

**2005 Computing**

**Higher – New Arrangements**

**Finalised Marking Instructions**

**These Marking Instructions have been prepared by Examination Teams for use by SQA Appointed Markers when marking External course Assessments.**

**Section 1 – Systems & Software Development**

<b>1</b>	(a) What is a <i>buffer</i> ?		
	Area of memory (RAM) / storage in receiving device / interface / peripheral <b>(1 Mark)</b> Area of memory is <b>NOT</b> enough, must indicate where the area of memory is located	<b>1 Mark</b>	
	(b) Explain the function of a buffer within a <i>printer interface</i> .		
	Used to temporarily store data ( <b>1 mark</b> ) (in transit) between cpu and printer ( <b>1 mark</b> ) <b>OR</b> Used to temporarily store data ( <b>1 mark</b> ) thereby freeing the cpu to get on with other tasks ( <b>1 mark</b> ). Marks may be transferred between (a) and (b) eg if part (b) has been answered in part (a)	<b>2 Marks</b>	<b>(3 Marks)</b>
<b>2</b>	In <i>floating point notation</i> what defines (i) the range (ii) the precision or accuracy of the numbers stored?		
	(i) exponent (ii) mantissa	<b>1 Mark</b> <b>1 Mark</b>	<b>(2 Marks)</b>
<b>3</b>	Describe how graphics are stored using a <i>bit-mapped</i> package.		
	<ul style="list-style-type: none"> <li>• Each pixel is represented by a (binary) number / bit</li> <li>• Stored as an array of pixels / grid of dots (must give idea of collection of pixels)</li> </ul> <b>(1 mark for each point)</b>	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>

4	Describe the function of a <i>defragmenter</i> .		
	<ul style="list-style-type: none"> <li>• Locate parts of files around disk (file is split up)</li> <li>• Re-order these</li> <li>• Into physically adjacent blocks / contiguous allocation of blocks</li> <li>• Thereby speeding up loading of files / file access / gather free space at end of disc</li> </ul> <p>(1 mark for each point - up to max of 3) Lose a mark if talk about 'memory'</p>	3 x 1 Mark	(3 Marks)
5	A network has a file server and a print server. Name <b>one</b> other type of server that the network may have.		
	- web, multimedia(CD), application, mail , communication, proxy (1 mark) Do not accept file, printer, internet	1 Mark	(1 Mark)
6	(a) What is the number <b>385</b> represented as a binary number?		
	110000001	1 Mark	
	(b) Represent the number <b>-86</b> in <b>8-bit Two's Complement</b> .		
	10101010	1 Mark	(2 Marks)
7	Lambside Council want to network their stand-alone computers. What piece of hardware will need to be present in their computers to allow this to happen?		
	Network Interface card (NIC <b>IS</b> acceptable) Network card / interface card / Ethernet <b>NOT</b> acceptable	1 Mark	(1 Mark)
8	Magnus has created a graphic file at home. The computers at school use a different graphics application. Name a standard file format that the file could be saved in to allow <b>both</b> applications to read the same file.		
	gif, jpeg, tiff, bmp, png / any other valid <b>NOT</b> bitmap/vector	1 Mark	(1 Mark)

9	Give <b>one</b> reason why increasing the amount of cache memory can improve system performance.		
	<ul style="list-style-type: none"> <li>- less fetches required to main memory as more data is cached</li> <li>- pre fetching of more instructions</li> <li>- other valid reason</li> </ul> <b>(1 mark for valid point)</b>	<b>1 Mark</b>	<b>(1 Mark)</b>
10	A <i>software specification</i> is produced at the analysis stage of the software development cycle. State the purpose of this document.		
	Document detailing the exact problem which the client would like a solution to Legal binding contract between parties Details (FULLY describes) the task that the system will perform <b>(1 mark for a suitable description)</b>	<b>1 Mark</b>	<b>(1 Mark)</b>
11	Describe <b>two</b> techniques used by the systems analyst for extracting information at the analysis stage of the software development cycle.		
	Interview – question employees on current methods Observation – go into work place and study current practice, taking notes Study documentation – examine input and output which is required Questionnaire – generate information from many employees by issuing questionnaire <b>(1 mark for each correct description)</b> <b>MUST include a description, stating the name of the technique is NOT enough</b>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
12	An employee with a disability makes use of a specialised input device, however it does not work with a recently installed piece of software. What type of maintenance would be required to alter the software to accept this type of input device? Justify your answer.		
	Adaptive maintenance: the actual function of the software does not need to be changed; it just needs to be altered to accept input from a different source. <b>(1 mark for type of maintenance, 1 mark for justification - justification MUST relate to context)</b>	<b>2x1 Mark</b>	<b>(2 Marks)</b>

13	<i>Pseudocode</i> is a design notation used to design a solution to a problem. (a) Describe what is meant by “pseudocode”.		
	pseudocode : written design uses English terms (to describe structures of program) (1 mark for correct description)	1 Mark	
	(b) Name and describe <b>one</b> other design notation which could be used.		
	flowchart : graphical representation indicating flow of data and control structures structure chart or diagram : graphical representation indicating modular structure and hierarchy used (1 mark for name and 1 mark for correct description)	2 x 1 Mark	(3 Marks)
14	What type of variable can be accessed from anywhere in a program?		
	global variable(1 mark)	1 Mark	(1 Mark)
15	A program has been created to process a list of 50 names. Identify the data structure and data type that could be used to store this list of names within the program.		
	String array, array of strings / char, array of records (1 mark for data structure, 1 mark for data type)	2x1 Mark	(2 Marks)
16	A group of students are working together to create a piece of software for a local playgroup. The lecturer tells them that module libraries can be used. Identify <b>two</b> benefits of using module libraries when constructing code.		
	Pre-tested so no need to go through exhaustive testing Pre-written so no need to write the code The code should be error free and should work correctly (1 mark each for <b>two</b> benefits)	2x1 Mark	(2 Marks)
17	The software in question 16 is to be written in a procedural language. Give <b>one</b> reason why a procedural language has been chosen for this task.		
	Procedural has data types, control structures etc which can be used Modular / use of procedures/functions (any suitable response 1 mark)	1 Mark	(1 Mark)


