2011 Computing

Intermediate 2

Finalised Marking Instructions

	SECTION I Attempt ALL questions in this section	Marking guidelines
1.	Arrange the following *memory capacities* into order from the smallest to the biggest. **Terabyte Kilobyte Megabyte**	Kilobyte**,** Megabyte, Terabyte **1 mark**
2.	State **one** method of spreading a computer virus.	• E-Mail • Opening e-mail attachments • Opening e-mail messages • Using alien disks (Backing Storage) • Opening web pages • Downloading files from the Internet **1 mark (any one)**
3.	Name the part of the processor where data is stored temporarily.	Registers **1 mark**
4.	Maria uses both a laptop and a palmtop computer to store data for her business. State **one** *input device* that you would find on a laptop but not on a palmtop.	• Touchpad • Trackpad • keyboard **1 mark (any one)**
5.	State **one** *standard file format* that could be used to save a word processed file.	• Text • ASCII • RTF **1 mark (any one)**
6.	Convert the binary number 11011 into a decimal number.	27 **1 mark**
7.	Name **one** *input device* that could be used to capture a graphic.	• Scanner • Digital camera • Web-Cam • Digital Video Camera **1 mark (any one)**
8.	A bank's employee is checking that a computer has enough RAM to load a new software package. Name the document produced with the software that could help the employee.	Technical guide **1 mark**

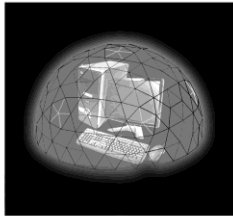| 9.	Macros can set up when using applications. Describe **one** method of creating and using a macro.	A series of commands or actions are recorded **(1 mark)** and then these commands can be executed using one keystroke **(1 mark)** OR Coded using a scripting language **(1 mark)** and resulting commands executed **(1 mark)**. (1 mark for recording of commands and 1 mark for execution of commands) **2 marks**
10.	Normal and extreme data are used to test a computer program. State **one** other type of test data that should be used to test the program.	Exceptional **1 mark**
11.	A program has been created to allow student details to be stored.	
	(a) State the variable type that should be used to store the address of a student.	String **1 mark**
	(b) State **one** method a programmer could use to make the program readable.	- Internal commentary - White space - Modular code - Meaningful variable and subprogram names etc **1 mark (any one)**
12.	The following is a line of pseudocode used to calculate the volume of a cuboid: **volume = height multiplied by length squared** Using an appropriate high level language with which you are familiar, write **program code** for this step of the pseudocode above.	volume = height*(length^2) or volume = height* length**2 (1 mark for multiply and 1 mark for square operator) **2 marks**

[END OF SECTION I]

		SECTION II **Attempt ALL questions in this section**	**Marking guidelines**
13.		Each contestant in the game show "Total Knockout" must compete in five events. A program has been created to calculate the total and average points for each contestant. The pseudocode for part of this programme is shown below: 2.1. loop 5 times 2.2. get event points 2.3. add points to total 2.4. end loop 2.5. evaluate average points 2.6. display total and average points	
	(a)	Name **one other** *design notation* that could have been used.	• Flowchart • Structured diagram **1 mark (any one)**
	(b)	Steps 2.1 and 2.4 are the beginning and the end of a *fixed loop*. Explain why a fixed loop is used here.	• The loop must be carried out a fixed number of times (five times, once for each event). • A conditional loop would only be used if the number of repetitions is not known in advance. **1 mark (any one)**
	(c)	Using a high level language with which you are familiar, write the line of **program code** for step 2.5 of the algorithm.	Average:=total/events; Average:=total/5; Correct variables **(1 mark)** Division sign **(1 mark)** **2 marks**
	(d)	The names of 50 contestants have to be stored. State the data structure that should be used to store all the contestants' names.	Array **1 mark**

