

QUESTION 6.



2 (a) Any **two** from:

- DRAM has to be refreshed / charged
// SRAM does not request a refresh
- DRAM uses a single transistor and capacitor
// SRAM uses more than one transistor to form a memory cell
// SRAM has more complex circuitry
- DRAM stores each bit as a charge
// SRAM each bit is stored using a flip-flop / latch
- DRAM uses higher power(because it requires more circuitry for refreshing)
// SRAM uses less power (no need to refresh)
- DRAM less expensive (to purchase / requires fewer transistors)
// SRAM is more expensive (to buy as it requires more transistors)
- DRAM has slower access time / speed (because it needs to be refreshed)
// SRAM has faster access times
- DRAM can have higher storage / bit / data density
// SRAM has lower storage / bit / data density
- DRAM used in main memory
// SRAM used in cache memory

[2]



(b) (i) Any **two** from

- The hardware is unusable without an OS // hides complexity of hardware from user
- Acts as an interface / controls communications between user and hardware / hardware and software
- Provides software platform / environment on which other programs can be run [2]

(ii) Any **two** from:

- Process / task / resource management
- Main memory management
- Peripheral / hardware / device management
- File / secondary storage management
- Security management
- Provision of a software platform / environment on which other programs can be run – only if not given in part (b)(i)
- Interrupt handling
- Provision of a user interface run – only if not given in part (b)(i) [2]

(c) Any **two** from:

- A DLL file is a shared library file
- Code is saved separately from the main .EXE files
- Code is only loaded into main memory when required at run-time
- The DDL file can be made available to several applications (at the same time) [2]

QUESTION 7.

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8 (a) **ONE** mark for each bullet point from **MAX TWO** groups.

- The code is already written
- (So the programmer is not starting over again) which saves time
- The code will have been used by many people
- So it should be already thoroughly tested // relatively error-free
- The programmer can use, e.g. mathematical / graphics functions, etc. (may not know how to code)
- Can be sure that the function will perform as it should // simplifies the program.
- The code should conform to industry standards
- And therefore contribute towards a more robust program

[4]

(b) (i) **ONE** mark for each benefit, and **ONE** mark for a further expansion.

- The executable file is smaller / the executable does not contain all the library routines ...
- ... DLL files are only loaded into memory when required.
- Changes / improvements / error correction to the DLL file code are done independently of the main program...
- ... So there is no need to recompile the main program
- ... All programs using it will benefit
- A single DLL file can be made available to several application programs...
- ... Saving space in memory / easing the pressure on memory

[4]

(ii) **ONE** mark for each bullet point from **MAX ONE** group.

- The executable code is not self-contained ...
- ... the DLL file(s) needed to be included at run time.
- Appropriate (linking) software must be available at run-time ...
- ... to link/include/import the DLL files.
- The DLL file must be present ...
- ... otherwise (unable to find X.dll) errors
- Unexpected changes to the DLL file / corrupted DLL file ...
- ... could mean the program stops working as expected
- Malicious changes to the DLL file ...
- ... could install a virus on the user's computer / related files could be corrupted

[2]

QUESTION 8.



Question	Answer	Marks
6(a)	1 mark for each method to max 2 • Biometric authentication // by example • Two-step authentication // by example • Firewall / proxy • Encryption • Different access rights for different users • Password protect <u>file</u> (using a different password) • Anti-malware	2
6(b)(i)	1 mark per bullet to max 2 • Pre-existing / pre-compiled / pre-written modules / code ... • ... can be linked into her program (without amendment) • To perform common / complex tasks	2



Question	Answer
6(b)(ii)	1 mark per bullet point. Max 2 for <u>one benefit</u>, max 2 for <u>one drawback</u> Benefit: • Less code needs to be written • ... saves time / saves re-inventing the wheel • Pre-tested // Used by many people • ... reduces time testing // can be fairly sure that the function will perform as it should • Can be written in a different programming language • ... making use of special features of that language • Can be complex algorithms (e.g. mathematical/graphics functions) • ... she does not need to work out how to write it // ...that she may not know how to code • Simplifies the program • ... since just the name of the function included in the source code Drawback: • Compatibility issues • ... may not work with the other code/may require changing program for it to work • Not guaranteed thorough testing • ... may be unknown or unexpected bugs / virus • Library routine may not meet exact needs • ... may give unexpected results // ... may need editing • If library routine is changed • ... there may be unexpected results / errors



Question	Answer
6(c)	1 mark per bullet point. Max 3 marks for interpreter, max 3 marks for compiler Interpreter: • Used during development • Debugging is easier • ... Because errors are reported as they are found // No need to wait until the end of the process for the error report • ... Because errors can be corrected as they are found Compiler: • Compiler used when development complete // compiler used when program ready for distribution • Produces an executable file (.exe) • ... After compilation the compiler does not need to be present for the program to run • ... The program can be given to others without access to (source) code • ... Final program does not need to be re-compiled each time it is run • Cross-compilation, the program can be compiled to run on different platforms

QUESTION 9.



Question	Answer	Marks
3(a)(i)	1 mark for each advantage, 1 mark for a valid expansion to max 2 × 2 • Code is already tested • ...so it is more robust/likely to work • Saves programming time • ...code does not have to be written/re-written from scratch • The programmer can use e.g. mathematical functions • ...that s/he may not know how to code • If there is an improvement in the library routine • ...the program updates automatically	4
3(a)(ii)	1 mark per bullet point to max 2 • A collection of self-contained (shared library) programs • ...that are already compiled • Linked to the main program during execution • Library program code is separate from the .EXE file • Library file only loaded into memory when required at run time • A DLL file can be made available to several applications (at the same time) • If DLL routine is updated the program that uses it will run the update	2
3(b)(i)	1 mark per bullet point to max 1 • Errors can be corrected as they occur • Can run a partially complete program when developing • The effect of any change made to the code can be seen immediately	1



Question	Answer
3(b)(ii)	1 mark per bullet point to max 3 • Produces an executable file • User does not have access to source code • It will (probably) be faster to run the executable • Code does not have to be compiled each time it is run • Does not need the compiler to be present at run-time

QUESTION 10.



Question	Answer	Marks
2(a)(i)	1 mark for correct answer To convert a (higher level) programming language to a different form	1
2(a)(ii)	1 mark per bullet point to max 2 - Easier de-bugging ...because errors can be corrected in real time - The effect of any change made to the code can be seen immediately - Parts of the program can be <u>tested</u>, without all the program code being available	2
2(a)(iii)	1 mark for correct answer Assembler	1



Question	Answer
2(b)	1 mark per bullet point to max 2 • The code is already written so the programmer is not starting over again which saves time • The code will have been used by many people so it should be already thoroughly tested and relatively error-free / won't need re-testing • The programmer can use e.g. mathematical / graphics functions etc. that he may not know how to code • Use of named library functions can simplify the program and make it easier to read • The library routine code should conform to industry standards and therefore contribute towards a more robust program