**Section 2 – Systems & Software Development**

<b>18</b>	Peter runs a photography store. He develops and prints photographs in various formats.		
	(a) He decides to offer a “red-eye” removal service on all digital images. Would he use bit-mapped graphic or vector graphic software? Explain your answer.		
	Bitmapped ( <b>1 mark</b> ) allows individual pixels to be edited <b>OR</b> all digital photographs are bitmapped ( <b>1 mark</b> )	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>
	(b) An image is 4 x 6 inches, has a resolution of 800 dpi and each pixel can display 65536 different colours. Calculate the storage requirements for this image. Express your answer using suitable units. Show <b>ALL</b> working.		
	4 x 6 x 800 x 800 ( <b>1 mark</b> ) x 16 bits ( <b>1 mark</b> )= 245760000 bits ( <b>1 mark</b> ) (30720000 bytes) / 8 / 1024 / 1024 = 29.3 <u>Mb</u> ( <b>1 mark</b> ) (accept 29 <u>Mb</u> ) (total of <b>4 marks</b> ) no working with correct answer ( <b>4 marks</b> )	<b>4 x 1 Mark</b>	<b>(4 Marks)</b>
	(c) Customers bring their image files into the shop on flash cards and CD-R. Peter has to be able to read the files from these different formats. Explain <b>one</b> advantage of each format over the other for the customer.		
	Contents of flash card can be easily edited Flash card has higher capacity than CD-R (currently 1 Gb in most high street outlets) Flash card can be read by printer Flash card doesn't need computer to write to it (as CD does)  CD-R disks are cheaper to buy CD-R cannot be changed once written  Portability with suitable comparison  Any other valid reason well expressed	<b>2 Marks</b>	<b>(2 Marks)</b>

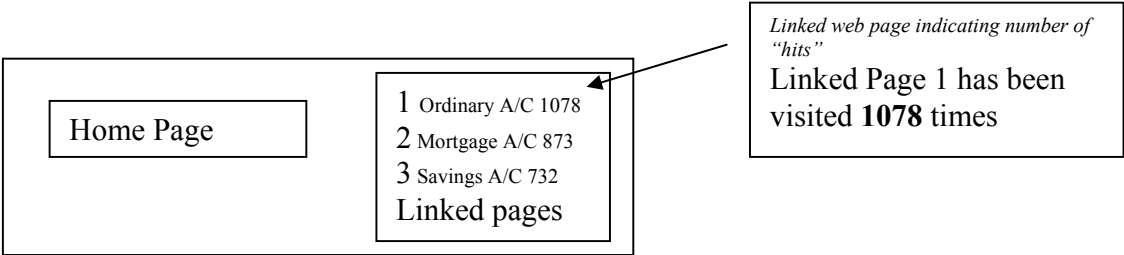
	(d) Peter is replacing his colour inkjet printer. Describe <b>one</b> technical characteristic that the printer should have. Justify your answer.		
	Resolution – high quality photographs required Bit-depth – real life (true) colour required in photographs Print speed – fast to meet demand of many customers Different paper sizes – customers may require varying sizes of photographs Buffer size – larger buffer to free up the CPU when printing many/large photos <b>(1 mark for appropriate characteristic, 1 mark for justification)</b>	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>
			<b>10 Marks</b>

<b>19</b>	Joe is playing a game program on his computer. The processor in Joe's computer uses a 24-bit <i>data bus</i> and a 32-bit <i>address bus</i> . The computer has a <i>USB interface</i> .		
	(a) Calculate the maximum amount of memory which Joe's computer could address. Express your answer using suitable units.		
	$2^{32}$ (1 mark) x 24 bits (1 mark) = 12Gb (1 mark)	3x1 Mark	(3 Marks)
	(b) Two functions of an interface are <i>data format conversion</i> and handling of <i>status signals</i> . Describe both of these functions.		
	Data format conversion – changing one data format used by one device into a suitable form for another device (1 mark) eg analogue to digital, serial to parallel  A suitable example would also be awarded 1 mark  Handling of status signals – signals used to show if a device is ready to send/receive data eg status signal on a printer can show that it is out of paper. (1 mark)	2x1 Mark	(2 Marks)
	(c) Joe read that clock speed and data bus width are both indicators of processor performance. (i) Name <b>two</b> other methods of <b>measuring</b> processor performance. (ii) Describe each of the methods named in part (i)		
	(i) MIPS , FLOPS (MFlops), Application based tests (1 mark for each name) (ii) MIPS – measures how many millions of instructions are processed in a second FLOPS (MFLOPS) - measures how many floating point instructions processed in a second Application based tests / benchmarking – measures certain criteria defined by the Application based test (applies a standard set of tasks) (1 mark for each description)	2 x 1 Mark  2 x 1 Mark	(4 Marks)

	<p><b>(d)</b> A new highest score is to be written to the high score table in the game. This is done by a <i>memory write</i> operation. Describe how a typical processor would carry out a 'memory write' operation. Your answer should mention the buses used at each stage.</p>		
	<p>Address bus is set up with the address to be written to <b>(1 mark)</b>  Data bus is set up with data to be written <b>(1 mark)</b>  Write line (on control bus) is activated. <b>(1 mark)</b>  Place data in appropriate memory location <b>(1 mark)</b>  Incorrect order minus <b>1 mark</b> (unless lines 1 and 2)</p>	<p><b>4x1 Mark</b></p>	<p><b>(4 Marks)</b></p>
			<p><b>13 Marks</b></p>

<b>20</b>	(a) Connaidh buys a new web design creation package. She finds that it will not run on her computer. Suggest two reasons for this.		
	Not enough memory Not enough backing storage OS compatibility Processor does not contain necessary functions to run package Graphics card does not contain necessary functions to run package Plug ins required (1 mark for each reason)	<b>2x1 Mark</b>	<b>(2 Marks)</b>
	(b) This image was created in a vector graphics package. State <b>two</b> operations that could be carried out on the object.		
			
	The object could be - filled with a colour/pattern - line pattern/colour could be altered - line width could be changed - scaled/resized - rotated (1 mark each for two operations)	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>
	(c) Memory management will perform a number of tasks during the loading of a file. Describe <b>one</b> of these tasks.		
Protect other processes Check there is enough free memory Select the area of memory to place the process. (1 mark for valid reason)	<b>1 Mark</b>	<b>(1 Mark)</b>	

	<b>(d)</b> When using the software, Connaidh is worried about breaching the Copyright, Designs and Patents Act. Describe two ways in which she could breach copyright.		
	Inclusion of copyright images on a web page Transfer of music files Run software on 2 or more computers without correct licence <b>(1 mark for each)</b>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
	<b>(e)</b> State <b>two</b> techniques that anti-virus software may use in the <b>detection</b> of a virus.		
	checksum, virus signature, heuristic detection, memory resident monitoring <b>(1 mark for each detection technique)</b>	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>
			<b>9 Marks</b>

