

4. Software

4.1 Types of software and interrupts

Marking Scheme

Q1)

Any **three** from:

- provides a user interface
- input/output control/handling
- security
- (handling) interrupts
- spooling
- memory management
- processor management
- utilities (e.g. copy, save, delete, rename, etc.)
- maintain user accounts
- load/run software
- error reporting/handling
- multiprogramming
- batch processing/JCL
- multitasking

[3]

Q2)

Any **four** from:

- Provides a user interface
- Handles interrupts / errors
- Memory management
- File management
- Manages peripherals (inputs/outputs)
- Provides security methods
- Allows multitasking
- Manages multiprogramming
- Enables batch processing
- Manages software installation / removal
- Allows creation of multiple accounts
- Levels of access

[4]

Q3)

Question	Answer	Marks
	Three from e.g. : ∞ (Provides an) interface ∞ Loads / opens / installs / closes software ∞ Manages the hardware // manages peripherals // spooling ∞ Manages the transfer of programs into and out of memory ∞ Divides processing time // processor management ∞ Manages file handling ∞ Manages error handling // manages interrupts ∞ Manages security software ∞ Manages utility software ∞ Manages user accounts ∞ Multitasking ∞ Multiprogramming // time slicing ∞ Batch processing	3

Q4)

Question	Answer	Marks
	Four from: ∞ It performs a number of basic tasks, including controlling hardware/file handling (any other suitable examples) ∞ It allows the user to communicate with the computer using hardware // without it the user would not be able to communicate with the computer using hardware ∞ It provides the user with a user interface // without it the user would not have a user interface to use ∞ PC's are often used to perform many complex tasks at a time ... – ... the OS is needed to handle this multitasking – ... therefore, it provides the ability to handle interrupts	4

Q5)

Question	Answer	Marks
	One mark for each correct term in the correct place: • System • Application • Operating • Hardware	4

Q6)

Question	Answer	Marks
(a)	Two from: • System software provides services that the computer requires • ... whereas application software provides services that the user requires One from (system software): • Utility software // by example e.g. defragmentation software, antivirus, firewall • Operating system One from (application software): • Any suitable example of an application e.g. word processor, web browser, video-editing software	4
(b)	• Secondary storage // HDD // SSD	1

Q7)

Question	Answer	Marks
(a)	<ul style="list-style-type: none"> Operating system 	1
(b)	Any one from: <ul style="list-style-type: none"> Create a file Copy a file Open a file Close a file Move a file Delete a file Rename a file Save a file Sort files 	1
(c)	Any two from: e.g. <ul style="list-style-type: none"> Keeping track of the status of each memory location Managing the movement of data to and from RAM Checks that processes have enough memory located to them Makes sure that two processes don't try to access the same memory location Manage the transfer of pages between virtual memory and RAM Allows multitasking 	2
(d)	<ul style="list-style-type: none"> Interrupt 	1

Q8)

Question	Answer	Marks										
	<p>One mark for each correct term:</p> <table><tr><th>Term</th><th>Description</th></tr><tr><td>hardware</td><td>A collective term for the physical components of the computer system.</td></tr><tr><td>application software</td><td>A type of software that provides services that the user requires and allows the user to perform tasks on the computer.</td></tr><tr><td>operating system</td><td>A type of software that manages the main functions of the computer, including managing files and managing memory.</td></tr><tr><td>firmware</td><td>A type of software that is stored in the read only memory (ROM). It includes the basic input output system (BIOS) and the bootloader.</td></tr></table>	Term	Description	hardware	A collective term for the physical components of the computer system.	application software	A type of software that provides services that the user requires and allows the user to perform tasks on the computer.	operating system	A type of software that manages the main functions of the computer, including managing files and managing memory.	firmware	A type of software that is stored in the read only memory (ROM). It includes the basic input output system (BIOS) and the bootloader.	4
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Q9)

Question	Answer	Marks
(a)	Any one from: – Operating system // Interrupt handler	1
(b)	Any five from: e.g. – Key press generates the interrupt – Interrupt given a priority – Interrupt is sent to CPU – Interrupt is placed in a queue – CPU stops current task to check the queue/service the interrupt ... – ... using an interrupt service routine – If key press is highest priority the interrupt is processed	5
(c)(i)	Any two suitable hardware example e.g.: – Moving the mouse – Clicking a mouse button – Plugging in a device – Paper jam in printer – Printer out of paper	2
(c)(ii)	Any two suitable software examples e.g.: – Division by zero – Two processes accessing the same memory location – Null value	2

Q10)

Question	Answer	Marks
(a)	Any one from: <ul style="list-style-type: none"> • Permanently store instructions (in ROM) • Stores instructions to boot up/start up the computer • Provides the operating system with a platform to run on • Controls/manages/allows communication with hardware • Store instructions securely (to stop them being easily corrupted) 	1
(b)	Any one from: Example: <ul style="list-style-type: none"> • Bootstrap • Bootloader • BIOS • Operating system (in embedded system) • Programs (in embedded systems) 	1
(c)	Any two from: <ul style="list-style-type: none"> • Operating system • Utility software <p>NOTE: Two examples of utility software can be awarded</p>	2

Q11)

(a)	Any one from: <ul style="list-style-type: none"> Operating system Utility software // by example 	1
Question	Answer	Marks
(b)	Any two from.: Example: <ul style="list-style-type: none"> Word processor Spreadsheet Database Web browser Image/photo-editor Video-editor Email client Game Social media app 	2
(c)	Any two from: <ul style="list-style-type: none"> System software manages/maintains the hardware/software Applications software allows the user to perform tasks 	2

Q12)

Question	Answer	Marks
(a)	One mark for each correct term in the correct place. <ul style="list-style-type: none"> printer computer priority level fetch–decode–execute cycle interrupt queue higher interrupt service routine (ISR) 	7
(b)	Example: <ul style="list-style-type: none"> Memory management Multitasking 	2

Q13)

Question	Answer	Marks
(a)(i)	D	1
(a)(ii)	<p>One mark for identifying a function. One mark for a matching description. For example:</p> <ul style="list-style-type: none"> • Memory management • ... managing what gets allocated where in memory • Managing peripherals and drivers • ... managing the communication between any input and output devices that are connected to the computer • Multitasking • ... managing the process of switching between tasks that are being carrying out • Platform for running applications • ... allowing communication between the applications software and the hardware • System security • ... proving features such as username and password • User accounts • ... allowing multiple user accounts to be created on a computer 	2
(b)	<p>Any one from:</p> <ul style="list-style-type: none"> • Firmware • Bootloader • BIOS • Bootstrap 	1

Q14)

Question	Answer	Marks
(a)	Instructions/program that is used to operate a computer/hardware	1
(b)	B	1
(c)	Operating system // system software	1