



## 6.1 Hardware and software part 1

Name: \_\_\_\_\_

Class: \_\_\_\_\_

Date: \_\_\_\_\_

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Time: **265 minutes**

Marks: **201 marks**

Comments:

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**Q1.**

State **one** role of the operating system, other than resource management.

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(Total 1 mark)

**Q2.**

An operating system is designed to hide the complexities of the hardware from the user and to manage the hardware and other resources.

State **three** different types of management of either hardware or other resources that are performed by an operating system.

Type 1 

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Type 2 

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Type 3 

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(Total 3 marks)

**Q3.**

The tables below show two versions of the same segment of a program.

Version A	Version B
<pre>if x &gt; 0:     y = y + 2 else:     y = y - 1</pre>	<pre>00011100 00110000 00101010 10010010 11101010 00000010 00101100 10010001</pre>

- (a) Shade in **one** lozenge to indicate which version, **A** or **B**, in the tables above represents object code.

Version A ☐

Version B ☐

(1)

- (b) Describe **two** differences between a compiler and an interpreter.

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(2)

- (c) Explain what intermediate code is **and** why some compilers will produce intermediate code as the final output.

(2)

(Total 5 marks)

**Q4.**

Explain the role of the operating system and state the important tasks which are carried out by most operating systems.

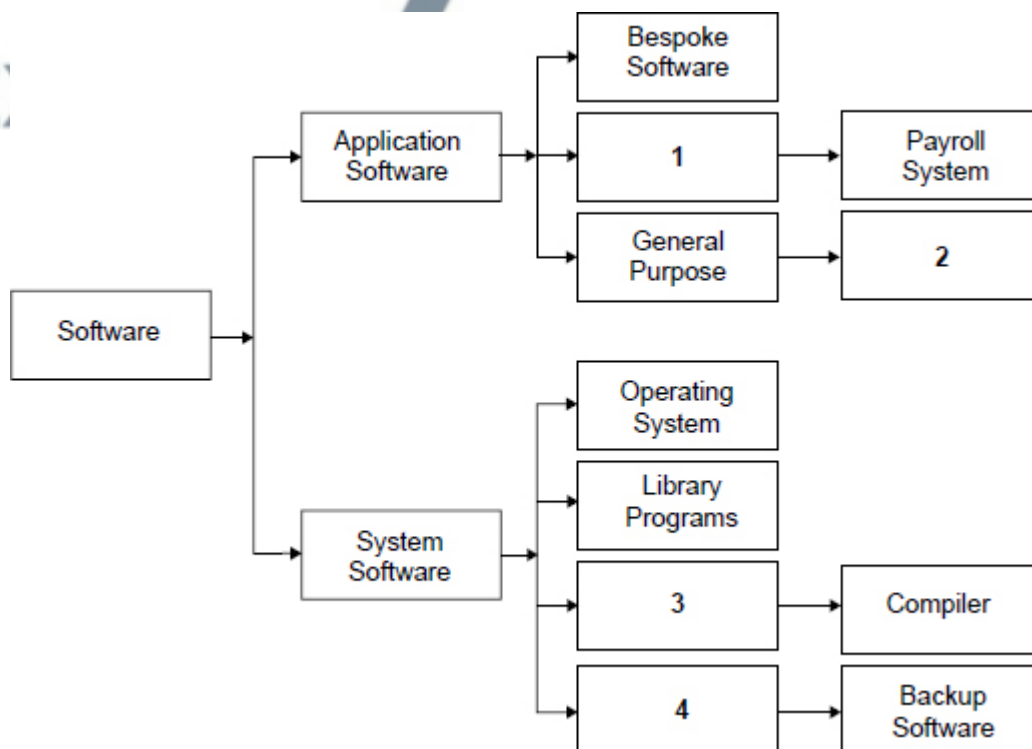
Beyond those of a standard operating system, describe the additional operational characteristics that you would expect a real time operating system to have.

In your answer you will be assessed on your ability to use good English, and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

(Total 7 marks)

**Q5.**

The diagram below shows the classifications of various types of software used on a computer system and some examples of these types.



- (a) Complete the diagram by suggesting labels for the boxes numbered 1 to 4 in the diagram.

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

(4)

- (b) (i) Machine code is the first generation of programming language.

What is the second generation of programming language?

\_\_\_\_\_

(1)

- (ii) A program written in a second generation programming language has been loaded into a computer. In this form it cannot be directly executed on this computer.

What has to be done to make an executable form of the program, which can be directly executed by this computer, and what would be used, typically, to do this?

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

(2)

- (iii) A programmer then finds that when the executable form of the program is transferred unaltered to another computer, the program does not run and an error message is displayed.