<p><b>21.</b></p>	<p>A website has been created by a software house for a bank. A program has been written to count and record the number of times each page linked to the home page is visited or “hit”.</p> 		
	<p><b>(a)</b> The evaluation stage is part of the Software Development Process. How does this evaluation benefit:</p> <p><b>(i)</b> the bank;</p> <p><b>(ii)</b> the project manager of the software house.</p>		
	<p><b>(i)</b> Actual client has an opportunity to ensure that software meets requirements Bank can comment on program’s operation <b>any 1 for 1 mark</b></p> <p><b>(ii)</b> Comments made by client can allow changes to be made Cuts down on (corrective) maintenance later Monitoring the performance of the team <b>any 1 for 1 mark</b></p> <p>As the same reason "to ensure that the program is correct" can apply to both groups then the same answer for parts <b>(i)</b> and <b>(ii)</b> should be allowed</p>	<p><b>1 Mark</b></p> <p><b>1 Mark</b></p>	<p><b>(2 Marks)</b></p>
	<p><b>(b)</b> One of the software house's aims is to ensure a <i>reliable</i> program.</p> <p><b>(i)</b> Explain what the term “reliable” means.</p> <p><b>(ii)</b> Describe fully <b>one</b> method the software house could use to ensure that the program is reliable <b>before</b> the software is released.</p>		
	<p><b>(i)</b> The program produces correct results every time it is run Or The program does not stop when executed due to design faults <b>(1 mark)</b></p> <p><b>(ii)</b> Testing- where all levels of test data is used with all levels of possible users Each stage within the SDP is thoroughly checked and compared with software specification Module Testing, Systematic Testing, Comprehensive Testing <b>(1 mark for FULL description)</b></p>	<p><b>1 Mark</b></p> <p><b>1 Mark</b></p>	<p><b>(2 Marks)</b></p>

	<p><b>(c)</b> The number of hits for each page is stored in an array. Using the example in the diagram above:</p> <p style="text-align: center;">Hits(1) = 1078</p> <p>Using a design notation with which you are familiar, write an algorithm which would find the <b>page</b> with the maximum number of hits within the website.</p>		
	<p>If the algorithm is perfect apart from the candidate ...  ... does not relate the algorithm to the problem (-1 mark)  ... stores the maximum value, rather than the position of the max value (-1 mark)  Therefore a perfect recitation of the standard algorithm (findmax) will gain a total of 4 marks!</p> <p>Max = 1 <span style="float: right;"><b>(1 mark for initialising to first page)</b></span>  For Page=2 to total number of pages <span style="float: right;"><b>(1 mark for boundaries of loop)</b></span>      If hits(page) &gt; hits(max) then <span style="float: right;"><b>(1 mark for correct condition)</b></span>          Max= page <span style="float: right;"><b>(1 mark for correct assignment)</b></span>      End If <span style="float: right;"><b>(1 mark for IF)</b></span>  End for <span style="float: right;"><b>(1 mark for loop)</b></span></p> <p>Note! Algorithm may be more textual...</p> <p>Set Max to 1 <span style="float: right;"><b>(1 mark for initialising to first page)</b></span>  Loop through rest of array <span style="float: right;"><b>(1 mark for boundaries of loop)</b></span>      If hits on page(current) &gt; hits on page(max) then <span style="float: right;"><b>(1 mark for correct condition)</b></span>          Reset max to current page number <span style="float: right;"><b>(1 mark for correct assignment)</b></span>      End If <span style="float: right;"><b>(1 mark for IF)</b></span>  End for <span style="float: right;"><b>(1 mark for loop)</b></span></p>	<b>6x1 Mark</b>	<b>(6 Marks)</b>
	<p><b>(d)</b> Bank employees also need to search and use other websites.  One problem they experience is that web pages take a long time to download.  Describe a possible reason for this problem.</p>		
	<p>Not enough bandwidth is made available <b>(1 mark)</b>  Do NOT accept an answer relating to plug-ins</p>	<b>1 Mark</b>	<b>(1 Mark)</b>
			<b>11 Marks</b>

22.	A computer program to run the registration process at Dunwearie High School is being developed.		
	(a) It is very important that the finished software is <i>robust</i> Explain what the term 'robust' means.		
	Program does not crash and/or stop due to unexpected input (1 mark)	1 Mark	(1 Mark)
	(b) The software uses parameters throughout. These are either call <i>by reference</i> or call <i>by value</i> .  (i) Describe what is meant by the term call 'by reference'. Your answer should refer to the mechanism by which this is achieved. (ii) Describe what is meant by the term call 'by value'. Your answer should refer to the mechanism by which this is achieved. (iii) Give <b>one</b> advantage of using call by value compared with call by reference. Justify your answer.		
	(i) One mark for correct description of pass by reference parameter passed is the actual variable itself (or the address of same) (1 mark), any changes to the parameter persist beyond the call (1mark)  (ii) One mark for correct description of pass by value current value of variable is passed in (1 mark), any changes do not affect the original value (1 mark)  (iii) Changes to the value do not affect the original variable (1 mark), preventing unforeseen changes / preserving the original value for later use in the program (1 mark)	2x1 Mark  2x1 Mark  2x1 Mark	(6 Marks)
		7 Marks	

23.	A mail order company requires a piece of software to be developed that will store and process customer details. The software house is considering creating a specialised program or using an application package which supports scripting.		
	(a) Describe <b>two</b> uses for scripting languages.		
	Allows user to customise package/menus for own needs Allows macros to be created Can be set up to enable complex commands to be carried out easily Manipulation of data at a low level (Any 2, <b>1 mark</b> each) <b>Do not allow “scripts to be created”.</b>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
	(b) The software house decides to use a high level language to create the package. <i>Event-driven</i> and <i>declarative</i> languages could be used.  (i) Describe what “event-driven” and “declarative” language are.  (ii) For each of the languages given in (i), give <b>one</b> reason why that type of language may be suitable for the mail order company’s purpose		
	(i) Declarative – where a knowledge base of facts and rules is set up and can be queried Event driven – where objects such as buttons trigger the execution of code ( <b>1 mark</b> each)  (ii) Declarative – searches can be carried out through queries, without additional coding Event driven – could be set up for easy data entry where data operator just clicked on buttons to enter new records etc (Must link to problem, <b>1 mark</b> each)	<b>2x1 Mark</b>  <b>2x1 Mark</b>	<b>(4 marks)</b>
	(c)The programmers use both a <i>compiler</i> and <i>interpreter</i> when constructing the code.  (i) Why would an interpreter be used when developing the software?  (ii) Explain in terms of <i>efficiency</i> the difference between using a compiler compared with an interpreter when translating code related to the pseudocode below.  1. loop 300 times 2. ask user for name 3. store name in array 4. end loop		