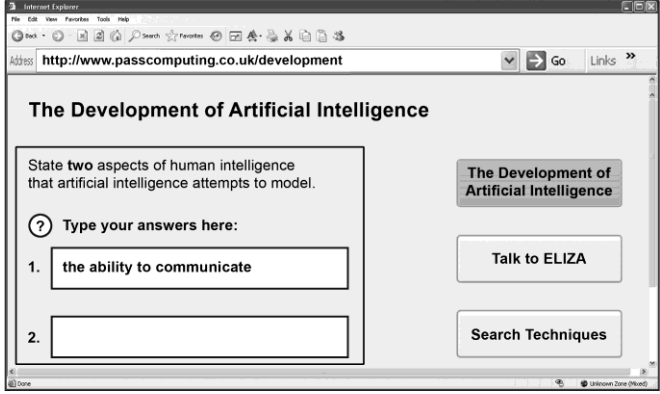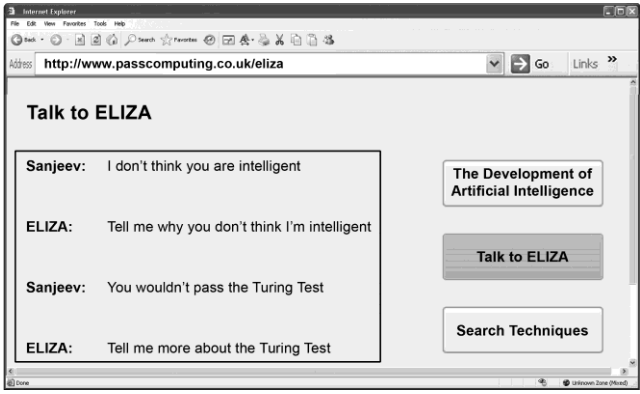|	(e)		The program design is updated to display an error message if the points entered are not in the range 5 to 25 inclusive. Step 2.2 of the algorithm is refined to include the *conditional statement* shown below:
			
			IF (points<5) AND (points >=25)
			THEN
			       display error message
			END IF	

		(i)	Identify **two** mistakes made in the above pseudocode.	Incorrect logical operator – should be OR instead of AND **(1 mark)** Incorrect relational operator – should be >25 instead of >=25 **(1 mark)** **2 marks**
		(ii)	Name the *standard algorithm* that is used to check that values entered are within a correct range.	Input Validation **1 mark**
		(iii)	The program is to be tested using 8 and 21 as examples of *normal* test data for the points. State **two** numbers that should be used for *extreme* test data.	• 5 **(1 mark)** • 25 **(1 mark)** **2 marks**
	(f)		A *text editor* is used at the implementation stage. Describe **one** feature of a text editor.	Allows the user to • Enter code • Edit code • Search and replace • Format program code eg indentation of structures. **1 mark (any one)**
	(g)		Each contestant is given a certificate at the end of the game show. State **one** reason why a laser printer is used to print a certificate for each of the 50 contestants rather than an inkjet printer.	• Faster output of multiple copies (ppm) • Lower running costs **1 mark (any one)**
				(12)

14.	Antiques can be bought and sold on the BargainSearch website.			
	(a)	Kamila is selling her antique vase. She has taken a black and white photograph of the vase. The photograph measures 2 inches by 3 inches and has a resolution of 800 dpi.		
		(i)	Calculate the storage requirements of the photograph in Kilobytes. **Show all working.**	2*3*800*800 = 3840000 bits **(1 mark)** 3840000/8 = 480000 bytes **(1 mark)** 480000/1024 = 468.75 kilobytes **(1 mark)** **(All correct – 3 marks)**
		(ii)	Kamila uploaded her photograph to the website. The camera was connected to her computer system through a USB *interface*. State **one** function of an interface.	Compensates for differences in • Speed • Code • Format • Voltage • Convert from analogue to digital **1 mark (any one)**
	(b)	The reserve price of the vase is £42.50. State how a real number such as 42.50 would be represented in the computer.		• Floating point representation • Mantissa and exponent **1 mark (any one)**

(c)		A computer program is written in a high level programming language to keep track of the bids for each antique.		
	(i)	Name the *standard algorithm* that is required to find the highest bid.	Find maximum **1 mark**	
	(ii)	State **one** advantage of writing the program in a high level language rather than in machine code.	• Easier to understand • Easier to edit • Easier to find errors • Portable **1 mark (any one)**	
	(iii)	The *user interface* for the program is planned on paper. State which stage of the software development process is being carried out.	Design **1 mark**	
	(iv)	The completed program is compiled. Describe how a *compiler* translates a high level language program into machine code.	Compiler translates the whole program into machine code in one operation. **1 mark**	
(d)		Name the legislation that BargainSearch must comply with when storing customer information.	Data Protection Act **1 mark**	
				(10)