Why might the executable form of the program not be able to run on this computer?

\_\_\_\_\_  
\_\_\_\_\_

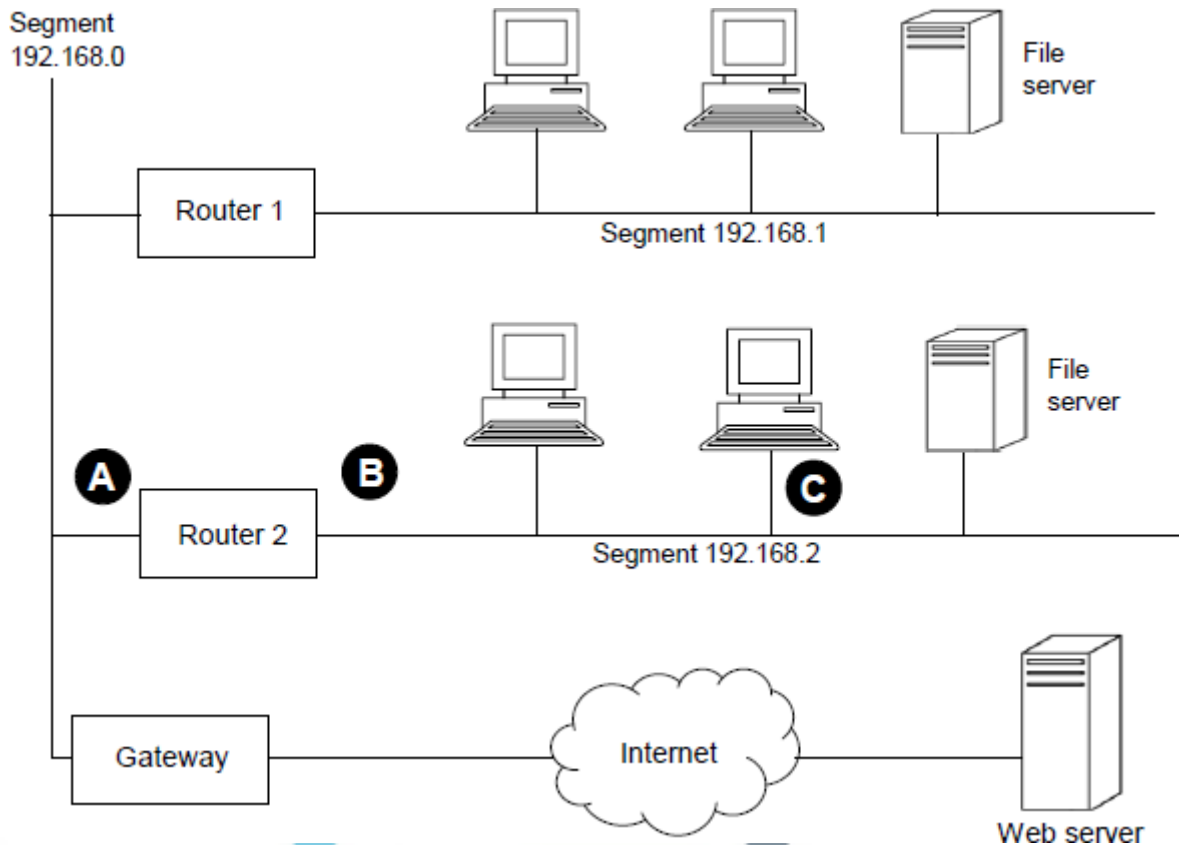
(1)

(Total 8 marks)

## Q6.

A company operates a Local Area Network (LAN) which is used by its employees.

The diagram below shows the topology of the LAN.



- (a) Suggest suitable IP addresses for:
- (i) the 'Router 2' port labelled A \_\_\_\_\_ (1)
- (ii) the 'Router 2' port labelled B \_\_\_\_\_ (1)
- (iii) the network adapter card in the computer labelled C \_\_\_\_\_ (1)

- (b) The network has been divided into segments.

Explain why networks that use a bus topology are often segmented.

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(2)

- (c) Previously, employees of the company used word processing and spreadsheet software that was installed locally on each of the individual computers on the network. Now, employees use software with similar features as a service (SaaS). The software runs on a web server and is accessed through the Internet.

- (i) Explain **two** advantages of using software as a service instead of using software installed locally on individual computers.

Advantage 1 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Advantage 2 \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(2)

- (ii) Explain **one** disadvantage of using software as a service instead of using software installed locally on individual computers.

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

(1)

- (d) One difference between a Local Area Network (LAN) and a Wide Area Network (WAN) is the area that they cover. Describe **two** other differences between a LAN and a WAN.

