|  |  |  |  |
| --- | --- | --- | --- |
| **Content: 3.3.1 The systems cycle** | **Red** | **Amber** | **Green** |
| 1. describe the following stages of the system life cycle (definition of the problem, investigation and analysis, design, implementation, testing, installation, documentation, evaluation and maintenance) and how the stages relate to ICT systems; |  |  |  |
| 1. describe the advantages and disadvantages of different approaches an analyst might use when investigating a system: questionnaires, interviews, meetings, document analysis, observation; |  |  |  |
| 1. describe the following software development methodologies: prototyping and rapid application development (RAD); |  |  |  |
| 1. describe the purpose of test data and explain the importance of testing and test plans; |  |  |  |
| 1. describe the contents of the requirements specification, the design specification and the system specification, distinguishing between them; |  |  |  |
| 1. describe the roles and responsibilities of the following members of the project team: project manager, systems analyst, systems designer, programmer and tester; |  |  |  |
| 1. describe, interpret and create critical path analysis (CPA) and Gantt charts, and for each explain its suitability for use in a given application. |  |  |  |
| 1. describe, interpret and create data flow diagrams and flowcharts, and for each explain its suitability for use in a given application. |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Content: 3.3.2 Designing computer based information systems** | **Red** | **Amber** | **Green** |
| 1. compare batch, interactive and real-time processing systems in terms of processing methods, response time and user interface requirements; |  |  |  |
| 1. describe the difference between types of operating systems (single-user, multi-user, multi-tasking, interactive, real time, batch processing and distributed processing systems) by identifying their major characteristics; |  |  |  |
| 1. explain the use of colour, layout, quantity of information on screen, size of font, complexity of language and type of controls when designing a human–computer interface; |  |  |  |
| 1. explain the concept and implication of good methods of human–device communications, particularly human–computer interfaces (HCI) using command line interfaces, menus/submenus, graphical user interfaces (GUIs), natural languages (including speech input–output) and forms dialogue; |  |  |  |
| 1. explain how a potential user’s perception, attention, memory and learning can be taken into account when designing an interface; |  |  |  |
| 1. describe mental models and how they can be applied to the design of a user interface; |  |  |  |
| 1. explain the importance of designing a system model that matches closely the user’s mental model; |  |  |  |
| 1. describe the user interface design tool known as the Model Human Processor, developed by Card, Moran and Newell, and its application. |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Content: 3.3.3 Networks and communications** | **Red** | **Amber** | **Green** |
| 1. compare the characteristics of a local area network (LAN), a wide area network (WAN) and a virtual network; |  |  |  |
| 1. compare the characteristics and purpose of intranets, the internet and extranets; |  |  |  |
| 1. describe client-server and peer-to-peer networks giving advantages and disadvantages of each; |  |  |  |
| 1. explain the importance of bandwidth when transmitting data and analyse how different types of communication media (cables, wireless, optical) govern the bandwidth available (knowledge of examples of different communication media is expected); |  |  |  |
| 1. compare the role of the following network components: switches, hubs, wireless access points, network interface cards, wireless network interface cards, routers, repeaters, gateways, firewalls and servers (file, applications, mail, proxy, print, backup) and justify where their use would be appropriate; |  |  |  |
| 1. describe optical communication methods (infrared, fibre optic, laser), their advantages and disadvantages and typical applications; |  |  |  |
| 1. describe wireless communication methods (Bluetooth®, radio), their advantages, disadvantages and typical applications; |  |  |  |
| 1. describe the facilities of the following communication applications: fax, email, bulletin (discussion) boards, tele/video conferencing and instant messaging and compare their use for a given task; |  |  |  |
| 1. discuss the use and implications of social networking; |  |  |  |
| 1. compare different types of broadband connection and analyse suitable situations where the use of each would be appropriate: asymmetric digital subscriber line (ADSL), cable, wireless, leased line, satellite; |  |  |  |
| 1. describe how a mobile phone network operates (cellular and satellite) and the advantages and disadvantages of cellular and satellite mobile phone systems and their use; |  |  |  |
|  |  |  |  |
| 1. describe how satellite communications systems are used and work in global positioning, weather, data transfer systems and television, explaining the advantages and disadvantages of using satellites for these applications; |  |  |  |