15.		RepairIT uses application software to create an advert.	
		RepairIT 21 New Street Dunmaree DN11 6UR www.repairit.co.uk RENEW, REPAIR, UPGRADE Special Offers for July 2011 Operating Systems Vision 2011 NEW **£79.99** Vision 2011 Upgrade **£22.99** *FREE* NOVirus software with every purchase *FREE* network setup!	
	(a)	The advert shown above was created using a graphics package. From this advert, identify **one** object and **one** operation that may have been carried out on that object.	Object – heading text; operation – font, size of text changed. Object – image: operation – copied, pasted, scaled, rotated, flipped. Object **(1 mark)** Operation **(1 mark)** **2 marks**
	(b)	RepairIT sends the advert to their regular customers by e-mail. State **one** feature of e-mail that would allow RepairIT to send the advert to all its customers in one operation.	• Mailing list • Contact List • E-Mailing List • Distribution List **1 mark (any one)**
	(c)	RepairIT is advertising the Vision 2011 *operating system*. State **two** functions of an operating system.	• Saving and loading files on disk • Controls peripherals • Provides HCI for user • Manages loading and execution of programs • Error reporting **2 marks (any two)**

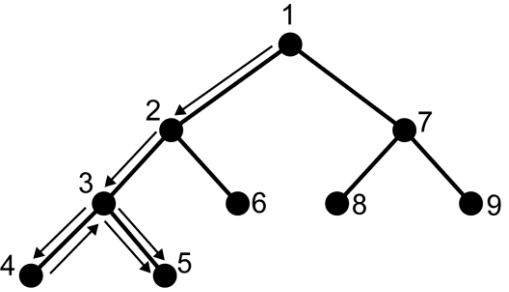|				
	(d)		RepairIT is setting up a *LAN* in the resource centre of the local library.	
		(i)	State **one** advantage of using a LAN instead of stand-alone computers.	• Share peripherals eg printers • Share data • Share programs (multi-user licence) • Backup data more effectively • Control security more effectively • Communications **1 mark (any one)**
		(ii)	One computer is to be used as the *file server*. Describe **one** function of a file server.	• Central store for data and programs that can be accessed by network users • Automatic backup • Backups can be easily managed **1 mark (any one)**
	(e)		RepairIT offers free *anti-virus software* with every purchase. Describe **one** purpose of anti-virus software.	• Detects viruses • Removes viruses • Quarantine Files **1 mark (any one)**
				(8)

[END OF SECTION II]

			SECTION III **Part A − Artificial Intelligence** **Attempt ALL questions in this section.**	**Marking guidelines**
16.			Sanjeev is revising for his artificial intelligence assessment using the website PassComputing. 	
	(a)		Sanjeev selects "The Development of Artificial Intelligence" button. He types "the ability to communicate" as his first answer. State **one other** aspect of human intelligence that artificial intelligence attempts to model.	• Retain knowledge • Solve problems • The ability to learn **1 mark (any one)**
	(b)		Sanjeev selects the "Talk to ELIZA" button. ELIZA was one of the first examples of a natural language processing application. 	
		(i)	ELIZA would not pass the *Turing Test*. Describe the Turing Test.	User communicates with an unseen respondent **(1 mark)**; if he cannot tell if it is a computer or a person using a computer then it is said to be intelligent **(1 mark)**. **2 marks**

		(ii)	Describe **one** reason why ELIZA shows only limited intelligence.	- No memory of previous conversations - Uses set keywords to create responses - Only tests one aspect of intelligence **1 mark (any one)**	
		(iii)	State **one** recent type of language processing application.	- Automated translation - Speech recognition - Chatterbot - Natural language database - Natural language searching **1 mark (any one)**	
	(c)		Sanjeev downloads revision notes. State **one** suitable backing storage device for storing the downloaded files.	- USB flash drive - Hard disk drive - CD-R - CD-RW - DVD-R - DVD-RW **1 mark (any one)**	
					(6)

