National Qualifications 2019

2019 Graphic Communication

Advanced Higher

Finalised Marking Instructions

These marking instructions have been prepared by examination teams for use by SQA appointed markers when marking external course assessments.

General marking principles for Advanced Higher Graphic Communication

This information is provided to help you understand the general principles you must apply when marking candidate responses to questions in this paper. These principles must be read in conjunction with the detailed marking instructions, which identify the key features required in candidate responses.

(a) Marks for each candidate response must **always** be assigned in line with these general marking principles and the detailed marking instructions for this assessment.

(b) Marking should always be positive. This means that, for each candidate response, marks are accumulated for the demonstration of relevant skills, knowledge and understanding: they are not deducted from a maximum on the basis of errors or omissions.

(c) If a specific 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.

(d) For each candidate response, the following provides an overview of the marking principles. Refer to the detailed marking instructions for further guidance on how these principles should be applied.

(i) Questions that ask candidates to **describe**
Candidates must provide a statement or structure of characteristics and/or features. This should be more than an outline or a list. Candidates may refer to, for instance, a concept, experiment, situation, or facts in the context of and appropriate to the question. Candidates will normally be required to make the same number of factual/appropriate points as there are marks available.

(ii) Questions that ask candidates to **explain**
Candidates must generally relate cause and effect and/or make relationships between things clear. These will be related to the context of the question or a specific area within a question.

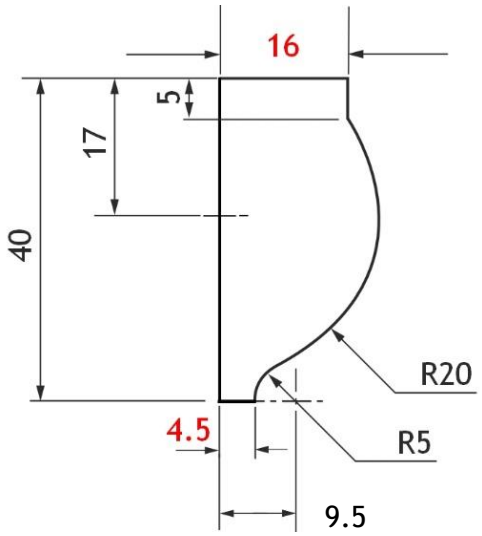
(iii) Questions that ask candidates to **compare**
Candidates must generally demonstrate knowledge and understanding of the similarities and/or differences between, for instance, things, methods, or choices. These will be related to the context of the question or a specific area within a question.

(e) Candidates can respond to any question using text, sketching, annotations or combinations where they prefer. No marks shall be awarded for the quality of sketching. Marking will relate only to the information being conveyed.

Marking instructions for each question

Question			Expected response	Max mark	Additional guidance
1.	(a)		Top down and bottom up modelling • 'Top down' is using dimensions from **existing geometry or parts/models** to generate new parts **or** modeling parts within an **assembly environment**. • 'Bottom up' is modelling each part **separately** and then creating an assembly	**2**	No reference to context required. **1 mark** for clear explanation of 'bottom up'. **1 mark** for clear explanation of 'top down'.
	(b)	(i)	**Tolerance** This dimension is different from the general tolerance because it is a functional dimension and **critical to the assembly and/or function and/or manufacturing accuracy** of supporting leg and the top/bottom.	**1**	The term 'functional' is not essential. Accept Accept allows **interchangeability of parts** or **correct reassembly** of replacement part.
		(ii)	**Datum Face** • Will allow the **dimensions** of the glass container to be **checked/ quality assured** from a single surface. • Allows **parallel dimensioning** to be used **or** this method **eliminates compound errors** possible in chain dimensioning. • Can be used to **check the set up/calibration/accuracy of machines** used in manufacturing the glass container. • Could also be used to check that the egg-timer is **assembled correctly/has the correct dimensions after assembly** eg that the top of the egg timer sits level on the glass container.	**2**	

