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Mark Scheme (Results)

Summer 2013

GCE D&T Graphic Products
(6GR02/01)

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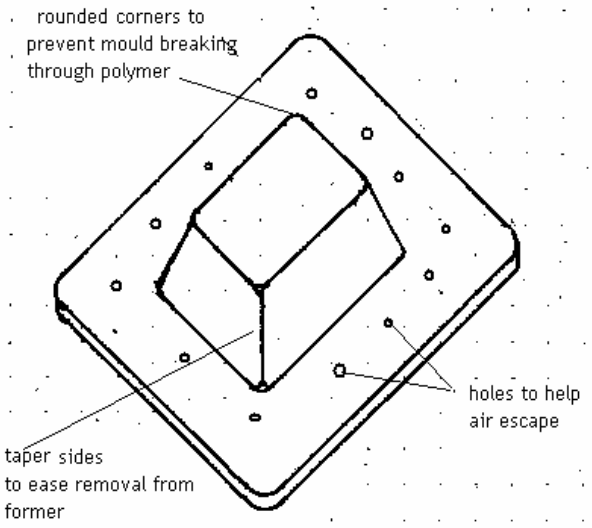
<table>
<tr><th>Question Number</th><th>Answer</th><th>Mark</th></tr>
<tr><td>1(a)</td><td>Any one of the following from:

• Polystyrene / HIPS (1)
• Polyvinyl Chloride / PVC (1)
• Acetate / cellulose triacetate (1)
• LDPE (1)
• PET (1)</td><td>(1)</td></tr>
<tr><td>1(b)</td><td>Sketch marks (max 2 marks)
Marks can be awarded for a 2D sketch which shows the expected details.
Basic sketch of cuboid with sloping sides (1)
Detail on sketch ie vent holes /curved edges shown (1)

Annotation marks (max 3 marks)
Smooth/tapered sides to allow for easy removal of former (1)
Smooth sides give a high quality finish. (1)
Rounded edges to prevent former puncturing the blister. (1)
Holes in base to help air escape. (1)
 

(2x1 for sketch & 3x1 for annotation)</td><td>(5)</td></tr>
<tr><td>1(c) (i)</td><td>Any two shown in <u>Risk</u> column of table:
(2x1)</td><td>(2)</td></tr>
<tr><td>1(c) (ii)</td><td>The response MUST be correct to the risk.

<table>
<tr><th>Hazard</th><th>Risk</th><th>People at risk</th><th>Control measure</th></tr>
<tr><td rowspan="2">Using a disc sander</td><td>Any risk associated with dust particles (1)</td><td rowspan="2">• User.
• People in immediate area</td><td>• Face mask (1)
• Goggles (1)
• Dust extractor (1)</td></tr>
<tr><td>Table not set correctly (1)</td><td>• Check machine before use (1)
• Get technician to reset table (1)
• Guards set at correct distance (1)

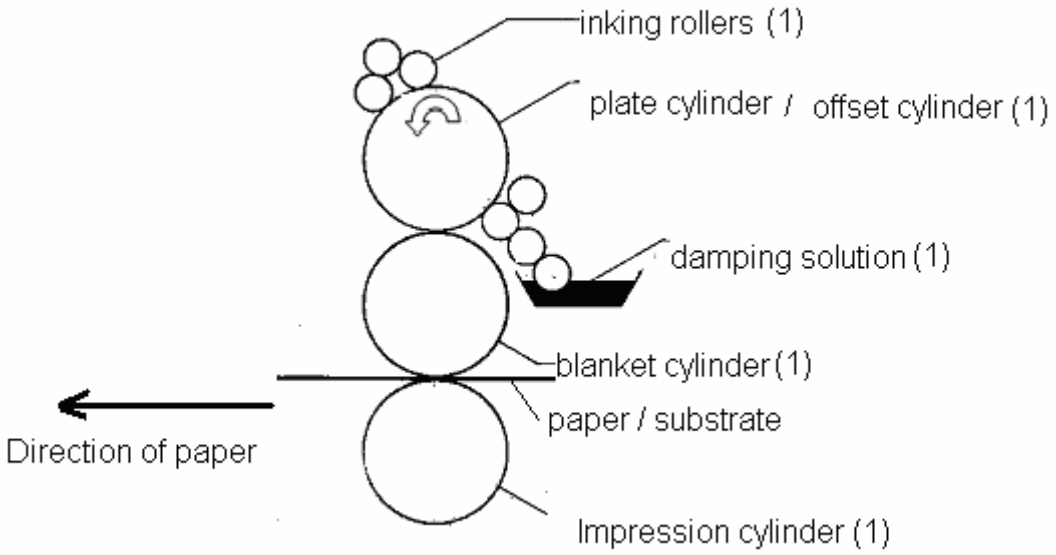
_____</td></tr>
</table></td><td></td></tr>
</table>