17.			Mr MacDonald is testing a new robotic farmer called CropMaster. CropMaster sprays crops, removes weeds and picks fruit.	
	(a)	**(i)**	State **one** application of artificial intelligence that CropMaster could use to identify the weeds.	• Computer vision • Pattern matching • Vision Systems **1 mark (any one)**
		(ii)	Describe **one** problem that could affect the accuracy of CropMaster in correctly identifying the weeds.	• Poor lighting • Shading from trees • Weeds very similar to crops • Weeds growing over crops • Dirt on lens **1 mark (any one)**
	(b)		CropMaster uses an *Artificial Neural System* to help forecast the weather so that the farmer can decide when to harvest his crops.	
		(i)	What is an Artificial Neural System?	Electronic model of the human brain **1 mark**
		(ii)	State **one** disadvantage of using an Artificial Neural System for this purpose.	• Expensive to set up • Cannot explain reasoning behind how it made its prediction or decision **1 mark (any one)**
	(c)		After testing CropMaster for two months, Mr MacDonald is asked to comment on how effective the robotic farmer is at identifying weeds. State which stage of the software development process is being carried out.	Evaluation **1 mark**
	(d)		Mr MacDonald also uses an expert system called HealthyHerd to help him diagnose illnesses in his farm animals.	
		(i)	State **two** advantages to the farmer of using the expert system HealthyHerd rather than consulting a vet.	• Expertise always available • Reduced bill • Combines expertise of several experts • Less chance of errors **2 marks (any two)**
		(ii)	State **one** example of a hardware development, other than higher capacity hard drives, that has allowed expert systems to be more effective.	• Increased processing power • Increased memory **1 mark (any one)**
				(8)

18.	CoolCamera offers discounted digital cameras and printers. The knowledge base holds facts and rules about cameras on offer.	
	1 cost(maxpix, 110). *(camera maxpix costs £110)*	
	2 cost(megashoot, 220).	
	3 cost(powershoot, 105).	
	4 cost(photomaster, 225).	
	5 oldmodel(fastpics). *(camera fastpics is an old model)*	
	6 oldmodel(compactcamera).	
	7 megapixels(maxpix, 4). *(camera maxpix has 4 megapixels)*	
	8 megapixels(megashoot, 6).	
	9 megapixels(powershoot, 12).	
	10 megapixels(photomaster, 10).	
	11 free_printer(X) if *(camera X gets a free printer if X is an old model)* oldmodel(X).	
	12 special_deal (X) if *(camera X is a special deal if X is a camera with cost Y and Y is greater than £200)* cost(X, Y) and Y>200.	

	(a)	**(i)**	State the result of the following query: ?cost(megashoot,120).	No or false **1 mark**
		(ii)	State the result of the following query: ?megapixels(X,12).	X = powershoot **1 mark**
	(b)		State the **first** result of the following query: ?free_printer(X).	X = fastpics **1 mark**
	(c)		Using the numbering system to help you, trace how the system will evaluate the query: ?special_deal(X). as far as the **first** solution.	Match at line 12 Subgoal 1 cost(X,Y) Match at line 1 X = maxpix, Y = 110 **1 mark** Subgoal 2 Y>200 **1 mark** Subgoal fails Backtrack to subgoal 1 cost(X,Y) Match at line 2 X = megashoot, Y = 220 **1 mark** Subgoal 2 Y>200 **1 mark** Subgoal succeeds **4 marks**

	(d)	Editing software is free with cameras that have more than 10 megapixels. Use this information to complete the rule: free_software (X)	*free_software (X)* if megapixels (X, Y) **1 mark** and Y>10 **1 mark** **2 marks**
	(e)	The knowledge base was written in a declarative language that uses *depth first search*. Describe what is meant by a depth first search. You may use a diagram to illustrate your answer.	The search keeps extending down the left hand node downwards until it reaches a solution **(1 mark)** or backtracks to an earlier success point **(1 mark)**. **2 marks**
			(11)

		SECTION III **Part B – Computer Networking** **Attempt ALL questions in this section.**	**Marking guidelines**
19.		Eilidh uses a mobile phone, mp3 player and laptop to communicate and play music.	
	(a)	Eilidh speaks to a friend using her mobile phone. Explain why this is an example of *unicast transmission*.	The mobile phone is only communicating with one other device **1 mark**
	(b)	Eilidh also uses her mobile phone to access the World Wide Web. Name the type of software Eilidh is using to access and view web pages on her mobile phone.	Microbrowser **1 mark**
	(c)	Eilidh can connect her mobile phone, mp3 player and laptop wirelessly so that she can share data.	
		(i) Name this type of network.	WPAN **1 mark**
		(ii) Name the hardware that must be installed i each of these devices to allow wireless communication.	Wireless NIC **1 mark**
	(d)	State **one** example of *file transfer* when Eilidh is using her mobile phone, mp3 player or laptop.	• To upload music files onto her mp3 player. • To transfer files between her mobile phone and laptop. • To update contacts etc. • To download apps from the www. **1 mark (any one)**
			(5)