Question			Expected response	Max mark	Additional guidance
1.	(c)		**Glass Container** • Draw the profile to the correct sizes: **40mm vertical line,16mm horizontal line, 5mm vertical line*,** an **arc R20** and an **arc R5, 4.5mm horizontal line (1 mark)** • **Tangent constraint,** between 2 arcs **(1 mark)** • **Revolve** profile 360° around the **axis** (dimension of distance to axis is needed **or** it is clear the 40mm line has been used to revolve around) **(1 mark)** • Vertical position of the centre of arcs **ie 40mm and 17mm centres (40mm can be inferred from the sketch ie centre point of R5 arc lines up with 4.5mm line : see diagram) (1 mark)** • **Shell** to **wall thickness 1.5mm** removing **top and bottom faces** (shell can also be done after the mirror command) **(1 mark)** • **Mirror** across the **base circle/ horizontal work-plane** to create the other half of the egg timer container **(1 mark).**	**6**	The words underlined **'tangent constraint'**, **'shell'** and **'mirror'** are essential for these respective marks. * this mark can still be awarded without the 5 mm line, provided the candidate has extruded the cylindrical ends after revolving **or** extruding the ring shape after revolving and shelling. **Tangent constraint mark** can also be awarded if - Candidate draws the full profile including R20,R5,R5,R20 arcs and applies a tangent constraint between any of these arcs **Mirror mark** can also be awarded if - Candidate mirrors the profile sketch across a horizontal line before using revolve and shell - Mirror has been used in another way to create the correct final model



Question			Expected response	Max mark	Additional guidance
	(d)		**Supporting Leg** • Correct profile, including dimensions and position (**profile diameter 4mm, distance to axis of revolution 2.5mm and the circle below the surface of the ends**), **(1 mark).** • **HELIX** command, **(1 mark)**. • Number of **revolutions 5 or 6** and total height **78 to 80mm** **or** Number of **revolutions 5 or 6** and **pitch 14.8mm** **or** **Pitch size** and **total height 78 to 80mm (1 mark).** • *Create a circle **10 mm diameter** and **extrude 5mm** to create the ends **(1 mark) (creation of both ends is necessary, modelled separately or created using mirror).** • **Second helix** created by radial array of the original helix at 180 degrees **or** modelled separately (no dimensions needed) **(1 mark)****	**5**	The circle profile used for the helix must be on the vertical plane ie the same as the axis * Second helix could be created by repeating the modelling process: no sizes needed.

Question			Expected response	Max mark	Additional guidance
2.	(a)		• Then select the **number of frames** in the timeline. • Set the **duration** or the **end frame** of the animation. • Set up the **path/tween**. • Adjust the **frame rate** to adjust quality or refine movement.	**3**	
	(b)		• Windows Media Video **(WMV).** • Audio Video Interleave **(AVI).** • Apple QuickTime Movie **(MOV).** • Moving Picture Experts Group **(MPEG).**	**1**	accept **GIF**
	(c)	(i)	• Reaches a **multilingual market.** • Can be **more easily adapted to improve accessibility** (eg add an audio description/relevant subtitles). • **Universally understood** (eg children/the elderly). • Using up to date technologies can **enhance the brand** of the airline which can influence passengers' choices.	**2**	
		(ii)	• Requires **expensive hardware** (screens). • Requires **specialist outsourcing/ skills/technicians.** • Could experience **technical issues.**	**2**	Do not accept: - screen could become damaged - better for the environment.

Question			Expected response	Max mark	Additional guidance
3.	(a)		Silhouette • Silhouette of the bike is **distinctive** and/or **eye-catching** because it is surrounded by whitespace, it is in an unusual location and is dominant due to its size. • The **black silhouette of bike** creates **unity** with the text 'street'/'Sao Paulo' etc' and other black shapes in the graphic. • The **black silhouette of bike** creates **depth** by size relative to the silhouette of the helicopter and buildings. • **Different shapes of silhouette** (the buildings v leafy plants) create **contrast** adding visual interest and impact. Negative Space • Negative space **frames the lower half of the image** and provides and **interesting edge to the design.** • Negative space **introduces another two sporting figures adding interest and content.** • Negative space creates **unity** between the **cloud graphic** and the **white circle graphic.** Balance **radial balance created** by features round the perimeter of the flag or in a circle around the center of the flag. **or** (horizontal) **asymmetrical balance** the colourful **top half** with the black and white **bottom half.** **or** the (vertical) **symmetrical balance** with building and plant images on left and right side. **or** the (horizontal) **symmetrical balance** with similar amounts of white space at the top and bottom halves.	**3**	**Important note** An answer may be relevant to silhouette, negative space and/or balance which is acceptable but no marks should be awarded for repeat responses.