	<p>(i) As an interpreter translates line by line coding errors can be pinpointed and dealt with quickly able to run partial code (or code with errors in it) able to identify syntax errors as they are typed <b>1 mark</b> for any suitable two <b>Your answer should include processor time and memory usage.</b></p> <p>(ii) Using a compiler the loop would only need to be translated once. The compiler does not need to be in RAM when the code is being executed as the object code (machine code) is created. This frees up RAM &amp; takes up less processing power as code does not need to be translated again when executed. <b>(1 mark</b> for RAM and <b>1 mark</b> for processor descriptions for compiler)</p> <p>Using an interpreter the loop would need to be translated every time the loop was executed. The interpreter would be resident in RAM during translation/execution and every time the code was executed the loop would need to be translated every time (300), thus taking up processor time. <b>(1 mark</b> for RAM and <b>1 mark</b> for processor descriptions for interpreter)</p> <p>Answer must make two clear points - one related to memory the other to processor time. Whilst the comparison may be implicit the answer must be in context.</p>	<p><b>2x1 Mark</b></p> <p><b>2x1 Mark</b></p>	<p><b>(4 Marks)</b></p>
			<p><b>10 Marks</b></p>



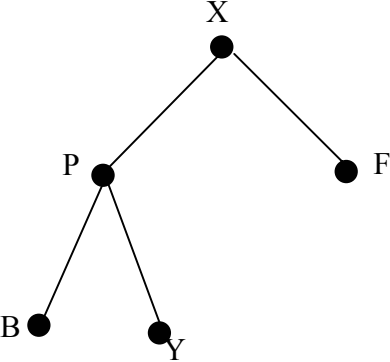
<p><b>(b)</b> Assuming a depth-first search is used, explain how the program would find the solutions to the following query. You should use the line numbers to exemplify your answer.</p> <p>? satellite (titan Y)</p>		
<p>10 Sub Goal orbits(titan Y)                   <b>1 mark</b>  8 Y= Saturn                                   <b>1 mark</b> for line  (Return solution Y = Saturn)</p> <p>11 Sub Goal orbits(titan Z)  8 Z= Saturn                                   <b>1 mark</b> for two lines</p> <p>11 2<sup>nd</sup> Sub Goal satellite(saturn Y)       <b>1 mark</b>  10 Sub Goal orbits(saturn Y)           <b>1 mark</b>  7 Y= the_sun                               <b>1 mark</b> for line  (Return solution Y= the_sun)</p>	<b>6x1 Mark</b>	<b>(6 Marks)</b>
<p><b>(c)</b> A moon is to be defined as an object that orbits a planet. Design a “moon_of” rule for use in the knowledge base.</p>		
<p>moon_of(X Y):- orbits (X Y),    planet(Y).  <b>1 mark</b> for orbits, <b>1 mark</b> for planet and <b>1 mark</b> for correct variables</p> <p>moon(X):- planet(Y), orbits(X,Y) should be allocated <b>1 mark</b></p>	<b>3x1 Mark</b>	<b>(3 Marks)</b>
<p><b>(d)</b> Describe a problem that would be encountered when trying to extend the knowledge base to describe all known stars? Explain your answer.</p>		
<p>Huge number of known stars (<b>1 mark</b>) leading to coding of massive number of facts (<b>1 mark</b>)  Large number of objects involved (<b>1 mark</b>) in orbiting the stars leading to coding of massive number of facts (<b>1 mark</b>)  Difficulties in agreeing the definitions of objects (<b>1 mark</b>) leading to difficulty in coding rules for different definitions.(<b>1 mark</b>)</p>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
		<b>14 Marks</b>

25.	Valuable objects are found by people using metal detectors and by other activities such as digging the garden. Such objects are the subject of common law in Scotland and a company has decided to provide legal advice using an expert system.		
	<b>(a)</b> An expert system has <i>an inference engine</i> . Describe the function of this component.		
	Inference engine – pattern matches the query against the knowledge base <b>OR</b> Chooses suitable rules to solve the query Determines the question that the user is asked next  <b>1 mark</b> description	<b>1 Mark</b>	<b>(1 Mark)</b>
	<b>(b)</b> The fully tested expert system is made available on the World Wide Web and a user follows the advice given. However, the advice is wrong because the law is different in their country.		
	<b>(i)</b> Explain whether the user can be held responsible for breaking the law <b>(ii)</b> Describe <b>two other</b> limitations of an expert system when providing legal advice		
	<b>(i)</b> The user can be held responsible ( <b>1 mark</b> )  The expert system is to be treated as reference like a book. ( <b>1 mark</b> ). Ignorance is no excuse ( <b>1 mark</b> )  <b>(ii)</b> Unlike a human might generate no advice on given input. Lack of common sense. Have to update system regularly Lack of imagination using unexpected input. Inability to extrapolate from similar input with even one situation not programmed. Narrow domain of knowledge and therefore advice. Any other reasonable answer. Variability of laws dependant on country <b>1 mark</b> each for two descriptions	<b>2x1 Mark</b>          <b>2x1 Mark</b>	<b>(4 Marks)</b>

	(c) The expert system could not be created using a procedural language. Give <b>one</b> reason why a procedural language was not used.		
	Against – need to code the search methods / inference engine / coding of user interface ( <b>1 mark</b> )	<b>1 Mark</b>	<b>(1 Mark)</b>
	(d) Describe <b>one</b> advantage of using expert systems for legal advice.		
	Consistency of response , multi-access, 24/7 access, advice from many experts ( <b>1 mark</b> )	<b>1 Mark</b>	<b>(1 Mark)</b>
			<b>7 Marks</b>

26.	A hospital holds many text-based reports of patient interviews in a computerised database. They decide to introduce natural language processing to help with the searching of the system. The system does not use speech input or speech recognition of any kind.		
	<p>(a) (i) Describe what is meant by natural language processing.</p> <p>(ii) Describe <b>two</b> problems associated with natural language processing using an example to illustrate your answer.</p>		
	<p>(i) Ability of a computer system to break down human language into its component parts (<b>1 mark</b>), parse for syntax, derive meaning from human language <b>1 mark</b>.</p> <p>(ii) Expanding/evolving nature of human language eg to text someone, surf the web etc          Ambiguity in meaning of sentences eg The man hit the boy with the stick.          Same word can have different meanings eg building is a verb and noun (do not accept to/two/too etc as these are spoken word problems)  <b>1 mark</b> for problem, <b>1 mark</b> for example</p>	<p><b>2x1 Mark</b></p> <p><b>4x1 Mark</b></p>	<p><b>(6 Marks)</b></p>
	<p>(b) A doctor wants to search for cases where pneumonia has been found. A search in the old database would result in matches such as:</p> <p style="text-align: center;">“pneumonia cannot be excluded”          “rule out pneumonia”          “pneumonia was confirmed”</p> <p>Using the examples above explain why a search system using natural language processing would be more efficient.</p>		
	<p>Could search for <b>phrases</b> based on the same <b>meaning (1 mark)</b>          So phrases such as “rule out pneumonia” would not be reported (<b>1 mark</b>)</p>	<p><b>2x1 Mark</b></p>	<p><b>(2 Marks)</b></p>

