Section 1

Assessment instructions

Attempt **all** of the questions in this section. Each question is worth 1 mark.
Questions marked 'Select all that apply' have more than one correct answer.

Questions

1   What is the result when you convert $43{,}936_{10}$ to hexadecimal (base 16)?

   A   A16A
   B   ABA0
   C   BAB0
   D   FBA1

2   Which of the following busses is bidirectional?

   A   Address bus
   B   Control bus
   C   Data bus
   D   Timer bus

3   In the fetch/execute cycle, which of the following does the CPU fetch during a read operation?

   Select all that apply

   A   A character map
   B   A program instruction
   C   Another address
   D   The data

4   Which of the following is true about RAM?

   A   RAM is measured in MHz
   B   RAM is non-volatile
   C   RAM is volatile
   D   RAM reads data in sequence

5   During high-altitude cruising, a pilot will usually turn on the autopilot to hold the altitude and other settings. Which type of operating system does autopilot computer use?

   A   Multi-user single tasking
   B   Real time multi-tasking
   C   Time-sharing cloud control
   D   Wing control multi-processing

6 'Duty to the profession' is one of the sections in the Code of Conduct of a professional institution in computing. Which of the following are also sections of this code?

   Select all that apply

   A   Duty to the Relevant Authority
   B   Duty to Maximise Company Profits
   C   Professional Competence and Integrity
   D   The Public Interest

7 The Copyright, Designs and Patents Act (1988) protects different types of intellectual property, one of which is copyright. Which one of the following is covered by copyright?

   A   A name or title
   B   An original idea
   C   A particular colour
   D   The original expression of an idea

8 Which of the following activities is illegal under The Computer Misuse Act (1990)?

   A   Accessing files on your company intranet
   B   Making a backup of a computer program
   C   Selling a computer that is not fit for purpose
   D   Writing and deploying a computer virus

9 Which professional body, in the field of computing, produces the standards for wireless networking (802.11)?

   A   BCS, The Chartered Institute for IT
   B   Institute for Electrical and Electronics Engineers (IEEE)
   C   Institution of Analysts and Programmers (IAP)
   D   Institution of Engineering and Technology (IET)

10 If a professional becomes aware of any unethical activity or malpractice, within their place of employment, what should they do about it?

   A   Keep it to themselves to protect the good name of their employer
   B   Phone the editorial desk of a tabloid newspaper immediately
   C   Report it to their immediate superior and let them decide what to do
   D   Use company reporting procedures but be prepared to go public if necessary

11 Which of the following data types would be most appropriate to use for currency?

    A   Boolean
    B   Integer
    C   Real
    D   String

12 Which of the following are logical operators?

Select all that apply

    A   AND
    B   OR
    C   NOT
    D   NULL

13 Which of the following programming mistakes will produce a run time error?

Select all that apply

    A   Assigning a variable to the wrong data type
    B   Division by zero
    C   Making a grammatical error
    D   Using a variable that has not had a value assigned to it

14 Which of the following are acceptable formats for the characters used for naming variables?

Select all that apply

    A   All lower case with an underscore between words
    B   Camel case
    C   Mixed upper and lower case
    D   Mixed upper and lower case with a space between words

15 Which one of the following is an example of iteration?

    A   Case statement
    B   Do while loop
    C   If statement
    D   Parameter passing

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Questions

1   Flash memory is commonly used in portable storage media. From which of the
    following memory types did Flash memory evolve?

    A   CBRAM
    B   DRAM
    C   EEPROM
    D   EPROM

2   Which one of the following binary numbers is equivalent to the hexadecimal
    number $BC5D_{16}$?

    A   1000 1100 0101 1101
    B   1001 1100 0101 1110
    C   1011 1100 0101 1101
    D   1011 1101 0101 1111

3   You work on a computer games advice line. A customer reports that the game is
    taking a long time to load and that the image on screen sometimes freezes in the
    middle of the game. You consider that this is likely to be caused by a bottleneck.

    Which of these actions would you recommend to the customer?

    Select all that apply

    A   Add more random access memory (RAM)
    B   Buy a new, higher performance version of the game
    C   Delete some files from the hard disk
    D   Upgrade the graphics card

4   Which of the following typical system attributes is automatically set by the OS to
    prevent users from modifying the file in any way?

    A   Archive
    B   Hidden
    C   Read-only
    D   System

5   Which of the following is the main function of the kernel of a computer operating system?

    A   Allows the user to control system functions
    B   Controls physical communication with devices
    C   Maps data storage in the system
    D   Regulates the entire computer system

6   Legislation for the disposal of electrical and electronic equipment in the UK stems from two main European Directives. One of these is entitled Waste Electrical & Electronic Equipment. What is the title of the other directive?