Difference 1 \_\_\_\_\_

\_\_\_\_\_

Difference 2 \_\_\_\_\_

\_\_\_\_\_

(2)

(Total 10 marks)

### Q7.

A school has recently launched a 'Parent Portal' which is a website that provides information from the school. By logging on to the portal a parent can access the information that is stored about their son or daughter. This information includes academic reports, discipline records and other personal data.

- (a) A parent recently contacted the school because he was concerned that when he logged on to read his daughter's report he could access the reports of all the other students.

The school should immediately look into this concern as a law has been broken. State the **full name** of the law that has been broken.

\_\_\_\_\_

(1)

- (b) Which principle of the law identified in your answer to part (a) has been broken?

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(1)

- (c) State another principle of the law identified in your answer to part (a).

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(1)

- (d) A parent also noted that the website was using HTTP (HyperText Transfer Protocol).

Why should the school be concerned about the use of this protocol and which protocol would you recommend that the school should use instead?

Why concerned \_\_\_\_\_

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Suggested protocol \_\_\_\_\_

(2)

- (e) The process of writing reports and then allowing access to these reports via the parent portal involves the use of many different categories of software.

Below is a list of different categories of software:

Operating system, Utility program, Special purpose application software, Bespoke application software, General purpose application software

Complete **Table 1** by writing the correct category from the list above in the **Category** column next to the appropriate **Software**.

You should **not** use a category more than once.

**Table 1**

<b>Software</b>	<b>Category</b>
Word processor used to write the pupil reports	
The parent portal web application which was programmed for this school	
The web server software run by the school	

(3)

(Total 8 marks)

**Q8.**

A computer system is made up of *software* and *hardware*.

Explain what is meant by these two terms.

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(Total 2 marks)

**Q9.**

(a) The table below lists some components of a computer system.

Put **one** tick on each row to identify each component as either:

- software
- hardware
- hardware and software.

Component	Software	Hardware	Hardware and software
Wireless router			
Compiler			
Keyboard			

(3)

(b) System software performs the tasks needed to operate the hardware. The operating system and library programs are system software.

(i) State **one** role of the operating system.

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(1)

(ii) State **one** purpose of library programs.

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(1)

(c) A company is looking at purchasing some bespoke software to help them run their ordering and purchasing activities.

(i) State **one** advantage of purchasing bespoke software.

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(1)

- (ii) State **one** disadvantage of purchasing bespoke software.

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(1)

(Total 7 marks)

**Q10.**

An operating system is designed to hide the complexities of the hardware from the user and to manage the hardware and other resources.

Give **three** different types of management of either hardware or other resources that are performed by an operating system.

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

3. \_\_\_\_\_

\_\_\_\_\_

(Total 3 marks)

**Q11.**

Software can be categorised as either system software or application software.

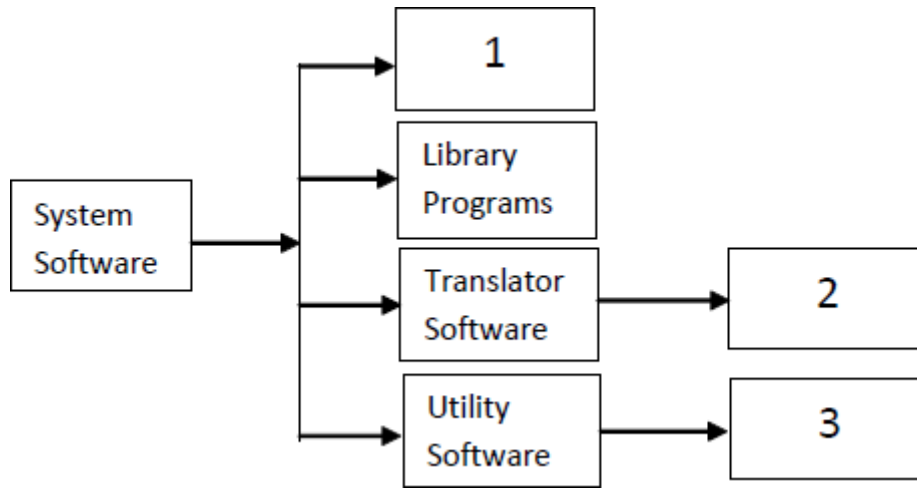
- (a) The table shown below lists three different examples of application software.

Put **one** tick in each row of the table to show which category each software program belongs to.

	General Purpose Software	Special Purpose Software	Bespoke Software
Word Processor			
Payroll Software			
Flight Control Software			

(3)

- (b) The diagram below shows an incomplete classification of system software.



Suggest suitable labels for boxes 1 to 3 in the diagram above.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

(3)

(Total 6 marks)

## Q12.

A computer programmer, developing a theatre seat booking system, has decided to use an event-driven object-oriented programming language.