	(c) State two advances in hardware and explain how each has aided the development of natural language processing.		
	<b>1 mark</b> for two advance and <b>1 mark</b> for relating description to NLP Faster clock speeds ( <b>1 mark</b> ) allowing searching of the database to be completed quickly.( <b>1 mark</b> ) More memory ( <b>1 mark</b> ) allowing more data to be held for analysis / parsing of sentences.( <b>1 mark</b> )	<b>4x1 Mark</b>	<b>(4 Marks)</b>
			<b>12 Marks</b>

<p>27.</p> <p>A new car has a navigation system with 5000 destinations is able to find a route between the driver's start point and destination.</p> <p>(a) For the search tree shown below write down the order the nodes would be visited using:</p>	 <pre> graph TD   X((X)) --- P((P))   X --- F((F))   P --- B((B))   P --- Y((Y)) </pre>		
	<p>(i) breadth-first (ii) depth-first</p>		
	<p>(i) XPFBY - <b>1 mark</b> for breadth-first  (ii) XPBYF - <b>1 mark</b> depth first</p>	<p><b>2x1 Mark</b></p>	<p><b>(2 Marks)</b></p>
	<p>(b) The navigation system has a small amount of memory. Explain which search method should be used.</p>		
	<p>Depth-first(<b>1 mark</b>) since only the current path need be stored. (<b>1 mark</b>)</p>	<p><b>2x1 Mark</b></p>	<p><b>(2 Marks)</b></p>
	<p>(c) Explain how <i>parallel processing</i> could speed up route finding</p> <ul style="list-style-type: none"> <li>• Given several different starting paths from any given node (<b>1 mark</b>)</li> <li>• they could be evaluated independently. (<b>1 mark</b>)</li> <li>• using different processors giving faster response times (<b>1 mark</b>)</li> </ul>	<p><b>3x1 Mark</b></p>	<p><b>(3 Marks)</b></p>
	<p>(d) The Turing test is a test for machine intelligence. Describe how the test could be used to determine if the navigation system has intelligence</p>		
	<ul style="list-style-type: none"> <li>• Human carries out a navigation</li> <li>• Machine carries out same navigation</li> <li>• Lack of ability to determine difference between two above</li> </ul> <p><b>1 mark</b> for each bullet point explained, lose <b>1 mark</b> if not in context of navigation</p>	<p><b>3x1 Mark</b></p>	<p><b>(3 Marks)</b></p>
			<p><b>10 Marks</b></p>

28.	<p>A building society lends money to people so that they can buy a house. A house valuation depends on factors such as</p> <ul style="list-style-type: none"> <li>• location of the house given by postcode</li> <li>• number of rooms</li> </ul> <p>The building society has access to all this information and accurate valuations of a large number of houses. The building society decides to use this data to create an artificial neural system (neural network) to value houses.</p>		
	(a) Give <b>two</b> reasons why this problem is suitable for the creation of a neural network (artificial neural system).		
	<p>Finite and known set of quantifiable inputs.          Access to large amount of existing data with output values for training.          Will be able to learn as the market changes.</p>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
	(b) A strength of an artificial neural system is its ability to learn.		
	(i) Describe the structure of an artificial neural system.		
	(ii) Describe how the neural net for valuing houses would be trained		
	<p>(i) Made up of layers of neurons (<b>1 mark</b>) with a set of input values each with its own weightings (<b>1 mark</b>). A calculation is performed on the input values which if it exceeds a threshold the neuron “fires” (<b>1 mark</b>).</p> <p>(ii) Iterative process          Using the existing and known criteria to input to a neuron and compare output to expected (<b>1mark</b>), weightings are adjusted allowing it to fire to produce correct output (<b>1 mark</b>)</p>	<b>3x1 Mark</b>  <b>2x1 Mark</b>	<b>(5 Marks)</b>
			<b>7 Marks</b>

**Section III Computer Networking - Answer all questions. Total 50 marks.**

<b>29</b>	International Pencils is a multinational office supplies manufacturer with branch offices in seven European capital cities. These branch offices are connected in a wide-area network (WAN) to allow financial data to flow around the company.		
	(a) When setting up the WAN, the company used <i>dedicated leased lines</i> . State one <b>advantage</b> and one <b>disadvantage</b> of leased-lines when compared to using the public telephone broadband network.		
	<b>1 mark</b> for advantage (security) and <b>1 mark</b> for disadvantage (cost)	<b>2x1 Marks</b>	<b>(2 Marks)</b>
	(b) The company network conforms to the Open Systems Interconnection (OSI) model. Two layers of the OSI model are the <b>Data Link</b> layer and the <b>Network</b> layer. (i) Describe these two layers of the OSI model. (ii) Name a networking device that operates at <b>each</b> of these levels.		
	(i) <b>2 marks</b> for <b>each</b> of descriptions of the layers ( <b>1 mark</b> for partial response) <ul style="list-style-type: none"> <li>Data - addresses size of packet, means of addressing packet, preventing two nodes transmitting at same time (link, error and flow control)</li> <li>Network - routes packets from one network to another (routing, switching and flow control over a network)</li> </ul>	<b>4x1 Mark</b>	
	(ii) <b>1 mark</b> for each layer correctly identified (maximum <b>2 marks</b> ) <ul style="list-style-type: none"> <li>(Bridge), hubs, switches operates at the Data link layer</li> <li>router operates at the Network layer</li> </ul>	<b>2x1 Mark</b>	<b>(6 Marks)</b>
	(c) Explain why is it important that networks are designed using standard models, such as OSI.		
Any valid reason ( <b>1 mark</b> ) <ul style="list-style-type: none"> <li>Ensure compatibility of hardware and software around world.</li> <li>Allow hardware and software from different manufacturers to be interconnected.</li> <li>Etc</li> </ul>	<b>1 Mark</b>	<b>(1 Mark)</b>	

	<p><b>(d)</b> Each device on the International Pencils European network has a <b>24-bit MAC</b> code.</p> <p><b>(i)</b> What does <i>MAC</i> stand for?</p> <p><b>(ii)</b> Explain why it is necessary for a device on the network to have a MAC code.</p> <p><b>(iii)</b> What is the <b>maximum</b> number of devices on this network?</p>		
	<p><b>(i)</b> Media Access Control (<b>1 mark</b>)</p> <p><b>(ii)</b> Each device has a unique identifier (<b>1 mark</b>) (to prevent addressing errors)</p> <p><b>(iii)</b> 24 bit address =&gt; <math>2^{24}</math> or 16,777,216 million addresses</p>	<p><b>1 Mark</b></p> <p><b>1 Mark</b></p> <p><b>1 Mark</b></p>	<p><b>(3 Marks)</b></p>
			<b>12 Marks</b>