20.			A website has been created for Lowland High School.	
	(a)		Name the stage of the software development process at which the website is created.	Implementation **1 mark**
	(b)		The school requires an *ISP*.	
		(i)	What does ISP stand for?	Internet Service Provider **1 mark**
		(ii)	Explain why the school requires an ISP.	• provide a server space to host the website • to allow connection to the Internet. • Provide E-mail access **1 mark (any one)**
	(c)		The school's website *URL* is: http://www.lowlandhs.sch.uk What does URL stand for?	Uniform Resource Locator **1 mark**
			When the website is loaded, the home page is displayed. The home page is shown below:	

	(d)	Name the part of the computer that stores this home page when it is loaded.	RAM **1 mark**
	(e)	State the method of *navigation* used in this home page.	Hyperlinks **1 mark**
	(f)	The Head Teacher only wants staff to have access to the reports page. State **one** *software security measure* that could be taken to ensure that only staff can access this web page.	Issue usernames and passwords to the staff **1 mark (must have both)**
	(g)	The school sells calendars, pens and diaries via the website. Name the type of *e-commerce* service that the school is providing.	e-sales **1 mark**
	(h)	State **one** reason why the school may require *Internet filtering*.	• To prevent students from accessing inappropriate websites • To prevent social engineering • To allow educational sites only. **1 mark (any one)**
			(9)

21.		UPac is a packaging company which has decided to sell goods online.	
	(a)	State **two** *financial* benefits to UPac of selling goods online. **2 marks (any two, one mark each)**	• Potential for more sales • Less staff to employ in future • Less premises to pay for (rent, electricity etc) • Wider range of customers **(Answers must relate to financial benefits)**
	(b)	Name **one** *type of connection* UPac's computers should use to ensure fast Internet access.	• ADSL • Leased line • Cable modem **1 mark (any one)**
	(c)	Explain why *encryption* is used when sending confidential files across the Internet.	• Data is unreadable if intercepted • For security purposes **1 mark (any one)**
	(d)	Staff are trained on an appropriate code of conduct when using the Internet. Suggest **two** ways in which the staff could break this code of conduct. **2 marks (any two, one mark each)**	• Staff could violate confidentiality and protection of customers' data • Use inappropriate websites during worktime • Abuse other employees (e-mail bullying) etc
	(e)	UPac uses *Domain Name Services* (DNS) to provide *host name resolution* across their network. State **one** benefit to UPac of using host name resolution.	Hosts names are easier to remember than IP adresses **1 mark**
	(f)	UPac has been advised to make a backup of their data.	
		(i) State **two** reasons why UPac need to backup their data. **2 marks (any two, one mark each)**	• Data could be lost. • There may be a fire or flood that could damage data. • Data could be corrupted in transit etc.
		(ii) UPac uses a tape drive to backup their data. Describe a suitable backup strategy that UPac could use. **2 marks (any two, one mark each)**	• Make a backup at least once a day. • Keep backup tapes in safe place etc.
			(11)
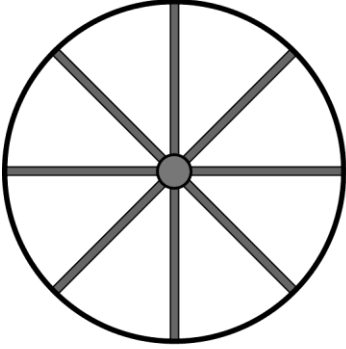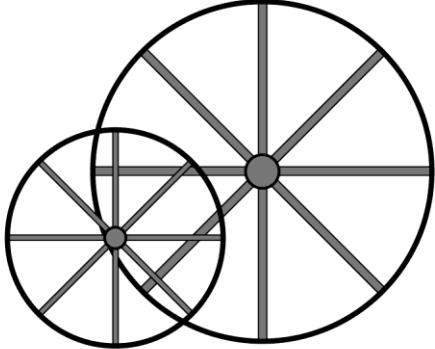
		SECTION III Part C – Multimedia Technology Attempt ALL questions in this section.	Marking guidelines
22.		Murdo has created a *presentation* to demonstrate what it is like to work on a trawler. One of the pages is shown below:	

FISHING BOATS

Trawlers are a type of fishing boat. They use nets to catch fish. Trawlers can cope with high winds and bad weather conditions.