- (a) The operating system that is installed on the computer that the new booking system will be used on is an interactive network operating system. This has the characteristics of both an interactive operating system and a network operating system.

Explain what is meant by the terms *interactive operating system* and *network operating system*.

Interactive operating system: \_\_\_\_\_

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Network operating system: \_\_\_\_\_

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(2)

- (b) To allow it to work with the computer's operating system, the programs developed by the programmer should be event-driven.

Explain how an event-driven program works.

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(2)

(Total 4 marks)

**Q13.**

- (a) One type of software can be described by the phrase "*performs tasks needed to operate the hardware*".

What type of software is being described?

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(1)

- (b) (i) Explain what is meant by *general purpose application software*.

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(1)

- (ii) Give **one** example of general purpose application software.

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(1)

- (c) An IT manager needs to buy software to manage stock control.

- (i) Why might the manager choose a special purpose application package rather than a bespoke solution? Give **two** reasons.

1. \_\_\_\_\_

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2. \_\_\_\_\_

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(2)

- (ii) Although special purpose application packages for stock control are available, explain why the IT manager might choose to order a bespoke piece of software.

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(1)

(Total 6 marks)

**Q14.**

(a) Define the following terms.

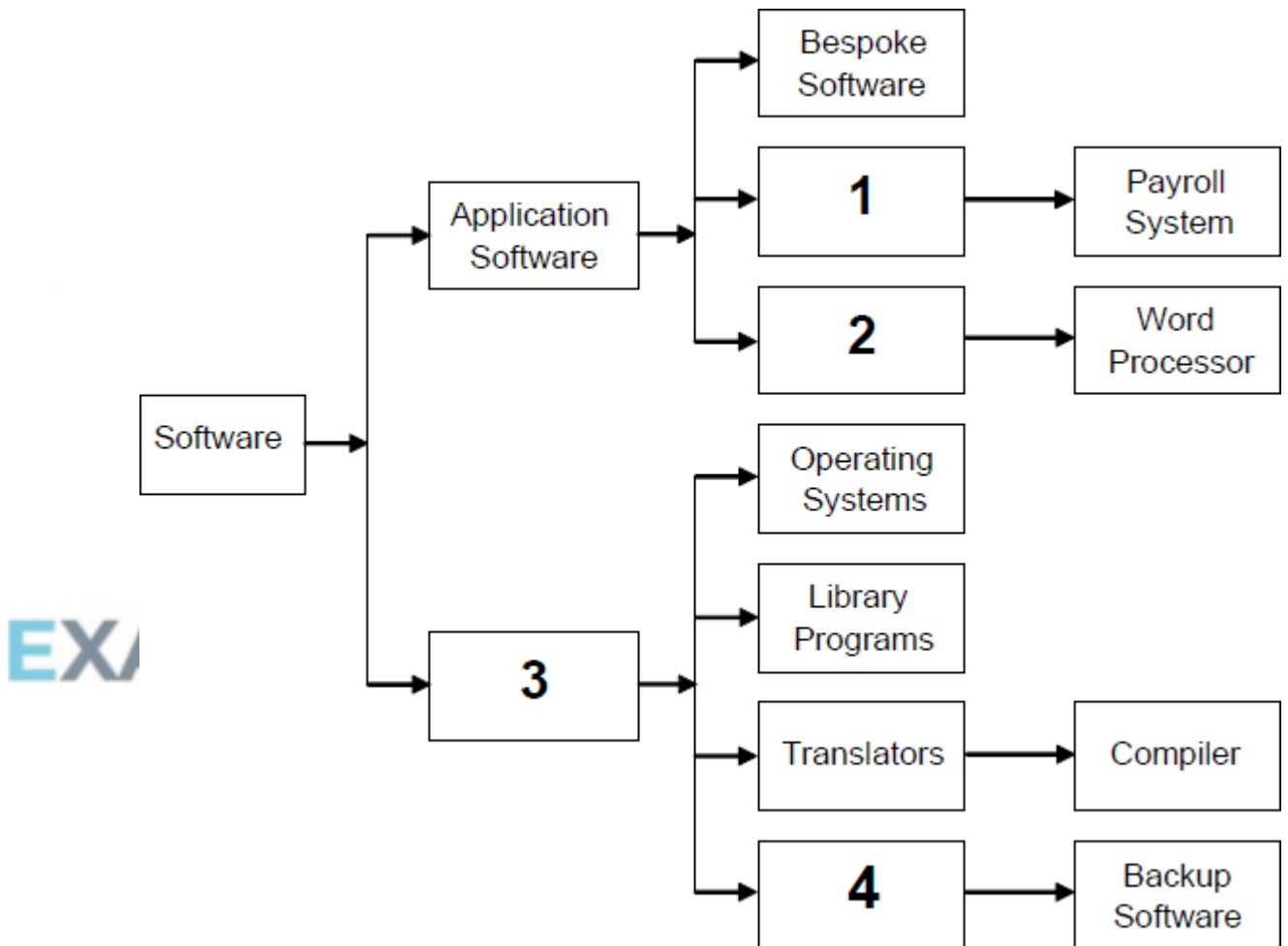
(i) Hardware: \_\_\_\_\_  
\_\_\_\_\_

(1)