30	A group of students are planning to connect their computers together so that they can play <i>NetSpider</i> , a new multi-player network game. Updates for the game are available from the game developer's website.		
	(a) The students could choose to use physical cables or a wireless LAN for their network. (i) Explain how a wireless LAN would operate. (ii) Give <b>two</b> reasons why the students might choose a wireless LAN over cabling.		
	(i) <b>1 mark</b> for each point <ul style="list-style-type: none"> <li>• Each machine has a wireless network card (transmitter /receiver (radio/infrared/etc))</li> <li>• Hub/switch receives and rebroadcasts signals from PCs OR</li> <li>• Signals are passed between the machines</li> </ul> (ii) Two of the following for <b>1 mark</b> each: <ul style="list-style-type: none"> <li>• No physical cables to lay/trip over</li> <li>• Flexibility of being able to move around</li> <li>• Physical structure of building presents no obstacles</li> <li>• Any other valid</li> </ul>	<b>2x1 Mark</b>          <b>2x1 Mark</b>	          <b>(4 Marks)</b>
	(b) The game updates are available at the IP address <b>127.47.86.23</b> or by going to the designer's web address at <a href="http://www.WebGrafters.co.uk">www.WebGrafters.co.uk</a> (i) Briefly explain the purpose of an IP address. (ii) How are the IP address and the web address related?		
	(i) It uniquely identifies a machine/device on the network ( <b>1 mark</b> )  (ii) <b>1 mark</b> for each of: <ul style="list-style-type: none"> <li>• IP address unique to machine and web address unique to site</li> <li>• DNS keeps record of unique web address and matches to list of ISP's <b>OR</b></li> <li>• domain name resolution matches the IP address to the URL</li> </ul>	<b>1 Mark</b>       <b>2x1 Mark</b>	          <b>(3 Marks)</b>

	<p>(c) The updater file is transferred using a browser operating the TCP/IP standard internet protocol.</p> <p>(i) Describe how the transfer takes place under <b>TCP/IP</b>.</p> <p>(ii) Name <b>another</b> standard protocol that might be used to transfer this file.</p>		
	<p>(i) Detailed description of use, <b>1 mark</b> per bullet point</p> <ul style="list-style-type: none"> <li>• Data split into packets</li> <li>• Packets given destination address and sent</li> <li>• Each packet follows own route to destination</li> <li>• Packets reassembled into original order</li> </ul> <p>(ii) Name a suitable protocol (http, FTP) (<b>1 mark</b>) not SMTP</p>	<p><b>4x1 Mark</b></p> <p><b>1 Mark</b></p>	<p><b>(5 Marks)</b></p>
	<p>(d) The connection used by the students to download the file is rated at <b>15 Megabits per second</b> (Mbps).</p> <p>(i) If the size of the updater file is 112 Megabytes, how long will it take to download at 15 Mbps?</p> <p>(ii) Give <b>two</b> reasons why it might take longer to download the file in practice.</p>		
	<p>(i) <math>(112*8)/15 = 59.73</math> seconds (or 1 minute) (<b>1 mark</b> for *8 and <b>1 mark</b> for divide by 15)</p> <p>(ii) Any two of the following for <b>1 mark</b> each:</p> <ul style="list-style-type: none"> <li>• bad packets needing re-sent / collisions of data</li> <li>• rest of message frame takes up space and hence bandwidth</li> <li>• another part of the network between host and students may be slower connection etc</li> <li>• sharing bandwidth</li> <li>• integrity checks on file</li> <li>• any other valid</li> </ul>	<p><b>2x1 Mark</b></p> <p><b>2x1 Mark</b></p>	<p><b>(4 Marks)</b></p>
			<p><b>16 marks</b></p>

31	Fragrant Futures is a charity dedicated to preserving wildflowers and older varieties of herbs and fruits. It plans to build an education centre with over 100 networked computers. This will allow school parties to access a very large central database of plants and run other educational software about nature conservation.		
	(a) Describe <b>two</b> different technological advances that have made the creation of such a network possible. Justify your answer.		
	<b>1 mark</b> for <b>each</b> advance. Possible answers include <ul style="list-style-type: none"> <li>• faster or more reliable network cabling or other hardware (switches etc)</li> <li>• better networking software, easier to install and/or configure</li> <li>• greater standardization of hardware/software through protocols or data standards</li> <li>• any other acceptable</li> </ul> <b>1 mark</b> for <b>each</b> justification related to context.	<b>4x1 Mark</b>	<b>(4 Marks)</b>
	<b>(b)</b> The database can be updated by registered users and is held on one computer. <b>(i)</b> Explain why it is necessary for this network to have a backup strategy. <b>(ii)</b> Describe a suitable backup strategy for use in this situation. You should make reference to hardware and software needed.		
	<b>(i)</b> <b>1 mark</b> for <b>explanation</b> of need for strategy (data loss through corruption etc)  <b>(ii)</b> Valid strategy involving regular (incremental / differential / full) backups taken ( <b>1 mark</b> ) <b>OR</b> Backup held elsewhere ( <b>1 mark</b> ) Use of large volume tape drive, or other suitable (DVD-R, DVD-RW, not just DVD) ( <b>1 mark</b> ) together with software to perform backups overnight, or other suitable ( <b>1 mark</b> )	<b>1 Mark</b>  <b>3x1 Mark</b>	<b>(4 Marks)</b>
	<b>(c)</b> Fragrant Futures has been the victim of a <i>denial of service</i> attack. Describe how a <b>denial of service</b> attack operates.		
	<b>2 marks</b> for <b>description</b> of attack for example: <ul style="list-style-type: none"> <li>• Multiple messages sent to the email server by attacker</li> <li>• Server cannot handle volume (thousands/millions are sent) therefore runs out of disk space</li> </ul> Many others are possible	<b>2 Marks</b>	<b>(2 Marks)</b>