| 1. describe how mobile technology and networks can enable communication from anywhere in the world; |  |  |  |
| 1. discuss the implications of being able to communicate from anywhere in the world using mobile technology and networks; |  |  |  |
| 1. explain the importance of standards for communicating between devices and explain how protocols are used to enable this communication (candidates will not be expected to have detailed knowledge of specific protocols). |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Content: 3.3.4 Applications of ICT** | **Red** | **Amber** | **Green** |
| 1. describe the advantages and disadvantages of the following software-based training methods: online tutorials, computer based training, video conferencing |  |  |  |
| 1. discuss the limitations of using ICT in society today and how advances in technology may overcome some of those limitations; |  |  |  |
| 1. discuss the use of networks of computers at work and at home; |  |  |  |
| 1. describe how distributed database systems may be stored in more than one physical location using the following approaches: partitioned between sites (vertical and horizontal), entire databases duplicated at each site, central database with remote local indexes; |  |  |  |
| 1. discuss the use of different types of distributed database systems; |  |  |  |
| 1. explain security issues of distributed databases: interception of data, physical access to data, consistency and integrity of data and analyse methods of overcoming these issues; |  |  |  |
| 1. describe the components of an expert system (user interface, inference engine, knowledge base) and explain the advantages and disadvantages for a given application; |  |  |  |
| 1. describe the features of an effective management information systems (MIS) and explain the advantages and disadvantages of its use; |  |  |  |
| 1. describe how MIS and expert systems can be used by organisations; |  |  |  |
| 1. discuss the range of services offered by digital television networks and the impact of these services on individuals, television companies and broadcasters; |  |  |  |
| 1. discuss the range of services offered by mobile communication services and the impact of these services on individuals and organisations; |  |  |  |
| 1. describe the internal resources of an organisation: human, technological and premises; |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Content: 3.3.5 Implementing computer-based information systems** | **Red** | **Amber** | **Green** |
| 1. explain the involvement of the client when a custom-written computer-based information system is to be produced, from the initial meeting with the client to the installation of the system; |  |  |  |
| 1. discuss the implications of selecting, implementing and supporting the installation of custom-written and off-the-shelf solutions; |  |  |  |
| 1. explain how the expertise of staff, costs, benefits and current systems affect decisions about upgrading or installing software and hardware; |  |  |  |
| 1. describe a range of methods for installing a new computer-based information system: parallel, phased, direct, pilot; |  |  |  |
| 1. discuss the choice of a particular installation method or methods for a range of applications; |  |  |  |
| 1. explain the role of reviews during the life of a computer-based information system, describing how reviews may be planned for and carried out effectively; |  |  |  |
| 1. describe perfective, adaptive and corrective maintenance; |  |  |  |
| 1. explain the need for perfective, adaptive and corrective maintenance during the life of a computer-based information system. |  |  |  |

|  |  |  |  |
| --- | --- | --- | --- |
| **Content: 3.3.6 Implications of ICT** | **Red** | **Amber** | **Green** |
| 1. discuss the impact of external change on an organisation, individuals within the organisation and on the systems in use; |  |  |  |
| 1. discuss change management and factors that must be considered (staff capability, staff views, systems, equipment and accommodation) when managing change; |  |  |  |
| 1. discuss the importance of consultation, participation and communication when managing change; |  |  |  |
| 1. discuss ethics relating to ICT with reference to codes of conduct, for example, the British Computer Society (BCS) code of conduct and the Association for Computing Machinery (ACM) Code of Ethics and Professional Conduct; |  |  |  |
| 1. discuss the need to keep data confidential and explain how this can be achieved; |  |  |  |
| 1. discuss how encryption, authorisation, authentication, virus checking, virus protection and physical security can be used to protect data; |  |  |  |
| 1. discuss hardware and software developments that are changing, or might change, the way we live. Examples might include advances in treating injuries or disease, leisure activities, the environment, the home, education and freedom of speech and movement. This list of examples is not exhaustive as questions will reflect the current use or abuse of ICT in society. |  |  |  |