

## APPLIED INFORMATION AND COMMUNICATION TECHNOLOGY

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Paper 3 Written B MARK SCHEME Maximum Mark: 80

Published

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Question	Answer	Marks
1(a)	Signal is switched on/off/in pulses to represent the code being sent.	1
1(b)	Two from:	2
	Line of sight only so will not affect other devices in home/building Short distance so will not interfere with other devices Short distance so uses very little (electrical) power.	
1(c)	Two from:	2
	Games controller/joystick to navigate/play using buttons/paddles Use of touchscreen with 'app' on smartphone to replicate navigation features Microphone for entering voice commands Keyboard/pad for entering alphanumeric characters/user names/id/password.	

Question	Answer	Marks
2(a)	<i>Eight from e.g.:</i> Has WAN and LAN ports for connection of (W)LAN to internet         USB ports to allow sharing of (multimedia) files         Has multiple NICs, for connection to different networks/internet        support 10/100/1000 Mbit <sup>-s</sup> networks         Act as gateway between networks        provides ADSL/cable connection to WAN        provides routing tables/'default' gateway         Combines function of router and WAP         Has wireless NIC        to allow/provide use of Wi-Fi        to provide use of 2.4/5Ghz wireless bands         Provides security facilities for network        Wi-Fi security facilities        one touch connection for wireless peripherals e.g. Printer         Provides DHCP functions        to allow automatic provision of addressing for connected devices         Has web-based administration interface        allows user to configure the router         Uses open-source/Linux operating system for ease of         update/customisation         Wi-Fi clone facility to add WAPs	8
2(b)	Provides USB interface for use of flash memory devices/external storage devices as NAS.  Six from:	6
	Traffic sent as IP packets from device packet contains destination in header Device looks up destination IP in its DNS table if IP address not known sends packet to 'default' gateway/router address if known sends packet to IP address Router examines packet header to determine destination IP address looks up IP address from DNS server if IP address not known sends packet to another router if IP address known sends packet to IP address of server.	

Question	Answer	Marks
3(a)	Four from e.g.:	4
	Signal is spread over a number of frequencies within the band frequency hopping is where carrier frequency is rapidly switched using a code known to both transmitter and receiver Uses a pseudorandom number generator to produce the codes direct spread where signal is spread over a range of frequencies centred on the main/nominal frequency Can be a mixture of frequency hopping and direct spread.	
3(b)	Six from:	6
	Increased resistance to interference Increased resistance from 'jamming' Increased bandwidth Increased resistance to eavesdropping/interception Increased resistance to multi-path reflections/fading Allows multiple users/access by multiple devices Can transmit on same frequency as others by using different code Limits power density so safer to use.	
3(c)	One from:	1
	Bluetooth GPS.	
4	Six from:	6
	Knowledge base has many individual items of information/facts that need updating so each item interacts with many other items during reasoning difficult to check all/every interaction Knowledge base objects are inter-dependent so modifying/updating one will affect another creating a need for more modifying Inferences/reasoning carried out during processing is not easily observed system makes inferences as processing occurs and changes/adds facts so changes may affect reasoning in unknown ways Changes may cause other changes to be made which may create need for more changes.	

Question	Answer	Marks
5	Six from: Examine patient to determine symptoms/collect data Enter symptoms/data into expert system via user interface Collect symptoms via sensors attached to patient Doctor/patient enters answers to questions into user interface Expert system searches knowledge base for match with symptoms/data Inference engine uses rules base to add data to working memory to use rules/conditions to find match for symptoms/data to add data that could trigger use of more rules use of forward/backward chaining to match conditions/data to produce list of probable/possible/suggested diagnoses/illnesses Results presented via user interface to doctor/patient as hardcopy/on screen Doctor uses results and own knowledge to make diagnosis.	6
6	<i>Eight from:</i> Advantages of e.g.:         Email has an audit trail for record keeping         Email can be answered/replied to at different times/at doctor's convenience         Email can have files attached for others to consult         Chat rooms are in real time/discussions are in real time         Chat rooms mean doctors do not have to travel to talk to others         Instant messaging is in (almost) in real time/discussions are in (almost)         real time         Instant messaging allows doctors to do other tasks         Video chat/conferencing can reduce costs of visits to other         doctors/meetings         Video chat/conferencing can be used to replace meetings where doctors have to travel         Disadvantages of e.g.:         Emails not secure         Emails can be ignored         Chat rooms can hide/do not necessarily show doctors identity         Instant messaging can easily be misused         Video chat/conferencing reduces personal interaction         Video chat/conferencing can be affected by technical issues/different time zones.	8

Question	Answer	Marks
7	Six from: Attach sensors/named sensors to patient connect sensors to computer system via ADC/convert analogue signals to digital Computer continually reads/stores data from sensors processes data for display compares data to pre-set values Data output/displayed on screen for doctors/nurses to watch accompanying sounds to reassure monitoring staff that all is well hardcopy produced stored data used for analysis/comparison over time alerts/alarms sounded if pre-set parameters exceeded.	6
8	Six from: Web browser uses HTTPS Website operator/owner acquires/has a certificate from a certificate provider using a certificate signing request Digital identity certificate provides a public key holds website owner name/information website owner email address Certificate provider has checked that the website owner has authority to use website address/domain Certificate provider signs certificate and provides a public document Web browser is sent digital certificate when it accesses website Web browser reads certificate information uses public key to decrypt certificate checks against built-in list of trusted/root certificates if certificate is valid then web site is authenticated if certificate is not valid user is given popup warning that site has not been authenticated.	6

Question	Answer	Marks
9(a)	<i>Four from:</i> At least 8 characters long Contains characters mixture of uppercase/lowercase/numbers keyboard characters/symbols not defined as numbers or letters Does not contain a complete word or phrase Is different from previous passwords Does not relate to the user/contain the user name Does not repeat characters too often.	4
9(b)	Four from: Users may write down passwords in accessible places if passwords are excessively complex required to be changed too frequently Users may have too many passwords to manage so may use same password for all accounts Users may choose weak passwords if not allowed to write down password Special characters may prove difficult to use if travelling in different countries/keyboards Identity management systems may require one password to access all others the master password may be easily found by hackers/social engineering techniques.	4
10	Four from: Basic requirements are identified input and outputs determined Initial/first prototype developed only includes user interfaces Customers/end-users examine the prototype provide feedback on additions or changes Prototype is revised/enhanced based on user feedback Prototype build and end user examination may be repeated.	4

Question	Answer	Marks
11	Six from:	6
	Benefits include e.g.         Reduced costs of development         Reduced time of development        as any changes are made during development         Increased user involvement        fewer misunderstandings/interpretations of design        final product more likely to satisfy the end-user         Can experiment with prototype before building final product         Drawbacks include e.g.         Analysis of requirements can be inadequate        complete project may not be analysed        better solutions may be overlooked         Confusion of end user over what is actually wanted/required        developer and end user may have different ideas of what end product	
	Excessive time spent on developing prototype prototype may become too complex not meet end user requirements	
	Max 5 marks for all benefits or all drawbacks. One mark available for a reasoned conclusion.	
	Total:	80