list-style-type: none"> <li>Contrasting sizes of typeface on the front side emphasises the words 'Anniversary', 'Golden', '50<sup>th</sup>' linking to the celebration.</li> <li>Outlined text contrasts with solid fill text.</li> <li>Angled A/E in the word's anniversary/ events contrast with regular text style.</li> </ul> <p>Any other acceptable answer that relates the invitation to the design brief.</p>
	(b)		<p>Pantone reference</p> <ul style="list-style-type: none"> <li>Ensures colour consistency or colour matching is achieved between the DTP, design and printed document</li> <li>To ensure the printed colours are the same as the pantone code/ reference</li> <li>the spot colour or the gold colour, in particular, must have a pantone code/reference</li> </ul> <p>Calendaring</p> <ul style="list-style-type: none"> <li>makes sure the paper is smooth where it is required</li> <li>to ensure the glossy finish in certain areas</li> </ul> <p>Duplexing</p> <ul style="list-style-type: none"> <li>necessary for double sided printing</li> <li>Ensures accurate alignment/ imposition of content on both sides of the invitation</li> </ul> <p>Paper weight</p> <ul style="list-style-type: none"> <li>Heavier paper weight will make the invitation feel more luxurious/higher quality</li> <li>Only the correct paper weight will allow the emboss feature to show up</li> </ul>	4	<p>Accept:</p> <ul style="list-style-type: none"> <li>Paperweight must be appropriate for the printing technique.</li> </ul>

Question			Expected response	Max mark	Additional guidance
2.	(a)		<ul style="list-style-type: none"> <li>Circle Profile sketch used to generate helix 6mm and position of axis-29mm (1 mark)</li> <li>Helix: 4 revolutions and pitch 20mm or height 80mm. (1 mark)</li> <li>12° taper applied to helix. (1 mark) - not just 12°</li> <li>Project geometry of helix profile circle(s) or redraw circle. (1 mark)</li> <li>Horizontal path profile for extrude along a path . (1 mark) *</li> <li>Vertical path profile for extrude along a path (1 mark) *</li> <li>Extrude along a path command. (1 mark) **</li> <li>Shell to 0.5mm removing top and bottom faces. (1 mark) ***</li> </ul>	8	<p>* As long as 4 out of 6 dimensions are included across both paths 2 marks can awarded (i.e. could be a 3D sketch and include both horizontal and vertical dimensions)</p> <p>** Mark for extrude along a path can be awarded if candidates uses a series of revolve and extrude commands provided each radius and linear dimension is included.</p> <p>*** Mark for shell can be awarded where the candidate has included wall thickness within profile sketch (ie both diameter 5 and 6 circles are included).</p>
	(b)		<ul style="list-style-type: none"> <li>Apply a freeform mesh to the cup body. (1 mark)</li> <li>Apply an axis of symmetry. (1 mark)</li> <li>Description of using points/ nodes/edges/faces to alter the shape of the body to include the grip indentations. (1 mark)</li> <li>Convert free form mesh back to the solid model. (1 mark)</li> </ul>	4	<p>Accept:</p> <p>‘Line’ rather than ‘edge’ provided candidate shows understanding of the manipulation process.</p>
3.	(a)		<ul style="list-style-type: none"> <li>Allows the customer to see the design on each face/panel of the jersey</li> <li>Shows all the areas that can have a customised designed</li> <li>Shows the long and short sleeve options</li> </ul>	1	<p>Accept:</p> <p>Shows (proportionally) each panel of the jersey the correct size.</p>
	(b)		<ul style="list-style-type: none"> <li>the higher the ppi the greater the accuracy in representing the design</li> <li>A low ppi may cause defects to be missed during the design phase</li> <li>Modern screens are high ppi to allow for better designing and viewing</li> <li>DPI 300 and above will show to the human eye the desired quality printed item. *</li> <li>Less than 300 dpi is a poorer quality printed item *</li> </ul>	2	<p>No marks awarded for simply defining dpi or ppi without explaining its relevance.</p> <p>* in this instance only accept 150 dpi as this is the required resolution (as in art work guidelines).</p> <p>Accept: PPI for screen and dpi for print for 1 mark max.</p>