		Trapping / grazing/ cutting/ abrasion to fingers **(1)** _____ Entanglement of hair/clothing **(1)**		• Training in safe use**(1)** • Safe areas/floor markings **(1)** • Guards set at correct distance **(1)** _____ • Secure loose clothing/ tie long hair back **(1)** • PPE **(1)**

Do not accept gloves appropriate PPE for using a sanding disc?

(2x1)

(2)

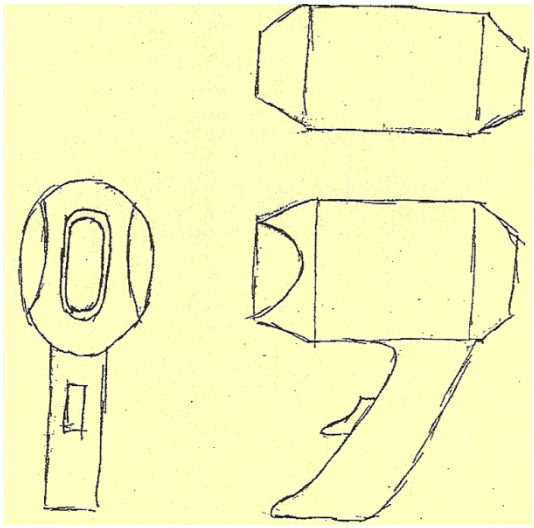
	Total for question	**10**
Question Number	Answer	Mark
2(a)(i)	**One** mark per correct label on drawing.  **(5x1)**	**(5)**
2(a)(ii)	Anticlockwise rotation **(1)** **(1x1)**	**(1)**
2(b)	Any **four** points of the following • One printing plate for each colour (CMYK). **(1)** • Flexible plates fixed onto cylinders / plates. **(1)**	

	• Ink distributed onto plates through a series of rollers.**(1)** • Plates dampened by water. **(1)** • Based on the repulsion of oil and water. **(1)** • The non-printing area attracts a water-based film. **(1)** • This keeps the non-printing areas ink-free. **(1)** • The image to be printed obtains ink from ink roller. **(1)** • Inked image is transferred from a plate. **(1)** • Onto The (rubber) blanket cylinder. **(1)** • Then onto the printing surface. **(1)** **(4x1)**	**(4)**
	Total for question	**10**

Question Number	Answer	Mark
3(a)	**Three sections only to be addressed** A maximum of two marks can be awarded per section. Statements must be related to the correct heading, otherwise no marks awardable. If no heading is given, award marks for the appropriate section. **Wet End Section** • Wood pulp diluted with water/ to form slurry. **(1)** • Slurry put/pumped through slit/slice **(1)** • Onto moving gauze bed. **(1)** • Belt vibrated water drained off **(1)** • Suction box under belt to help remove water**. (1)** • Allows fibres to interweave. **(1)** **Press Section** • Rollers press out excess water from the pulp. **(1)** • Pulp stretched to form rough paper. **(1)** • Rollers smooth / flatten out pulp. **(1)** • Thickness of board / paper determined at this stage **(1)** • By adjusting roller gap**. (1)** **Dryer Section** • Steam/ heated rollers used **(1)** • To remove moisture. **(1)** • Sizing agents / starches / resins added **(1)** • This enhances the paper properties. **(1)** **Calendar Section** • Paper/card fed through series of rollers **(1)** • To smooth paper. **(1)** • To make uniform thickness. **(1)** • Relief can be added to paper at this stage**. (1)** **(2x1) (2x1) (2x1)**	**(6)**