    A   Disposal of Hazardous Substances
    B   Raising of Hazardous Standards
    C   Restriction of Hazardous Substances
    D   Safety Standards for Disposal of Hazardous Waste

7   The Copyright, Designs and Patents Act (1988) gives the creator of a work certain rights to control the way that the work is used. Fair Use allows some activities to be carried out. Which of the following activities are permitted under Fair Use with regard to computer programs? You may assume that the question refers to a legally owned computer program.

    A   Allowing friends to make copies of the program
    B   Creating a few spare copies in case you lose the original program
    C   Making a back-up copy of the program
    D   Selling copies of the program to raise funds for a registered charity

8   Logging into a computer system without permission is an offence under which UK Act of Parliament?

    A   Computer Misuse Act (1990)
    B   Data Protection Act (1998)
    C   Digital Economy Act (2010)
    D   Regulation of Investigatory Powers (Scotland) Act (2000)

9   Which of the following roles would you expect to be carried out by a professional body in the field of computing?

    Select all that apply

    A   Enforcing the use of specific programming languages in industry
    B   Providing courses that allow members to gain certification
    C   Offering advice to members on the application of new legislation
    D   Setting technical standards for hardware or software production

10 Which Act of Parliament covers discriminatory practice concerning the fair treatment of people of all races, genders, ages and abilities?

    A   Computer Misuse Act (1990)
    B   Data Protection Act (1998)
    C   Equality Act (2010)
    D   Freedom of Information (Scotland) Act (2002)

11 Which of the following data types would be most appropriate to use for True or False answers for a quiz?

    A   Boolean
    B   Integer
    C   Real
    D   String

12 Identify the programming construct from the following list.

    A   Constant
    B   Function
    C   Selection
    D   Variation

13 The automated announcements that you hear on a train are composed of stock phrases which have been recorded and stored in a database. At the appropriate place on the line, the program must join an introductory phrase to a station name. For example, it must join up '**The next station is**' with '**Glasgow Central**' to produce a sensible announcement, '**The next station is Glasgow Central**'.

What is the name for the joining together of separate phrases?

    A   Chain Linking
    B   Concatenation
    C   Dynamic Continuity
    D   Unification

14 The use of modular programming allows the program code to be:

    A   Generated by an interpreter
    B   Interpreted by a compiler
    C   Run without the need for testing
    D   Written by more than one programmer

15 What is the Application Program Interface?

   A   A code used by programmers to locate missing applications
   B   A methodology for interleaving programs on the desktop
   C   A professional organisation to encourage computer programmers to network
   D   A toolset for programming for a graphical user interface

Section 2

Assessment instructions

Attempt this question. This section is worth **15 marks**.

Riverside College have received grant money to upgrade one computer lab for their students. The college caters for students of all ages and abilities.

You have been employed to plan and oversee the refurbishment. This will entail repairing and replacing equipment and disposing of unneeded components responsibly.

It is your responsibility to ensure that the room is accessible and safe for all who use it.

As a professional, you will have to take care to comply with all relevant legislation and you should explain the legal obligations relating to each aspect of the project giving the full title and date of all legislation.

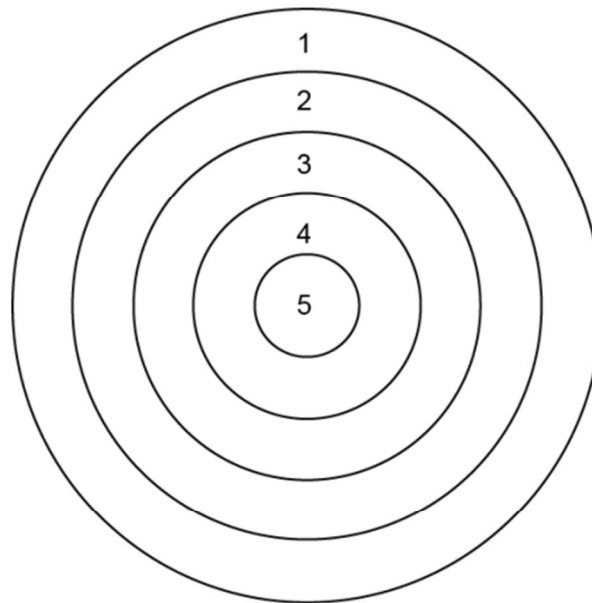| Questions	Marks
1 Using your knowledge of troubleshooting computer problems, outline the steps that you would take to establish the condition of the computers in the lab and outline the documentation that you would produce.	5
2 Examine options for disposing of unwanted equipment, choose the most appropriate method and explain your decision in terms of legal and ethical issues. Include any relevant legislation.	5
3 Discuss the factors that you would have to take into consideration in planning the placement of equipment, cabling and seating, safely and appropriately to cater for everyone.	5