Question			Expected response	Max mark	Additional guidance
3.	(c)		<p>Image Resolution:</p> <ul style="list-style-type: none"> <li>• 150 dpi (in this example) is the minimum required resolution to ensure the correct print quality</li> <li>• High resolution or vector files can be scaled without loss of resolution</li> <li>• The resolution must be clear enough to check the design on screen</li> </ul> <p>File types</p> <ul style="list-style-type: none"> <li>• JPEG allows the company to reproduce photographic images: this is a smaller file size than other types but still has the required quality for images of photos</li> <li>• TIF has the advantage of lossless compression, transparency and allows different layers within an image</li> <li>• SVG or other vector file for logos etc... so that these can be scaled without loss of quality</li> <li>• EPS or other suitable vector file for text</li> <li>• AI for the logo to ensure scalability/high quality at different sizes</li> </ul> <p>Colour space:</p> <ul style="list-style-type: none"> <li>• CYMK is preferable as it is used for print</li> <li>• the company will accept RGB as customers may only be seeing colours on screen. The company will then convert these to CYMK for printing</li> <li>• Pantone colours will be useful because the company will check the design against the pantone colours to ensure correct matching</li> </ul>	8	<p>Candidates can achieve full marks by mentioning 8 valid points from any category (resolution, file types, colour space, CAD/CAM).</p> <p>A simple statement will not gain marks as an explain response is required.</p> <p>Only accept a PNG (file types response) if the candidate states it will need to be converted to a PDF or vector file for printing. PNG is not generally a suitable file type for printing.</p> <p>Only accept answers that relate to file types mentioned in the print guidelines.</p> <p>Accept:</p> <ul style="list-style-type: none"> <li>- pdf files help the company because they can be easily opened and are small file sizes for storage/downloading.</li> <li>- The colour chart can help the company because it ensures printing accuracy and shows customer what to expect / reduces likelihood of customer complaints.</li> <li>- 'Converting all fonts to outlines' ensures the company will be able to print any text (independent of the original text file)</li> </ul>

Question			Expected response	Max mark	Additional guidance
3.	(c)		(continued)		
			<p>Cutting out the jersey:</p> <ul style="list-style-type: none"> <li>• .DXF or .AI, .EPS and .PDF files can be read by most fabric cutting machines/CADCAM machines</li> <li>• the company has made clear where the graphics could be placed so the jerseys panels fits together correctly</li> <li>• The development can be used to check the client design is continuous across the stitched panels</li> </ul>		

Question			Expected response	Max mark	Additional guidance
3.	(d)		<p>Screen printing disadvantages in this context</p> <ul style="list-style-type: none"> <li>• Screen printing would struggle with gradient fills and photographic images that consumers may specify</li> <li>• Screen printing is unlikely to be compatible with specialist fabrics (stretchable, breathable etc)</li> <li>• Screen printing limits you to one colour at a time slowing down the process time</li> <li>• Screen printing ink sits on the surface of the material so it could fade over time</li> </ul>	3	<p>Accept:</p> <p>Higher cost/slower production with justification eg (slower process due limited automation/single colour print cycles/customised designs needing different screens).</p>
	(e)		<p>mpeg</p> <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>• 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> </ul> <p>3gp</p> <ul style="list-style-type: none"> <li>• Can be viewed on mobile devices</li> <li>• Quicker to upload 3gp for sharing</li> <li>• Quicker to download 3gp files than the equivalent mpeg</li> <li>• It is compatible with a wide range of devices/hardware/software</li> <li>• It can contain text data in an editable format</li> </ul>	2	<p>Can only accept one response related to compatibility ie either for mpeg or 3gp.</p> <p>Repeated answers relevant to mpeg and 3gp will only receive a maximum of 1 mark.</p>

Question			Expected response	Max mark	Additional guidance
4.	(a)		<p>Illustration techniques in image:</p> <p>Texture Mapping</p> <ul style="list-style-type: none"> <li>The texture on the brick wall has been scaled appropriately for the environment</li> </ul> <p>Bump Mapping</p> <ul style="list-style-type: none"> <li>Brickwork on rear wall has applied bump mapping to enhance the realism, texture and depth of the brick work.</li> </ul> <p>Reflection</p> <ul style="list-style-type: none"> <li>Reflective surfaces add realism to the material by reflecting the scene or individual elements features within the scene (visible on the floor)</li> </ul> <p>Specularity</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 (visible on desk lights)</li> </ul> <p>Ambience</p> <ul style="list-style-type: none"> <li>Ambient mood/feeling produced by light/colour schemes to create white walls and natural light and open plan create a positive ambience</li> </ul> <p>Volumetrics</p> <ul style="list-style-type: none"> <li>Inclusion of air-born particles (for example dust) within the volume of room (visible in the ceiling light beams)</li> </ul>	6	<p>Accept:</p> <ul style="list-style-type: none"> <li>any answer that shows understanding of a relevant technique and can be clearly identified in the image</li> <li>‘Applying a decal’ or ‘Decal’ as it is relevant to the creation of this illustration: creating a realistic Image on the computer Screen</li> <li>‘materials’ or ‘applying materials’. Appearance of materials applied to back wall, furniture, flooring etc. enhances the realism of the sited environment</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>
	(b)		<ul style="list-style-type: none"> <li>Provides a greater range of luminosity than standard imaging techniques</li> <li>Layers up/combines rendered images to create the highest quality and most realistic lighting</li> <li>Creates reactive lighting to ensure scenes are illuminated as the eye would interpret them</li> </ul>	2	