(ii) Software: \_\_\_\_\_  
\_\_\_\_\_

(1)

(b) The diagram below shows the classification of various types of software used on a computer system and some examples of these types.



Complete the labelling of the diagram above by suggesting labels for 1 to 4 in the diagram.

1 \_\_\_\_\_ 2 \_\_\_\_\_

3 \_\_\_\_\_ 4 \_\_\_\_\_

(4)

(Total 6 marks)

**Q15.**

- (a) Explain the purpose of an operating system.

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(2)

- (b) Discuss the differences between operating systems designed for desktop computers and operating systems designed for embedded systems.

In this question you will also be assessed on your ability to use good English and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.



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(4)

(Total 6 marks)

**Q16.**

There are three different types of application software. General purpose is one type.

Name the other **two** types, and describe all **three** types. Use examples to illustrate your descriptions.

In your answer you will also be assessed on your ability to use good English, and to organise your answer clearly in complete sentences, using specialist vocabulary where appropriate.

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**(Total 6 marks)**

(a) Explain the difference between application software and system software.

**(2)**

**(1)**

**(1)**

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**Q18.**

A computer system consists of hardware and software.

- (a) What is meant by *hardware*?

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(1)

- (a) What is meant by *software*?

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(1)

(Total 2 marks)

**Q19.**

The table below lists a number of items of software. You are asked to show which software category each item belongs to.

Write in the appropriate cells in the table below the letter of the category which best fits each item of software. No letter should be used more than **once**.

Software	Category (letter only)
Spreadsheet Software	
Anti-virus Software	
Operating System	
Air Traffic Control Software	

A – System Software

B – Bespoke Software

C – Utility Software

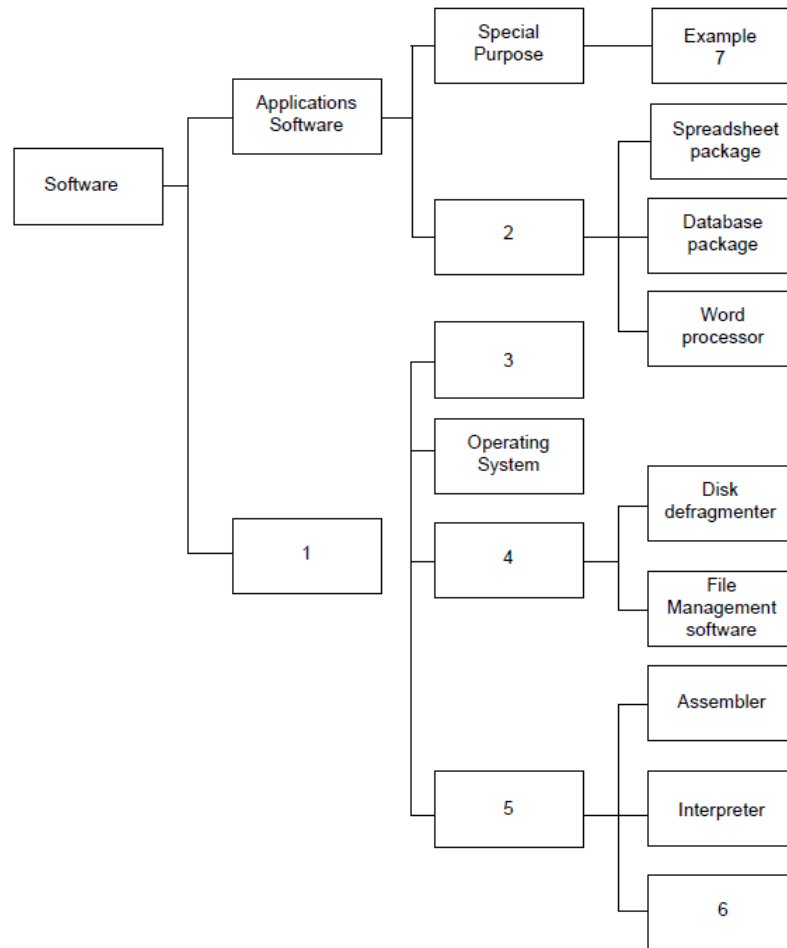
D – General Purpose Software

E – Special Purpose Software

(Total 4 marks)

**Q20.**

The diagram below shows the classification of various types of software used on a computer system.



