

**MARK SCHEME for the October/November 2010 question paper
for the guidance of teachers**

9691 COMPUTING

9691/31

Paper 3 (Written Paper), maximum raw mark 90

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Mark schemes must be read in conjunction with the question papers and the report on the examination.

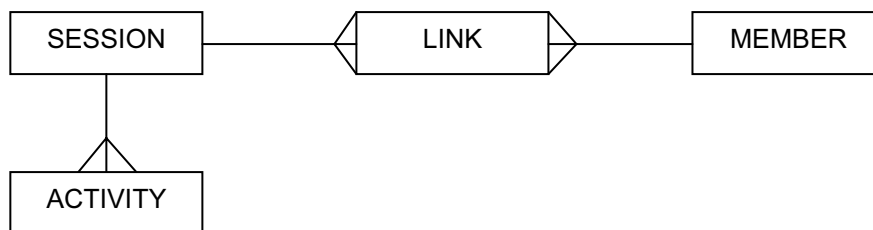
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- 1 (a) Advantages:
- Access to the correct customer information can be made from any machine/it is not necessary to use the machine storing that information
 - The customer details are always up-to-date/there is only one copy of the customer file.
- Disadvantages:
- While one user is accessing or amending the file, others cannot use it/because it is necessary to maintain the integrity of the data held
 - The data is less secure/more people can see the files so less confidential/more difficult to keep files confidential to one worker.
- (2 per -, max 1 advantage and 1 disadvantage, max 4) [4]
- (b) (i) - All computers in the star network are connected to the switch
 - The switch is capable of receiving a message and identifying where the message should go...
 - the message is only sent to the correct places/reducing network traffic
 (1 per -, max 2) [2]
- (ii) -Lies between the two networks
 -Passes messages from one network to the other
 -Converts data into the appropriate form for the receiving network
 (1 per -, max 2) [2]
- (iii) -Used to connect chief accountant's computer to telephone line (*not Internet*)
 -Converts between digital and analogue signals
 -Modulator/Demodulator
 (1 per -, max 2) [2]
- (c) -Information is relevant to the company/private network
 -bank of company resources
 -More chance of workers seeing information
 -Fewer people using intranet/less information available...
 -makes it easier to navigate...
 -faster to access information
 -Information more secure from hacking/viruses.
 -less unsolicited email
 (1 per -, max 4) [4]

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- Mark Points:
- All three entities represented
 - Session to Activity being one-to-many
 - Link entity between SESSION and MEMBER
 - Session to Link is one-to-many
 - Link to Member is many-to-one
- (allow 1 mark for session to member is many-to-many)
must be a recognisable ER diagram [5]

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- 3 (a)** -Single processor/control unit
 -Sequential processing
 -Instructions and data indistinguishable...
 -can be stored together (in same memory unit).
 (1 per -, max 3) [3]
- (b) (i)** -Hold the data currently being processed
 -Result of calculation is held in accumulator...
 -before being passed to memory unit
 (1 per -, max 2) [2]
- (ii)** -The address of the next instruction
 -Contents incremented (after being read)
 -Contents changed by a jump instruction
 (1 per -, max 3) [3]
- 4 (a)** -Interpreter translates one instruction and runs it before translating the next.
 -Compiler translates whole program before it is executed
 -Interpreter maintains source code throughout run/program execution
 -Compiler creates the object code and drops the source code
 -Interpreter must be present in memory during run/program execution
 -Compiler removed once object code produced
 -Object code larger than source code
 -Compiled program runs more quickly once it is translated
 -interpreter produces error diagnostics as they are met
 -compiler produces a file of error diagnostics at end of compilation
 -interpreter makes debugging easier
 -compiler needs whole program to be syntax error free to produce object code
 -interpreter can execute partial programs
 -compiler needs a whole block of code to run
 (1 per -, max 6) [6]
- (b)** -Puts each statement into form required by the syntax analyser
 -Keywords are tokenised
 -If keyword not in dictionary then error reported
 -Programmer-defined names entered into symbol table//symbol table created.
 -names not following rules create error message
 -Removes unnecessary characters
 (1 per -, max 5) [5]

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- 5 (a) -Software interrupt...
 -e.g. generated by the current program/may need to use printer/...
 -I/O interrupt...
 -e.g. Initiated by I/O hardware/user pressed a key/...
 -Timer interrupt...
 -e.g. end of time slice
 -Hardware interrupt...
 -e.g. power off
 (1 per -, max 2 pairs, max 4) [4]
- (b) -current process halted
 -Interrupt given a priority
 -Placed in queue with other interrupts to be done...
 -according to priority
 -When interrupt reaches top of queue it is processed // highest priority is handled first
 -Contents of registers placed on stack
 -values read from stack to registers.
 (1 per -, max 5) [5]
- 6 Repeat
 -Compare new value with root value / head
 -If > root value then follow right subtree
 -Else follow left subtree
 -Until no subtree
 -Insert new value as root of new subtree
 (1 per -, max 4) [4]
- 7 (a) (i) Mantissa is 01001100
 -Created by $9 \frac{1}{2} = 1001.1$
 -Point moved to be in front of first 1 and 0 placed in front
 Exponent is 00000100
 -created by number of places point is moved
 $-4 = 100_2$
 (1 per -, max 4) [4]
- (ii) -Mantissa is 01011001
 -Exponent is 00000101 [2]
- (b) -Range is decreased...
 -because power of two to multiply mantissa by is decreased
 -Accuracy is increased...
 -because more digits/bits (are represented after the binary point). [4]

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- 8 (a) -Can have staff training sessions...
 -without staff having to travel / thus saving time of employees
 -Saves costs of transport/hotels/venue
 -Meetings can be at any time/immediate
 -Personnel do not have to have large amount of time off work to attend.
 (1 per -, max 4) [4]
- (b) -Enlarges market
 -now worldwide rather than just local to stores
 -Opens up richer markets where higher prices can be charged
 -Sells 24/7
 -No need for expensive overheads
 -No need to employ more sales staff for extra sales.
 -possibility of larger range of goods
 (1 per -, max 4) [4]
- (c) Technical:
 -Designed for use by a technician/computer knowledgeable person
 -Shows how the system was put together/works
 -So that a technician can alter the system/correct it/maintain it
- User:
 -Designed for non computer literate user of system
 -Provides training guides/instructions for use
 -What to do when something goes wrong.
 (1 per -, max 4) [4]
- (d) *examples must refer to the scenario in the question*
- (i) -Needed to correct bugs in the system, found in operation
 -e.g. Totals over \$100 are output without cents value
- (ii) -Changes to the system necessary because of external factors
 -e.g. Sales tax on shoes has changed
- (iii) -Changes which enhance/improve performance of system
 - e.g. A change to the sorting algorithm to speed up production of lists of most popular shoes. [6]
- 9 (i) -Data and methods are kept together
 -Data can only be accessed using methods attached to it [2]
- (ii) -Computer given facts and rules
 -required outcomes are described, not how to achieve them [2]
- (iii) -Instructions are one-to-one with machine code/binary
 -Use of mnemonics / labels
 -Memory locations can be accessed directly
 (1 per -, max 2) [2]

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- 10 (a) (i)** -Simultaneous use of... (*do not accept: apparently*)
-more than one processor...
- (ii)** -to carry out large number of calculations...
-because the calculations are simple/similar/repetitive...
-carried out in much shorter time (compared with single processor)
-Calculations are interdependent with results of one group feeding into next calculations.
(1 per -, max 3 per dotty, max 4) [4]
- (b)** Need for complex software/O.S. [1]