Question			Expected response	Max mark	Additional guidance
4.	(c)		<p><b>Directional Lighting</b></p> <ul style="list-style-type: none"> <li>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>Used to produce an overall light with no specific direction to ensure all areas have general illumination</li> </ul> <p><b>Spotlight</b></p> <ul style="list-style-type: none"> <li>Used to show how the circular hanging lights would illuminate the area immediately below the light or produce a cone of light</li> </ul> <p><b>Area Light</b></p> <ul style="list-style-type: none"> <li>Used to create an area of directional light emitting from the computer monitors</li> </ul> <p><b>Image Based Lighting/IBL</b></p> <ul style="list-style-type: none"> <li>Used to simulate how the surrounding environment effects the lighting of objects</li> </ul>	6	<p>1 mark for the type of light 1 mark for the description.</p> <p>Accept: Point Light</p> <ul style="list-style-type: none"> <li>Used within the ceiling lamps to create a multi-directional light (in this case the light is inhibited by the lamp shade.</li> </ul> <p>Only accept: Point light as an alternative to Spotlight.</p>

Question			Expected response	Max mark	Additional guidance
5.	(a)		Structural Engineer <ul style="list-style-type: none"> <li>To show the areas of stress/ maximum forces (and determine if this is acceptable)</li> <li>To determine if modifications are required in terms of the shape of the design, the material, the joining method, number of or nature of supports on the bridge</li> </ul>	2	Accept: <ul style="list-style-type: none"> <li>'weak sections' instead of areas of high stress.</li> <li>to see if the bridge with withstand the maximum weight of the traffic.</li> </ul>
	(b)		Topographical survey <ul style="list-style-type: none"> <li>It would determine the height/ slope of the land/contours around the junction so that the bridge fits into the landscape and/or determine the earth moving requirements</li> <li>To determine the position of physical landscape features (including surface water features) for accurate modelling/correct choice of modelling materials</li> <li>The model maker would then scale this data to produce an accurate scale model</li> </ul>	2	Accept: <ul style="list-style-type: none"> <li>it will ensure the ends of the bridge are at suitable height.</li> <li>it will ensure the correct slope of the roads connected to the bridge.</li> </ul>
	(c)		Motion tweening <ul style="list-style-type: none"> <li>Ensures the cars (animated vehicles) follow a predefined path</li> <li>Generation of in-between frames or only need to define start and end frames to speed up the process</li> <li>Frame rate can be altered to represent changes in speed of traffic (when there are traffic jams or when all cars are at their speed limit)</li> <li>Can be easily edited for example increase/decrease the number of vehicles/change the path/add new characters (cars, busses etc)</li> <li>Allows multiple objects can be animated at the same time</li> </ul>	3	Accept: <ul style="list-style-type: none"> <li>Can be controlled, edited to give the smoothness, realism required for its purpose.</li> <li>phrases 'easy animation technique' or 'saves time' or 'reduces costs' with suitable justification.</li> </ul>

Question			Expected response	Max mark	Additional guidance
6.	(a)		<p>Easy Navigation</p> <ul style="list-style-type: none"> <li>so that a wide range of users/ all ages can understand the system</li> <li>so that customers can order their food quickly/with minimal fuss</li> <li>so that those with a variety of specific requirements (visually impaired) or those lacking ICT experience/skills are still able to use it</li> <li>the minimal use of words/ clear shapes/easy to understand layout, will help to across language barriers *</li> <li>An easy to navigate screen will enhance customer experience/ create customer loyalty and help staff</li> </ul>	3	<p>* Accept:</p> <ul style="list-style-type: none"> <li>Minimal words/clear shapes/ easy to understand layout will also speeds up the ordering process/(potentially) increases sales.</li> </ul>
	(b)		<p>Focal point</p> <ul style="list-style-type: none"> <li>the wedge shape of the pizza slices or direction of the blue lines between the slices creates a focal point at the centre of the logo</li> </ul> <p>Silhouette</p> <ul style="list-style-type: none"> <li>the solid colour fill used for the pizza slices creates a silhouette</li> </ul> <p>Negative space</p> <ul style="list-style-type: none"> <li>the circles on the pizza slices created by negative space suggest the pizza topping</li> </ul>	3	<p>Accept:</p> <ul style="list-style-type: none"> <li>silhouette of the words 'buy the slice' contrast with the rest of the logo and creates radial balance/creates unity with the radial balance on the interactive screen.</li> </ul>