Complete the labelling of the diagram by suggesting labels for 1 to 7 in the diagram.

Software classification:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

5. \_\_\_\_\_

6. \_\_\_\_\_

Example:

7. \_\_\_\_\_

(Total 7 marks)

## Q21.

A programmer developing a new application will choose a high level programming language. Typical modern software will provide an 'environment' in which all aspects of the application's development can be done.

(a) What feature must all program development environments have for the initial



creation of the program code?

\_\_\_\_\_  
(1)

- (b) The next stage in the development may use a **compiler**.

Explain what a compiler does, and suggest **one** output which may result from the compilation process, other than the executable code.

\_\_\_\_\_  
\_\_\_\_\_

Output: \_\_\_\_\_  
(3)

- (c) An alternative to a compiler is an **interpreter**.

Explain how an interpreter attempts to run a program.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(2)

- (d) The program development environment has **both** a compiler and interpreter.

- (i) Give **one** advantage of using an interpreter.

\_\_\_\_\_  
\_\_\_\_\_  
(1)

- (ii) Give **one** advantage of using a compiler.

\_\_\_\_\_  
\_\_\_\_\_  
(1)  
(Total 8 marks)

## Q22.

The table below lists some components of a computer system. Put **one** tick on each row to describe each component as either:

- software
- hardware
- hardware and software.

Component	Software	Hardware	Hardware and Software
An application program			
A printed circuit board which controls the wash programme inside a washing machine			
Main memory chips in the PC			

(Total 3 marks)

### Q23.

- (a) Define the term software. \_\_\_\_\_

\_\_\_\_\_

(1)

- (b) The table below shows a list of software types with an example.

Complete the entries in the table. All entries **must be different**.

Software category	Example
Programming language translator	(i) _____
(ii) _____	Disk defragmenter
(iii) _____	A DLL file that is used by several applications programs
General purpose applications program	(iv) _____

(4)

(Total 5 marks)

### Q24.

The table below lists a number of items of software.

Complete the table by adding the letter which best describes each item of software. No letter should be used more than **once**.

Software	Description (letter below)
Income tax calculation software	
Translator software for the C++ programming language	

<b>Word processing software</b>	
<b>Operating system</b>	

- A – System software
- B – Assembler software
- C – Bespoke software
- D – Interpreter or compiler software
- E – Utility software
- F – General purpose application software
- G – Special purpose application software

**(Total 4 marks)**

**Q25.**

- (a) Define the term software.