Section 3

Questions   **Marks**

1   The image shown below is a simple diagram showing the five layers of
    an operating system. Name each of the numbered layers and explain
    the purpose of each one.

Fiver layer model of operating system

10

2   (a) Explain the use of each of these internal components of the
        Central Processing Unit (CPU):

    (i)   Control Unit (CU)   2

    (ii) Arithmetic Logic Unit (ALU)   2

    (b) Registers are small units of memory and these are also located
        inside the CPU. Name three registers and state the purpose of
        each.   6

3 (a) Consider this statement:

Honest, upright, law-abiding citizens have nothing to fear from the distribution of their personal data

Discuss the ethical considerations that you would take into account, when coming to a decision as to whether or not, you would agree with the statement. **5**

(b) State the name and date of the legislation that aims to protect personal data in the UK. **1**

(c) State two of the eight data principles enshrined in this act and explain how each of them serves to protect data privacy. **4**

4 Professional societies have a duty to promote computing to society as a whole and to try to ensure that everyone benefits from IT.

One example of this is that professional societies offer user qualifications that are available to the general public through schools, colleges and approved training centres.

(a) Give an example of one of these qualifications. **1**

Drawing on your knowledge of one or more professional societies, indicate three more ways in which these organisations reach out to the wider society.

(b) Identify three different types of activity, give an example of each and explain what benefits they offer. **9**

5 As a college technician, a staff member asks you to take a look at her desktop PC. She tells you that it makes a very loud, roaring noise when she switches it on and then it switches itself off again.

   (a) She has given you the information that you need for the first part of your investigation. Now, list the other steps that you would follow through for every troubleshooting situation.   **3**

   (b) As you begin to determine the scope of the problem, you will have to decide whether to take a linear or a half-split approach to tackling the job. State which approach you have decided to use and justify your decision.   **3**

   (c) Explain how you would proceed. Outline the procedures that you would go through to resolve the problem and to test the system after you have fixed the fault. Describe the documentation that you would produce. You may sketch a sample document if that helps you to illustrate your answer.   **4**

6 As an ICT team leader in a college, your team members are frequently called upon to service the staff room printers.

   (a) This recurring problem takes up a lot of technician hours as each technician approaches each case from scratch. Sometimes a technician forgets a simple step and an obvious solution is missed.

   You decide to create a flow chart to help your team to work through the possible steps to find a resolution to the problem. The flow chart should contain all the questions that you would ask yourself as you work and it should display appropriate solutions as processes. Sketch that flow chart in your answer book, labelling it clearly and using appropriate symbols.   **6**

   (b) All faults should be logged to a faults database. Draw a table to show what the fault entries might look like for two of the possible faults in your flow chart. Include all relevant information including names and dates.   **4**

7   It is very important that every programmer tests their program to ensure that it performs well and is error-free.

There are two methods of testing known as White Box and Black Box.

(a) Describe each of these methods clearly indicating the main differences between them.   4

(b) Say which one is functional testing and which is structural testing.   1

(c) State one advantage of choosing to use Black Box testing and one advantage of choosing to use White Box testing.   2

(d) A further form of testing is Maintainability Testing. State two things that programmers should do to ensure the maintainability of the program.   2

(e) Before handing the program over to the client, the program should be tested to check that it is user-friendly. What is this type of testing called?   1

8   You have been asked to write a computer program which will accept a user's answers to a short multiple-choice quiz and return a score to the user. The quiz will consist of three questions.

The possible answers are labelled A, B, C and D. The user should select one letter as the answer.

There is only one correct answer to each question, each answer is worth one mark and the user can only attempt each question once.

You have been supplied with a set of correct answers to the quiz.

(a) What structure would you use to store the correct answers within the program?   1

(b) State which data type you would choose for the user input and say why that type would be the most appropriate.   2

(c) What programing method or structure would you use to implement the decision process? Explain why you chose that particular method.   3

(d) Describe what you consider to be good practice in the internal documentation that you would include with the code, using two examples to support your answer.   4