3(b)	Any **four** points of the following: Note: Statements must be related to the correct heading, otherwise no marks awardable. **Chemical pulp** • Logs (hardwood & softwood) are debarked **(1)** • Logs are cut into (20mm) chips **(1)** • Chips are pounded into fragments **(1)** • Chips are screened (for size) **(1)** • Pulp treated with acid or alkaline / bleach **(1)** • Treated in tanks / digesters under pressure. **(1)** • Lignin dissolved away **(1)** • Fibres filtered out **(1)** • Fibres washed **(1)** **Mechanical pulp** • Logs / coniferous wood saturated with water **(1)** • Logs are debarked **(1)** • Logs ground down to form a pulp **(1)** • Pieces of 1-2 mm produced **(1)** • Heat can be used to help improve process. **(1)** • Larger pieces are re-circulated **(1)** • Pulp is bleached **(1)** **(4x1)**	**(4)**
	Total for question	**10**

Question Number	Answer	Mark
4(a)	• One hand on a switch **(1)** other hand holding the guard in position **(1)** • Two switches **(1)** pushed simultaneously **(1)** • Full guards **(1)** protecting cutting blades / moving parts **(1)** • Light beam **(1)** which stops operation if the beam is broken **(1)** • Emergency stop button **(1)** to isolate power/stop machine quickly **(1)** **(2x1)**	**(2)**
4(b)	• Optical sensor **(1)** monitors the position of the work **(1)** • Data feed back to a computer **(1)** which aligns the die with the crop marks. **(1)** • Multiple/ Identical nets can be cut **(1)** at speed/ Dies can be reused **(1)** • Unskilled labour can be used **(1)** as operating system very simple/reduced labour cost. **(1)** • Automated/ Much quicker process **(1)** reduces lead times/increase rate of production/ allows continuous production. **(1)** • Process is more accurate **(1)** removing human error **(1)** • Allows for tessellation of nets **(1)** reducing wastage **(1)** • Can cut and score. Crease at the same time **(1)** saving time **(1)** **(2x1)**	**(2)**
4(c)	Any **three** of the following: • Checking for accuracy/tolerance. **(1)** • Checking for safety **(1)** • Checks carried out throughout manufacturing **(1)** • Check could be visual/automated/computerised **(1)** • Testing could be destructive/non-destructive **(1)** • Against the specification **(1)** • So that the product meets expectations. **(1)** **(3x1)**	**(3)**
4(d)	Any **three** of the following: • Quality of components monitored by quality control checks. **(1)** • The implementation of quality control checks **(1)** • Applied at every stage of design & manufacture. **(1)** • To ensure that conforms to the specification. **(1)** • To ensure that the product is fit for purpose. **(1)** • Ensures materials are of the required quality **(1)** • To make identical products with zero faults. **(1)** • Supplies fact based evidence for quality management systems. **(1)** • External QA checks employed (ISO/BS/CE) **(1)** **(3x1)**	**(3)**
	Total for question	**10**

Question Number	Answer	Mark
5(a)	Front view drawn in orthographic projection. **(1)** Plan view drawn in 3rd angle projection in projection to front view. **(1)** End view drawn in 3rd angle projection in projection to front view. **(1)** All views drawn in good proportions. **(1)** Switch shown in correct position on front and end views **(1)** Oval air outlet shown on front and end views **(1)** Correct shape of pistol grip on the front view **(1)**  **(7x1)**	**(7)**
5(b)	Any **three** of the following: • Coating cover pits in paper **(1)** • Giving smooth/ flat surface **(1)** • Range of surface finishes available **(1)** • High gloss/matt/satin/silk **(1)** • Allows for high resolution/high quality outcomes/enhances printing **(1)** • Improves durability/ water resistance of the paper **(1)** **(3x1)**	**(3)**
	Total for question	**10**