	<p>The charity has set up a website for students to access from outwith the education centre. The website has been created using HTML. The HTML code for one of the pages looks like this:</p> <pre>&lt;html&gt;   &lt;head&gt;     &lt;title&gt; FRAGRANT FUTURES &lt;/title&gt;   &lt;/head&gt; &lt;/html&gt;</pre> <p><b>(d)</b> Describe <b>two</b> other HTML tags that could be used for this page.</p>		
	<p>Style or font size or alignment(<b>1 mark</b> each description)  <b>1 mark</b> for poor description (includes forgetting the “/” close tags) of 2 tags</p>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
	<p><b>(e)</b> The website includes a search facility that enables users to search the web for information about particular flowers. Describe <b>two</b> methods that could be used by this search facility to find the relevant information across the WWW.</p>		
	<p>Meta-search – transmits search to various search engines and their databases are searched (<b>1 mark</b>)  Spider – works through individual web pages and their links (<b>1 mark</b>)</p>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
	<p><b>(f)</b> The charity wishes to sell some of their products on-line using this website.  <b>(i)</b> Describe <b>two</b> benefits to the company of selling goods on-line.  <b>(ii)</b> Describe <b>one</b> possible problem that could arise from selling goods on-line.  <b>(iii)</b> Describe <b>two</b> possible solutions to your answer to <b>(ii)</b>.</p>		
	<p><b>(i)</b> Have a wider audience to advertise to, no need to pay retail staff or rent shop space etc, can be accessed 24/7 etc (2 x <b>1 mark</b> each)  <b>(ii)</b> Description of credit or debit card fraud or any other valid problem (returns, suitability of goods, phishing etc) (<b>1 mark</b>)  <b>(iii)</b> Provide a secure socket layer, no order completion unless full details are accepted from customer, ISP or domain based address to be provided by customer, use of virtual on-line checking etc, encryption, digital certificates (2 x <b>1 mark</b> each)</p>	<b>2x1 Mark</b>  <b>1 Mark</b>  <b>2x1 Mark</b>	<b>(5 Marks)</b>
			<b>19 marks</b>

32	Data transmission on the network will either operate by <b>circuit-switching</b> or <b>packet-switching</b> . (i) Explain the term <i>circuit-switching</i> . (ii) Describe <b>one</b> advantage of <i>circuit-switching</i> over <i>packet-switching</i> for this network.		
	(i) <u>circuit-switching</u> is where a circuit is established between sender and receiver prior to transmission ( <b>1 mark</b> ) and is maintained throughout transmission. (leased lines etc) ( <b>1 mark</b> )  (ii) <b>1 mark</b> for any valid answer <ul style="list-style-type: none"> <li>• The actual transfer is faster as no addressing information transmitted</li> <li>• Packets do not need to be re-assembled by the receiver.</li> </ul>	<b>2x1 Mark</b>  <b>1 Mark</b>	<b>(3 Marks)</b>
			<b>3 Marks</b>

**Section III Multimedia Technology- Answer all questions. Total 50 marks.**

<b>33</b>		Jamie wants to be able to put family photographs and movie clips into a multimedia presentation. He has between 400 and 500 old photographs and about 10 minutes of movie clips.		
	<b>(a)</b>	<b>(i)</b> Name a design notation or technique which would be suitable for <b>planning</b> this presentation <b>(ii)</b> Give <b>two</b> reasons why your choice of notation or technique would be suitable for Jamie's task.		
		<b>(i)</b> Storyboard ( <b>1 mark</b> )  <b>(ii)</b> <ul style="list-style-type: none"> <li>• Shows links between screens eg timings, transitions</li> <li>• Gives content of screens eg placement of items, actual content</li> <li>• Shows common features eg backgrounds, style sheets</li> <li>• Gives navigation links</li> <li>• Any other valid reason</li> </ul> Any 2 distinct elements for <b>1 mark</b> each	<b>1 Mark</b>  <b>2x1 Mark</b>	<b>(3 Marks)</b>
	<b>(b)</b>	Jamie asks his relatives to provide audio comments for the photographs. Explain the steps he would follow to include the comments into his presentation. For each step you should include the relevant hardware and software. Your answer should include an appropriate level of technical detail.		
		<ul style="list-style-type: none"> <li>• Record the comments into his computer (<b>1 mark</b>)</li> <li>• using microphone, sound card (a to d converter) and digital audio software (<b>2 marks</b> for all 3, <b>1 mark</b> for any 2)</li> <li>• Edit the audio clips using the digital audio software if needed (<b>1 mark</b>)</li> <li>• Import the clip into the presentation(<b>1 mark</b>)</li> </ul>	<b>5x1 Mark</b>	<b>(5 Marks)</b>


	<p><b>(c)</b> Jamie makes a 20 second audio recording about one of the photos It is sampled at 11kHz with 8-bit resolution in stereo.</p> <p>What is the uncompressed filesize of the recording? Express your answer in appropriate units.</p>		
	<p>Sampling frequency*sound time*sampling depth*channels  <math>(11000*20*8*2) = 3\,520\,000 \text{ bits} = 429.69 \text{ Kb}</math> (lose mark for /1000 (440kb) not /1024)</p> <p><b>1 mark</b>      <b>1 mark</b>      <b>1 mark</b>      <b>1 mark</b></p>	<b>4x1 Mark</b>	<b>(4 Marks)</b>
	<p><b>(d)</b> Describe <b>two</b> techniques a multimedia creator may use to fully test the finished multimedia presentation.</p>		
	<ul style="list-style-type: none"> <li>• Try all links to make sure they function as specified</li> <li>• Play all videos</li> <li>• Ask ‘typical users’ to beta test it</li> </ul> <p>Any 2 valid techniques for <b>1 mark</b> each</p>	<b>2x1 Mark</b>	<b>(2 Marks)</b>
			<b>14 Marks</b>

<b>34</b>		Creators and users of multimedia applications frequently buy upgrades to their sound and video cards.		
	<b>(a)</b>	<b>(i)</b> Describe <b>two</b> developments in sound card technologies <b>(ii)</b> Show how they have contributed to the growth in multimedia products?		
		<b>(i)</b> 16 bit quality Ability to store waveform tables MIDI interface available Can mix or combine sounds increase number of channels <b>1 mark</b> for each of any two valid developments  <b>(ii)</b> 16 bit quality now gives CD quality audio Ability to store waveform tables allows simulation of instruments MIDI interface allows connection for input/output throughout eg keyboards Answer needs to be relevant to answer to part <b>(i)</b>	<b>2 x 1 Mark</b>          <b>2 x 1 Mark</b>	<b>(4 Marks)</b>
	<b>(b)</b>	Digital Signal Processing (DSP) is a feature of interface cards. What role does <b>Digital Signal Processing</b> play in these cards?		
		allows hardware decoding ( <b>1 mark</b> ) of digital/sound/video files ( <b>1 mark</b> )	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>
	<b>(c)</b>	Describe <b>two</b> similarities, other than DSP, in the way sound and video cards work		
		Both have dedicated co-processors to relieve main processor Both provide additional RAM Both do analogue to digital conversion <b>1 mark</b> for each of any two valid similarities	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>