Question			Expected response	Max mark	Additional guidance
	(b)		Vector graphics • **Scalable** to large format. • Shapes and silhouettes on the layout **easily edited** as vectors. • **Small file size** for a PC to process even or to send electronically.	**2**	Do not **accept high quality** or **more compatible** unless it is justified
	(c)	(i)	Raster • **JPEG** • **PNG** • **TIFF**	**1**	Accept 'BMP' file 'EPS' file
		(ii)	**Vector** • Adobe Illustrator file **(AI)** • Scalable Vector Graphic **(SVG).**	**1**	Do not accept 'PDF' Conversion to PDF would occur on completion of the flag not on individual images within the publication.
	(d)	(i)	Method 1, 3D Modelling to create skyline silhouette Any benefits such as • 3D cad allows **for manipulation of the model** orientation. • Much greater **control over the image**: number/location/ dimensions/proportions of buildings. • Lines and **shapes are ideal for creation in CAD**. • Greater control over the **appearance** eg **materials, lighting, colour.**	**2**	
		(ii)	Method 2, creating a sketch and then using a scanner to generate the image Benefits such as • The method gives **100% control over the outline shape/image.** • The sketch **can be easily converted to a vector** format for editing. • **No specialist software** required.	**2**	

Question			Expected response	Max mark	Additional guidance
		(iii)	Method 3, using a 'Shutterstock' image. Benefits such as • This allows for a **wide range of options** as Shutterstock will have thousands of images. • It **saves time** rather than setting up a photo shoot/or creating a 3D model *.	**2**	* 'Saves time' response must be justified Accept - No specialist skills required. - Shutterstock images can be made available as vector graphics.
	(e)	(i)	**Registration marks** • CMYK colours should form **crisp black registration mark/no blurred colours/edges** (colours misaligned suggest an issue with the printing process). • Blurred/offset colours will have an **impact on the perceived quality of the event.**	**2**	Accept - Critical to the legibility of the **text** and therefore the effective communication with the customer.
		(ii)	**Colour calibration** • Using colour calibration bar the colour match between **specified (CYMK) colours or pantone colours** and the **printed colours can be checked.** • Check that conversion from **RBG to CYMK** is accurate. • Check the **density or tint/shade of colours** (using densitometer bar) **can be checked.** • Suitability of **ink drying rates on substrate** can be checked. • Amount of colour **bleed on the substrate** can be checked**.**	**2**	Accept - Can be used to check that the colours on the different merchandise are matching.
	(f)		**Intellectual property** • So **the graphics** are not used **at an inferior quality event.** • So **the graphics** are not used **to produce inferior quality merchandise.** • So that **other companies cannot create inferior copies of the graphics.** • So that **company/image producers** are **paid for the use of their graphics.** • So that the **company's image is protected.**	**3**	Accept - So that the images are exclusively associated with this event.

Question			Expected response	Max mark	Additional guidance
	(g)	(i)	**Screen printing.**	**1**	
		(ii)	Suitability of screen printing • Suitable **type of material** (fabric). • Creates more **vibrant colours** (even on dark backgrounds) than the equivalent digital printing method. • Suitable **type of graphics** (eg silhouettes, solid fill colours). • Suitable for **limited colour range.** • Can print **vectors images** accurately. • Comparatively **low cost printing method .**	**3**	Accept Good for 25+ print runs (as this is likely to be the case at a large sporting event).

Question			Expected response	Max mark	Additional guidance
4.	(a)	(i)	Underground survey	**1**	
		(ii)	• Developer must be aware of the grounds geological **properties/ layers** as it could be prone to subsidence. • Developer must be aware if there is any **previous land use** that will affect construction. • **Rock positions/depths** for the **depth of the foundations.**	**2**	Answer must relate to the **developer** or to information to be **communicated to the homeowner.**
		(iii)	Drainage survey	**1**	
		(iv)	• Developers/site manager knows where **drainage channels should be dug.** • Developers/site manager knows where **access points (man holes) should be positioned.** • Developer can **inform owners** of the **stopcock/ meter position** also accept drain/manhole positions. • Developer can **inform owners** of what (or where) **services enter the property.** • Developer can inform Scottish water of **where house services join network services or where meters are located.**	**2**	Answer must relate to the **developer** or information the developer will communicate **to the homeowner.**
		(v)	Topographical Survey	**1**	
		(vi)	• Shows **contours** so developer knows what earth moving equipment required. • Shows the **position/direction of flow** for **waterways** so developer can **plan drainage** system. • Shows **adjacent land use** so developer can **plan site clearance** and/or **access.** • Shows **local roads** so developer can **plan access routes** and any new infrastructure.	**2**	Answer must relate to the **developer** or to information to be **communicated to the homeowner.** Accept If the land is **appropriate to build on** (eg the slope of the land).