Question			Expected response	Max mark	Additional guidance
6.	(c)	(i)	<p>Radial balance</p> <ul style="list-style-type: none"> <li>it is used to position the different pizza slice options in a curve or along a curved path making selection easier</li> <li>used to position the words around the logo adding unity to the design and connecting the logo to the layout of the screen</li> <li>the position of the circular buttons creates radial balance around the edge of the pizza and makes these easy to find/ use</li> </ul>	2	<p>Accept:</p> <ul style="list-style-type: none"> <li>there is radial balance in the logo, and this creates unity with other features.</li> <li>radial balance draws eyes to the circular buttons.</li> <li>The circle features are radially balanced and emphasis/link to/ create unity with the shape of the pizza.</li> </ul> <p>Candidates must describe how it enhances the screen not just give the meaning for the term.</p>
		(ii)	<p>Texture</p> <p>the grey stone background texture:</p> <ul style="list-style-type: none"> <li>relates to how the pizza might be made</li> <li>contrasts with/the smooth lettering and images or makes other features stand out</li> <li>contrasts with the texture of the pizzas</li> </ul> <p>the texture of the pizza:</p> <ul style="list-style-type: none"> <li>creates a clear distinction between the different pizzas making selection easier</li> <li>adds realism and attracts the consumers attention</li> <li>creates contrast with the smooth physical surface of the interactive screen</li> </ul>	2	<p>Accept:</p> <p>any two points related to how texture enhances the screen.</p>
	(d)		<ul style="list-style-type: none"> <li>a (customer activated) transition (eg drag or swipe) has been created to move the pizza from A to B (showing the slice has been selected)</li> <li>a new layer/highlight/emboss effect has been added around the beverages button to suggest the button has been pressed</li> <li>layer/shadow/drop shadow has been applied on the pizza slice to create a raised/depth effect.</li> <li>use 'fade' or other transition so 'slide flavour to order a slice' text disappears</li> </ul>	2	<p>Accept:</p> <p>An (motion tween) animation has been activated to move the chilli pizza slice from position in Image A to position in Image B, or a motion tween path will move the pizza slice the required distance.</p> <p>Do not accept:</p> <p>drop shadow, highlight etc. on its own without a proper description.</p>

Question			Expected response	Max mark	Additional guidance
7.	(a)		<p>British Standards errors</p> <ul style="list-style-type: none"> <li>• The surface texture symbol is the wrong way round/reversed</li> <li>• The cutting plane for the stepped section line is missing the thick line where it changes direction</li> <li>• The 3rd angle projection symbol is incorrect, or the first angle projection symbol has been used</li> <li>• +/-0.05mm is too small a tolerance to be applied across the whole kayak.</li> <li>• The centre of gravity/mass symbol in an unrealistic position</li> </ul>	3	<p>Accept:</p> <ul style="list-style-type: none"> <li>- Extension lines touching the product in some cases.</li> <li>- Deck feature not included in named features table.</li> </ul>
	(b)	(i)	<p>Tangent sketch constraint:</p> <ul style="list-style-type: none"> <li>• the R25 arc and R40 arc would need to have the tangent constraint applied to them</li> <li>• the top of the deck and the R25 arc would need a tangent constraint applied to them</li> </ul>	2	<p>Accept 'variable' fillet</p> <ul style="list-style-type: none"> <li>- Candidates must explain how this type of fillet is applied (1 mark) and include relevant dimensions/feature names (1 further mark)</li> </ul> <p>1 mark can be awarded for identifying the tangent constraint between the R25 and the kayak deck.</p>
		(ii)	<p>Irregular fillet:</p> <p>There would be an irregular fillet around the edge of the coaming, changing from the R2 at a defined point to the R6 at a different defined point (and back to R2 at the end).</p>	2	<p>Accept 'variable' rather than irregular fillet.</p> <ul style="list-style-type: none"> <li>- Candidates must explain how this type of fillet is applied (1 mark) and include relevant dimensions/feature names (1 mark).</li> </ul>

Question			Expected response	Max mark	Additional guidance
7.	(c)	(i)	<p>CFD</p> <ul style="list-style-type: none"> <li>• this would show how efficiently hull/shell of the kayak moves through the water</li> <li>• would assist the designer if changes were to be made to the shape/texture of the boat that could improve performance/hydrodynamics</li> </ul>	2	
		(ii)	<p>Motion Capture technology</p> <ul style="list-style-type: none"> <li>• attach reference points (balls) to the kayak and the kayaker to allow movement data to be collected</li> <li>• digitally capture the position of these points as they (kayak and kayaker) move down the course</li> <li>• analysing the data, they can find out the range of movement, speed of the kayak/kayaker at different points on the course</li> </ul>	2	<p>Accept:</p> <p>Any response relating to using the data to improve the design/manoeuvrability of Kayak (eg reducing the weight, changing the position of the coaming).</p> <p>The question states motion capture will be used in the 'design and testing of the Kayak' therefore do not accept answers related to making a promotional video.</p>

[END OF MARKING INSTRUCTIONS]