	<p><b>(d)</b> Holographic technology for storage of data will be welcomed by creators of large multimedia applications. State <b>one</b> improvement that holographic technology has made to the storage of data. Explain how this is achieved.</p>		
	<p>Increase in storage capacity (<b>1 mark</b>). Instead of recording only on the surface holographic technology records through the full depth of the medium. (<b>1 mark</b>)  <b>OR</b>  Increase in speed of reading data (<b>1 mark</b>). Holography allows a 'million' bits of data to be written and read in parallel with a single flash of light (<b>1 mark</b>)</p>	<p><b>2 x 1 Mark</b></p>	<p><b>(2 Marks)</b></p>
			<p><b>10 Marks</b></p>

<b>35</b>		Dr Michaelson is creating a multimedia presentation for use during a lecture.		
	<b>(a)</b>	As part of the presentation, he will be playing several sound files. He is considering which file formats to use. Why would standard file formats be useful in this case?		
		<ul style="list-style-type: none"> <li>• computer used for playback may not have same software that file was created with <b>(1 mark)</b></li> <li>• standard file formats can be imported successfully into them /ease of data transfer with standard file formats <b>(1 mark)</b></li> </ul>	<b>2 x1 Mark</b>	<b>(2 Marks)</b>
	<b>(b)</b>	<p>Dr Michaelson asks his assistant to send him some files in Resource Interchange File Format (RIFF). His assistant e-mails him with the following message :</p> <p style="text-align: center;">“Have attached two files as you requested”</p> <p>Dr Michaelson gets a little confused when he sees that the attachments are in WAV waveform file. Explain in detail why the assistant hadn’t made a mistake.</p>		
		<p>RIFF describes the structure of a file using headers and chunks <b>(1 mark)</b></p> <p>WAV files <b>are</b> RIFF files <b>(1 mark)</b> since they have the RIFF structure <b>(1 mark)</b></p>	<b>3 x 1 Mark</b>	<b>(3 Marks)</b>
	<b>(c)</b>	Name <b>one</b> sound file format, other than WAV and RIFF (ADPCM), and recommend a particular purpose for which it would be used.		
		<p>MP3 - music files (accept reference to hardware)</p> <p>AU - used to be standard Internet audio format</p> <p>AIFF – can support compression (AIFC)</p> <p>RAW (PCM) - High quality sampling, sample playback on embedded devices, etc.</p> <p><b>1 mark</b> for name and <b>1 mark</b> for circumstance</p>	<b>2 x 1 Mark</b>	<b>(2 Marks)</b>

	<b>(d)</b> Dr Michaelson is also going to use VRML files.		
	<b>(i)</b> What does VRML stand for? <b>(ii)</b> What is VRML used for? <b>(iii)</b> Why are VRML files an efficient way of downloading an image from the Internet?		
	<b>(i)</b> virtual reality markup/modeling language ( <b>1 mark</b> ) <b>(ii)</b> Animations and 3D imaging ( <b>1 mark</b> ) <b>(iii)</b> VRML describes a scene by attributes ( <b>1 mark</b> ). Data is downloaded from the Internet; VRML viewers interpret the code then render it on the client computer ( <b>1 mark</b> ) thus saving download time ( <b>1 mark</b> )	<b>1 Mark</b> <b>1 Mark</b> <b>3 x 1 Mark</b>	<b>(5 Marks)</b>
			<b>12 Marks</b>

36	<p>The image below is the first frame of a thirty-second movie clip. The movie clip is in 24-bit colour.</p> <p style="text-align: center;">  </p> <p>Picture of rowers ...&gt;</p>		
	(a) By referring to this frame, explain how the MPEG compression algorithm would be applied to this movie clip.		
	<p>This frame identified as key frame (or description of key frame) <b>(1 mark)</b>  Each subsequent frame is compared to this one <b>(1 mark)</b>  Only the changes are saved <b>(1 mark)</b></p>	<b>3 x 1 Mark</b>	<b>(3 Marks)</b>
	<p>(b) The movie is compressed but when played back, it is of lower quality than the original.  <b>(i)</b> State <b>two</b> reasons why this might have happened  <b>(ii)</b> For each of these, state why the quality has been reduced.</p>		
	<p><b>(i)</b></p> <ul style="list-style-type: none"> <li>• Picture quality reduced (detail removed)</li> <li>• Slow playback</li> <li>• reduction in frame rate</li> <li>• Any other appropriate explanation <b>1 mark</b> each</li> </ul> <p><b>(ii)</b></p> <ul style="list-style-type: none"> <li>• Picture quality reduced : Detail in the video may be removed by the compression technique used <b>(1 mark)</b></li> <li>• Slow playback : Decompression takes time so playback may be affected <b>(1 mark)</b></li> <li>• reduction in frame rate: frames rate reduced as part of compression</li> </ul> <p>Any other appropriate explanation : relevant reason <b>(1 mark)</b> answers from <b>two</b> bullet points needed</p>	<p><b>2 x 1 Mark</b></p> <p><b>2 x 1 Mark</b></p>	<b>(4 Marks)</b>

	(c)	Compression is still to be used on the original movie (i) State <b>two</b> ways that reduction in quality could be prevented? (ii) Explain how the quality is maintained by each of these.		
		(i) <ul style="list-style-type: none"> <li>• Use a lossless compression technique (1 mark)</li> <li>• Play back on a computer with a faster processor (1 mark)</li> </ul> Any other appropriate explanation (1 mark) answers from <b>two</b> bullet points needed (ii) <ul style="list-style-type: none"> <li>• Use a lossless compression technique: preserves all the original information (1 mark)</li> <li>• Play back on a computer with a faster processor: compensate for time taken to perform decompression (1 mark)</li> </ul> other appropriate explanation : relevant reason (1 mark) answers from <b>two</b> bullet points needed	2 x 1 Mark  2 x 1 Mark	(4 Marks)
	(d)	The cameraman who took the video now uses a Bluetooth enabled digital video camera and a Bluetooth enabled laptop computer instead of USB.		
	(i) (ii)	State <b>one</b> disadvantage of Bluetooth technology. Give <b>two</b> reasons why he finds his move to Bluetooth technology useful when downloading his video files at sports events.		
	(i) (ii)	Transfer speeds still relatively low (1 mark) 10 m (limited) transfer range <ul style="list-style-type: none"> <li>• Bluetooth allows downloading by wireless connection, useful if out of doors since no need to carry separate wires as with USB</li> <li>• allows for distances up to about 10 metres so eg could beam back to car, USB cable length restricts area of use</li> <li>• Many other devices, eg mobile phone, may have Bluetooth giving more interconnectivity and possibility of sending videos straight to a web page via his mobile phone</li> </ul> Any two valid reasons for 1 mark each, but must relate to scenario	1 Mark  2 x 1 Mark	(3 Marks)
				14 Marks

[END OF MARKING INSTRUCTIONS]