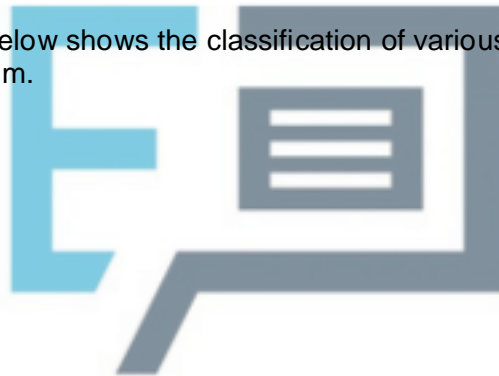
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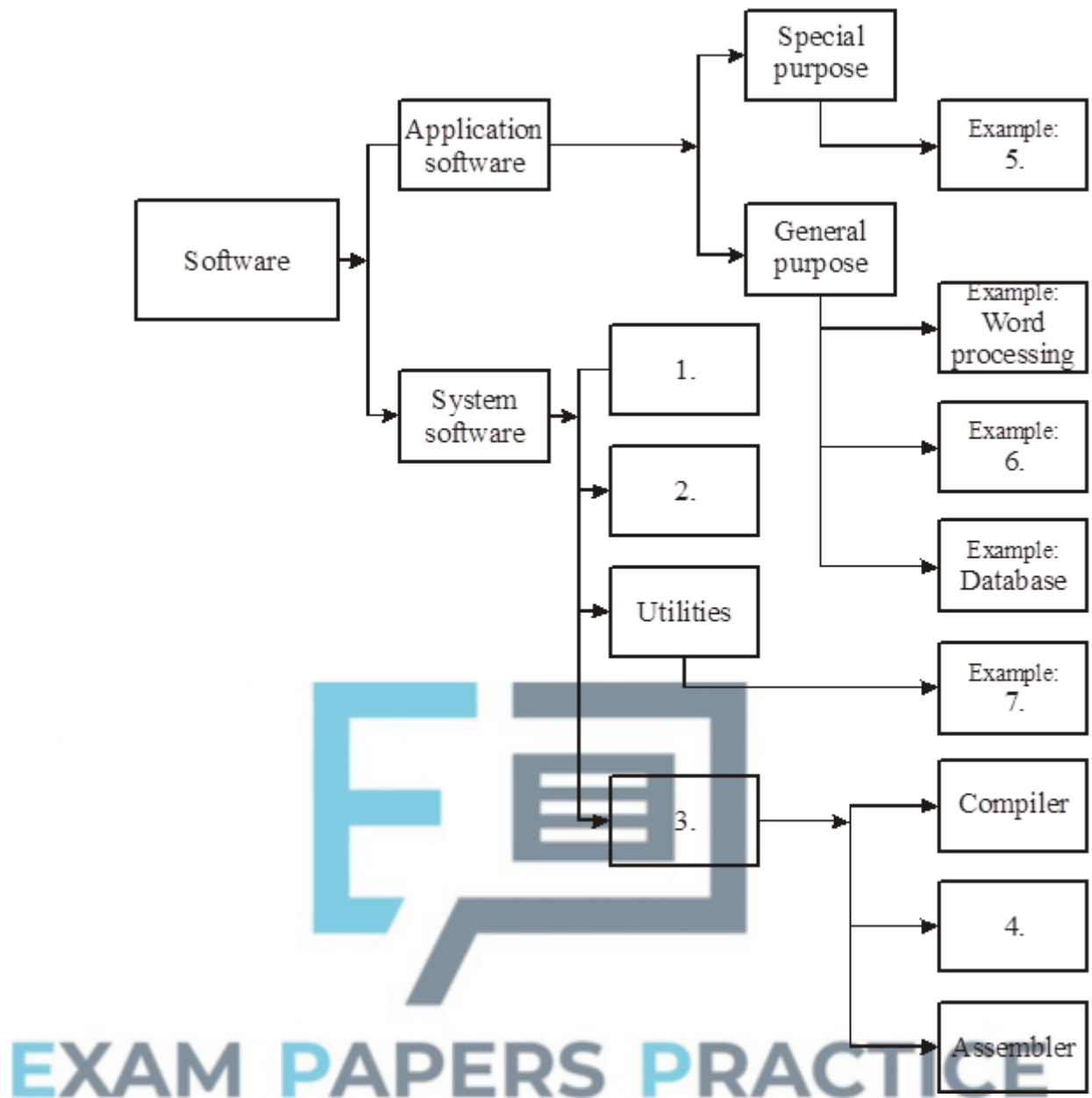
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**(1)**

- (b) The diagram below shows the classification of various types of software used on a computer system.



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Complete the labelling of the diagram by suggesting labels for 1 to 7 in the diagram.

Software category:

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

Software example:

5. \_\_\_\_\_

6. \_\_\_\_\_

7. \_\_\_\_\_

**Q26.**

- (a) One of the roles of an operating system is **Resource Management**. Give **three** resource management tasks for an operating system for a stand-alone computer.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

(3)

- (b) A second role of an operating system is the provision of a **virtual machine**. What does this mean?

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(1)

- (c) Give **three** tasks that an operating system for a computer connected to a computer network will have in addition to the tasks of an operating system for a stand-alone computer.

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_

(3)

(Total 7 marks)

**Q27.**

- (a) Using an example, outline the principles of Client-Server operation.

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(3)

- (b) Operating systems are often described as *event driven*.

- (i) Explain what is meant by the term event driven.

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(2)

- (ii) Give an example of an event.

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(1)

(Total 6 marks)

**Q28.**

- (a) The table below shows different software items.

Complete the table by entering the letter which best describes each item of software.

Note, not all letters will be used.

Software	Description (letter below)
Route planner software	
New point of sale software for supermarket X's checkout terminals	
Translator software for the Java programming language	
Spreadsheet software	

**A** - general purpose application software

**B** - bespoke software

**C** - interpreter/compiler software

**D** - special purpose application software

**E** - operating system

**F** - assembler software

(4)

- (b) Explain what is meant by a library program.

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(2)

(Total 6 marks)

**Q29.**

- (a) Define the term hardware.

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(1)

- (b) You buy a second-hand PC from a friend and immediately decide to upgrade some of the internal components of the computer system. Name **two** of the internal

components, and explain **one** different benefit for each which should result from the upgrade.

Component \_\_\_\_\_

Benefit \_\_\_\_\_

\_\_\_\_\_

Component \_\_\_\_\_

Benefit \_\_\_\_\_

(4)

- (c) Some months later you add a component that requires inserting an additional printed circuit board inside the computer. Name the component and explain the new feature/benefit which will result.

Your component should be different from those given for part (b).