Question			Expected response	Max mark	Additional guidance
	(b)	(i)	**Quantity Surveyor** • Shows the **types of material** (and material properties) for costing purposes. • Shows the **number/types of fixtures** (eg windows and doors) for costing purposes – assuming similar images are available of the other. • Shows **quantities of materials** (which can be worked out from the dimensions on the sketch).	**2**	Repeat responses will not be accepted
		(ii)	**Architectural Technician (AT)** • Mark ups shows how the house would be **altered/changed** so the AT can update the drawings. • Shows positions of **windows and doors** so the AT can check this against the drawing. • Shows **sizes of the building** so the AT can check this against the drawings.	**2**	Repeat responses will not be accepted
		(iii)	**Conservation Body** • Shows some of the **material characteristics/colours** so they are in keeping with the conservation guidelines. • The **materials can be checked** to determine if they are from **sustainable/reclaimed/local/ non-damaging** sources. • Shows **what the materials would look like in combination** to ensure they are in-keeping with surrounding properties. • Shows the **type of house features (eg aluminium windows)** to ensure they are in-keeping with surrounding properties.	**2**	Note that the housing development is within a conservation area. Repeat responses will not be accepted

Question			Expected answer(s)	Max mark	Additional guidance
5.	(a)		• Defines the **position** of different features. • Defines the **proportions/scale** of different features. • Allows a **visual hierarchy or hierarchy of information** to be worked out. • **Defines the standards/style** of **typeface/ image** for all of the pages and subpages. • Allows **different layouts** to be considered/ compared.	**3**	
	(b)		• Vertical **alignment** of text makes information easier to interpret. • **Contrast** of the white turbine against the coloured background. • Solid **colour** fills makes the information clearer. • **Depth** created by use of **smaller and larger turbines.** • **Dominance** created by the large turbine/title text drawing eye to important information. • **Simple shapes** appeals to the young target audience.	**2**	Any other acceptable answer related to design elements and principles Accept - Use of **bright colours** appeals to the younger audience. - The **focal point** created by the cutaway image of the turbine head.
	(c)	(i)	**Accessibility** **3GP**. • This file type can be **accessed on portable devices**/mobile phones. • The **small file size** will also improve accessibility as **it is quicker to download.** **WMV.** • Widely used file type so can be **accessed on the majority of devices** (with easily downloadable convertors it can run on apple devices). • **Small file size/high compression** makes it **ideal for streaming over the web.** • It is **compatible with older version of Microsoft software.**	**2**	**Small file size** will only be accepted for one response.

Question			Expected answer(s)	Max mark	Additional guidance
5.	(c)		**Interactivity** **VRML.** • Allow the audience to **view all available angles** and viewpoints of the model as a virtual experience. • Let the **audience navigate the 3D model/ environment using the keyboard and/or mouse.** • **Audiences can interact with the 3D model/ scene** using zoom, rotate etc. **MPEG** • It is a **more visually interesting** than a static 2D graphic ie JPEG and encourages greater interaction. • User can make **use of video features** skip, choose chapters and/or **select playback options**: SD or HD quality, volume, subtitles etc.	**2**	
	(d)	(i)	**White space** • Solid **colour background** makes the **turbine stand out.** • **Solid colour background** means there is **no other distractions** on the page/**focus is on the turbine.** • **Solid colour/white space contrasts** with the texture in the foreground.	**1**	
		(ii)	**Rule of Thirds** • Centre of Turbine Blades positioned **1/3 way across** the page. • Centre of Turbine Blades positioned **1/3 way down** the page. • Blurred image takes up one 1/3 of the page. **The turbine and sky takes up 2/3 of the page giving it greater emphasis.**	**1**	Accept - **Position** of the turbine **creates a natural focal point**
		(iii)	**Depth of Field** • **Blurred foreground** emphasises the **sharp outline of the turbine.** • The **blurred foreground** makes the **turbine a natural focal point** giving it emphasis.	**1**	

Question			Expected answer(s)	Max mark	Additional guidance
5.	(e)	(i)	**CFD** or **Computational Fluid Dynamics**	**1**	
		(ii)	• Check for efficiency of the turbine at **different wind speeds.** • Check **aerodynamics** and/or flow over the blades. • Check when **critical wind speeds** are reached so the turbine can be shut down. • Allows **testing of modified turbine** (eg different heights or blade lengths).	**2**	
		(iii)	• The effect on the efficiency of **extreme hot/cold or moisture** and/or **accept variations in environmental conditions.** • The **characteristics of the turbine may change over time** eg the surface texture/ aerodynamics of the blade become poorer reducing efficiency. • The **effect of the local topography/land use/natural features** on the airflow. • Assessing **how airflow is affected by neighbouring turbines**.	**2**	

[END OF MARKING INSTRUCTIONS]