Question Number	Answer	Mark
6(a)	**Advantages** **Two** advantages only needed. • Relatively inexpensive **(1)** material/ set up cost. **(1)** • Ideal for binding multiples / single sheets of paper **(1)** without folding paper. **(1)** • Fairly good quality visual appearance **(1)** allowing printed materials to be laid flat. **(1)** • Quicker to put document together **(1)** as can be done in-house. **(1)** • Pages can be added after binding **(1)** by opening comb. **(1)** Suitable for small batch production **(1)** as costs are low **(1)** • Binders can be re-opened **(1)** allowing pages to be added/ removed **(1)** **Disadvantages** • **One** disadvantage only needed • Not durable **(1)** as document tear down perforations. **(1)** • Comb can break **(1)** allowing document to fall apart. **(1)** • Not secure **(1)** as pages can be removed easily / torn out. **(1)** • Difficult to add additional pages **(1)** without using specialist equipment **(1)** **(2x1) (2x1) (2x1)**	**(6)**
6(b)	• Position of staples **(1)** means that cannot lay printed materials flat **(1)** • Lower quality **(1)** as poor visual appearance.**(1)** • Percentage of the page is lost with the staples **(1)** impacting on design of the sheets **(1)** • Spine will get damaged/difficult to read pages **(1)** as the booklet will not lie flat **(1)** **(1x2)**	**(2)**
6(c)	Any **four** of the following: • Radio waves/wireless system to transmit/ store data. **(1)** • System could be active or passive **(1)** • A method of identification using tags. **(1)** • Transmission is two way. **(1)** • The transmitter sends a signal. **(1)** • The transponder receives the signal.**(1)** • The transponder transmits a response signal. **(1)** • Transmitter then receives the signal. **(1)** • Transmitter also known as the reader. **(1)** • Transponder known as tag. **(1)** • Tag is attached to the product. **(1)** • Transmitter identifies position of the tag / product. **(1)** **(4x1)**	**(4)**
	Total for question	**12**

Question Number	Answer	Mark
7	Both Offset Lithography and Gravure Printing MUST be addressed. If only one then max of 6 marks. **Offset Lithography** Advantages • Consistent high image quality. **(1)** • Offset printing produces sharp and clean images and type. **(1)** • Rubber blanket conforms to the texture of the printing surface. **(1)** • Quick and easy production of printing plates. **(1)** • Aluminium printing plates have lower costs **(1)** • Longer printing plate life than on direct litho presses because there is no direct contact between the plate and the printing surface. **(1)** • Can exceed run lengths of a million impressions. **(1)** • Economical method to produce high quality printing in commercial printing quantities. **(1)** • More suitable than Gravure for batch production **(1)** Disadvantages • Slightly inferior image quality compared to rotogravure or photogravure printing. **(1)** • Anodized aluminium printing plates can become sensitive. **(1)** • Printing deteriorates and prints in non-image/background areas when developed plates are not cared for properly. **(1)** • Takes time to produce plates and printing press setup. **(1)** • Not suitable for small quantity printing jobs. **(1)** **Gravure Printing** Advantages • Ideal for long runs. **(1)** • Best for a variety of tonal ranges.**(1)** • Best for high quality commercial printing. **(1)** • Colour is more consistent. **(1)** • Gravure cylinders last much longer. **(1)** • Inks dry immediately. **(1)** Disadvantages • Printing plates are more expensive. **(1)** • Registration not as good as offset process. **(1)** • Solvent inks give off much higher VOC's. **(1)** • Water based inks do not print as well as solvent based inks. **(1)** **MODEL RESPONSE** **Offset Lithography produces a consistently high quality image (1) with sharp and clear texts (1) although not as sharp as Gravure (1); which is good for images with a variety of tonal ranges (1). In Gravure the colour is more consistent (1). Gravure is good for long prints runs (1) but it is expensive to set up due to copper being used for printing plates (1). Lithography would be more economical for longer length print runs (1).** **(8x1)**	**(8)**
	Total for question	**8**

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