Component \_\_\_\_\_

\_\_\_\_\_

Benefit \_\_\_\_\_

\_\_\_\_\_

(2)

(Total 7 marks)

### Q30.

- (a) What type of software is needed to view web pages? (Do not give a product name.)

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(1)

- (b) Most generic software has features such as printing, help, and formatting. Give **two** features which are specific to the software you named in part (a).

1. \_\_\_\_\_

\_\_\_\_\_

2. \_\_\_\_\_

\_\_\_\_\_

(2)

- (c) A computer user is accessing the World Wide Web for the home page, default.htm, of an organisation whose registered domain name is StationeryUs.co.uk.

What URL will allow the home page to be found and displayed?

\_\_\_\_\_

(1)

- (d) What could be used instead of a domain name to identify a site on the World Wide Web?

\_\_\_\_\_

(1)

- (e) Domain names are organised on the World Wide Web as a hierarchy. Name **two** top level domains.

1. \_\_\_\_\_

2. \_\_\_\_\_

(1)

(Total 6 marks)

### Q31.

Software may be classified as *System Software* or *Application Software*.

- (a) Give **three** examples of system software (not product names).

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

(3)

- (b) Give **three** examples of application software (not product names).

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

(3)

(Total 6 marks)

### Q32.

- (a) One classification of software is *system software*.

- (i) What is meant by system software?

\_\_\_\_\_

\_\_\_\_\_

(1)

- (ii) Give **one** example of system software. (Not a product name).

\_\_\_\_\_

(1)

- (b) Another software classification is *application software*.



(i) What is meant by application software?

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(1)

(ii) Give **one** example of this **type** of software. (Not a product name.)

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(1)

(c) Software may be off-the-shelf or bespoke.  
What is meant by bespoke software?

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(1)

(Total 5 marks)

### Q33.

Processes are rated in priority according to their expected running times. Processes with the shortest running times are given top priority. A process joining the list will be placed immediately after all other processes of equal or higher priority. The name of the process indicates the order in which it joined the list. Process6 joined the list before Process7.

The table below contains for each process its name, the memory address of its process control block, its expected running time and a pointer to the position in the table of the next process to be executed.

Processes are entered in the table wherever there is a free slot.

(i) Complete the pointer column after the following processes have been placed in the table:

HeadPointer = 6

Position	Name	Running Time	Address	Pointer
1	Process6	7	01400	
2				
3	Process7	17	01700	
4	Process2	17	02300	
5	Process9	45	04100	
6	Process5	2	01200	
7				
8	Process19	5	01900	

(3)

- (ii) The scheduler program is written in a high level language. Name and describe a suitable data structure for this table.

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(2)

- (iii) The Computer System Manager may wish to view the current order in which the runnable processes are predicted to run. Write an algorithm that will print the process names in runnable order.

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(4)

- (iv) Name another list of processes that must be maintained by the operating system. Explain why the processes are in this list.

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(2)

(Total 11 marks)

### Q34.

A computer system will use *system software* and applications software. In order to solve a business problem a company may use *special purpose applications software* or *general purpose applications software*.

- (a) Give **one** example of a type of system software.

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(1)

- (b) What is meant by **each** of the following terms?

- (i) Special purpose applications software;

\_\_\_\_\_  
\_\_\_\_\_  
(1)

- (ii) General purpose applications software.

\_\_\_\_\_  
\_\_\_\_\_  
(1)

- (c) Give **one** advantage of each of the following:

- (i) Special purpose applications software;

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(1)

- (ii) General purpose applications software.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
(1)  
(Total 5 marks)

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Q35.

- (a) Two classifications of software are *System Software* and *Application Software*.

What is meant by

- (i) System Software? \_\_\_\_\_  
\_\_\_\_\_  
(1)

- (ii) Application Software? \_\_\_\_\_  
\_\_\_\_\_  
(1)

- (iii) Give an example of System Software (not a product name).  
\_\_\_\_\_  
(1)

- (b) Application software can be subdivided into *general purpose*, *special purpose* and

*bespoke* software.

- (i) Give a type of general purpose application software package.

\_\_\_\_\_ (1)

- (ii) What is meant by a special purpose application software package?

\_\_\_\_\_  
\_\_\_\_\_ (1)

- (c) A school is planning to introduce an electronic registration system. The management have the choice of buying a readily available software package or having bespoke software written for them.

- (i) What is meant by bespoke software?

\_\_\_\_\_ (1)

- (ii) Give **one** advantage and **two** disadvantages of bespoke software over readily available software.

Advantage \_\_\_\_\_ (1)

Disadvantages:

1. \_\_\_\_\_

2. \_\_\_\_\_

(2)

(Total 9 marks)