Types of fish	Weather conditions	Fishing nets

Click on a button to activate the video clip

	(a)		Murdo asks his friends to check that the video clips are working properly. Name the stage of the software development process that is being carried out.	Testing **1 mark**
	(b)		Murdo used a *digital camera* to capture the photograph of the boat. Name the **type** of storage used to store this photograph within the camera.	Flash memory **1 mark**
	(c)		Image A has been edited to produce Image B **Image A**	**Image B**
		(i)	State the *image editing* feature that has been used to produce Image B.	Crop **1 mark**

			Image B has been edited to produce Image C.	
			Image B	**Image C**
		(ii)	State the *image editing* feature that has been used to produce Image C.	• Decrease resolution • Resampling **1 mark (any one)**
		(iii)	State the effect on the file size after Image B is edited to produce Image C.	File size is decreased **1 mark**
	Each video clip in the presentation can play for 30 minutes.			
	(d)		State the hardware device that must be installed within the computer before the video can play.	• Graphics card • Video graphics card • Video card **1 mark (any one)**
	(e)		Murdo wants to take his presentation to a college.	
		(i)	State the most appropriate type of *backing storage media* that he should use.	• External hard drive • Flash drive • DVD-R (not CD-R as lengthy video clips are required to be stored) **1 mark (any one)**
		(ii)	Murdo copies his presentation onto one of the computers at the college. Unfortunately the file will not run on the college's computer. State **one** reason why this could have happened.	• The appropriate software/player is not installed • Inadequate RAM • Slower processor (NOT storage) • Incorrect Operating System **1 mark (any one)**

(f)		Murdo wants to create a web page using the information in his presentation. He decides to use a *WYSIWYG editor*.		
	(i)	Name **one** other type of editor Murdo could use.	• Text • HTML **1 mark (any one)**	
	(ii)	State **one** benefit to Murdo of using a WYSIWYG editor to create the web page in this case.	• He can use the objects already created in his presentation without creating again • He can see exactly what the web pages will look like to compare to the presentation pages etc. **1 mark (any one)**	
				(10)

23.			An orchestra is recording a new song using digital technology.	
	(a)		Name **two** hardware devices that the computer must have in order to capture sound.	• Sound card **(1 mark)** • Microphone **(1 mark)** **2 marks**
	(b)		The orchestra play back the recorded song. They notice that the quality of the recording is poor. It is decided to increase the *sampling depth*.	
		(i)	State **one** implication of increasing the sampling depth.	• The file size will increase • Increase the range of values **1 mark (any one)**
		(ii)	Suggest **one** other method that could be used to improve the quality when recording sound.	• Increase the sampling frequency (rate) • Limit background noise **1 mark (any one)**
	(c)		The song is edited using *sound editing software*. Name **one** feature of sound editing software that will allow the song to be edited.	• Effects • Crop • Echo • Tempo • Volume **1 mark (any one)**
	(d)		A musician suggests using a *MIDI keyboard* to create the song. State **one** benefit of using a MIDI keyboard.	• Individual notes or instruments can be edited • No A to D conversion required • Larger choice of instruments **1 mark (any one)**
	(e)		The orchestra use a *digital video camera* to create a video for the song.	
		(i)	State **one** benefit of using a digital video camera rather than a *webcam* to capture this video.	• A digital video camera can have better resolution and/or colour bit depth than a webcam • More features with digital video camera such as zoom, replay etc • Digital video camera can store data on tape, DVD etc • Webcam moved with difficulty/ inflexible **1 mark (any one)**
		(ii)	Name **one** *compressed file format* for storing video.	• MPEG • MP4 • WMV **1 mark**
				(8)

24.		A *vector graphics package* has been used to create the following logos for a bicycle company.	
		Logo A 	**Logo B**
	(a)	State **one** reason why a *bit-mapped package* would **not** be appropriate for creating these logos.	• Only 2 objects are being used (line and circle) • There is not enough detail in the graphics to justify pixel level quality • The logo B is layered **1 mark (any one)**
	(b)	Name **two** features of a vector graphics package that have been used to produce Logo B from Logo A.	• Scaling • Duplication • Layering **2 marks (any two, one mark each)**
	(c)	Name **one** file type that could be used to store vector graphics.	• SVG • VRML (WRL) **1 mark**
	(d)	Name **one** attribute that is unique to a 3D graphic but not a 2D graphic.	• Texture • Rendering **1 mark (any one)**
	(e)	Explain why *compression* is often used with *bit-mapped* graphics.	Bit-mapped graphics produce larger file sizes **1 mark**
	(f)	State the law that protects the bicycle company's logos from being used by another company without their permission.	Copyright, Designs and Patents Act **1 mark**
			(7)

[END OF SECTION III]

[END OF MARKING INSTRUCTIONS]