

MARK SCHEME for the May/June 2008 question paper

9691 COMPUTING

9691/03

Paper 3 (Written Paper 3), maximum raw mark 90

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- 1 (a)** -Database held as a single table
 -Comprises records of information...
 -relating to physical items
 -and fields within the records
 -each record containing the same fields
 (1 per -, max 3) [3]
- (b)** -Reduced data duplication...
 -because data can be cross referenced using foreign keys
 -Improved accuracy of data...
 -because changes made more easily
 -Improved data integrity...
 -because reduced duplication means fewer clashes
 -Improved data security (privacy)...
 -because DBMS will control access by users more easily
 -Improved understanding by users...
 -because different users can be given different views of the data
 (max any 6) [6]
- 2 (a) (i)** -Parallel/both systems used simultaneously/in order to compare results
 -Phased/part of new system introduced/other parts only introduced when first has been fully tested, learned/horizontal introduction
 -Direct/old system removed, new system started up/no overlap of systems/no fallback
 (Up to 2 per -, max 6) [6]
- (ii)** Either:
 -Parallel
 -allows full testing to ensure doctors are satisfied with new system/patient records not lost if new system fails
 Or:
 -Phased
 -e.g. allows doctors to get used to computerised patient records before moving on to prescribing of drugs
 (1 per -, max 2) [2]
- (b)** -Restricted access/keeps patient records secure/sensitive nature of data/less chance of hacking
 -Limited volume of data/makes searches simpler, quicker/all data is relevant
 -Only relevant people have access/so communications can be considered secure/any comments on the intranet can be considered relevant, accurate, informed
 (max 4) [4]

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- 3 (a) (i)** -Pressure sensor/on front of robot to tell processor that a solid object has been touched
 -Radar or Sound or Sonar/to build up a picture of surroundings/to warn when something is in front of robot
 -Infra red/light sensor/to detect light intensity which will warn robot of change of surroundings/to warn when something is in front of robot
 -Sound sensor/may hear human or other machine approaching
 (Up to 2 per -, max 2-, max 4) [4]
- (ii)** -Decisions must be taken immediately...
 -because the environment it is working in is real time. [2]
- (b)** -Production line/don't have to pay a robot/able to work in 'difficult to reach situations'/more accurate/reliable/work 24,7/no support structure needed
 -Dangerous situation like nuclear reactor/robot expendable/too dangerous for human activity
 -Micro work/robot is completely accurate/human would not be able to do work to such tolerances
 -Situation requiring speed of reaction/human takes too long to react/plan course of action
 (1 per application + 1 per reason, max 2 applications, max 4) [4]
- 4 (a) (i)** 01011101
 (1 per nibble) [2]
- (ii)** 135
 (1 for 1, 1 for 35) [2]
- (iii)** 5D
 (1 per digit) [2]
- (b) (i)** -Group the bits in threes
 -from the LSB
 -Change the binary groups to denary
 (1 per -, max 2) [2]
- (ii)** -Groups of 4 bits
 -Give hexadecimal values [2]

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- 5 (a)**
- 1 Requirements of hardware need to be standardised in order to allow communication worldwide/these include connectors/communication medium/compatibility of peripherals with computer system/software similarities mean no problems with compatibility between files
 - 2 File format must match or receiving computer will read received file in the wrong 'language'/text only and rich text files (allow one mark each if they are explained)/others explained
 - 3 Need to match rate of communication/match type of communication – simplex, duplex/parallel, serial/mention common protocol between devices/matching of rules/layering means that many peripherals can be serviced on the same system
- (max 6 points, one from each of the three groups + any other three points) [6]
- (b)**
- Too much power in hands of those whose standards are adopted
 - Stifles innovation
 - Puts those with no standard systems at a disadvantage
- (1 per -, max 2) [2]
- 6 (a) (i)** The address of the next instruction [1]
- (ii)**
- Originally set to point to first instruction in the program
 - After the contents have been used/passed to memory address register (MAR)
 - PC is incremented
 - If the current instruction is a jump instruction (whose conditions are met)...
 - then the PC is reset to the address in the instruction
- (1 per -, max 4) [4]
- (b)**
- Holds the address of next instruction...
 - when passed from PC
 - Holds the address of data location to be accessed...
 - when passed from CIR
 - Holds the address of memory location currently in use
- (1 per -, max 4) [4]

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- 7 (a) 15,3,8,10,1 Compare 3 with those before 3,15,8,10,1
 Compare 8 with those before 3,8,15,10,1
 Compare 10 with those before 3,8,10,15,1
 Compare 1 with those before 1,3,8,10,15

Mark points:

-Compare each number in turn...

-with those before it...

-to find its final place in list...

-starting with second in list...

-ending with final answer

(1 per -, max 4. Note: 4 marks for showing stages with this example)

[4]

(b) 1st List	2nd List	Compare	New List
2,4,7,9	1,3,8,10,15	2,1	1
		2,3	1,2
		4,3	1,2,3
		4,8	1,2,3,4
		7,8	1,2,3,4,7
		9,8	1,2,3,4,8
		9,10	1,2,3,4,8,9
		Copy remaining	1,2,3,4,8,9,10,15

Marks points:

Clearly show:

-First from each list compared...

-smallest in new list...

-and replaced by next from its original list

-Repeat until one list empty

-Copy remains of other list to new list

(1 per -, max 4. Credit above points from an example)

[4]

- 8 (a) -When more than one program resident...
 -and requiring processing...
 -the operating system uses scheduling to decide on processing to be done
 -Allocation of processing...
 -in a multi-access/multi programming environment
 -to be 'fair' to all programs/users
 -to use the peripherals wisely
 -to prevent system failure
 -maximise use of processor
 (1 per -, max 2)

[2]

- (b) -FCFS/first job to enter ready queue is first to enter running queue/favours long jobs
 -SJF/sort jobs into time expected to run, shortest first/new jobs place in queue in correct order
 -RR/gives time slice to each job in turn/after slice job returns to back of queue
 -SRT/jobs sorted according to run time left to do/long jobs may never be done
 -MLQ/involves a number of queues/jobs migrate through the queues according to importance
 -PD (peripheral dependency)/non peripheral dependent jobs given low priority
 (2 per -, max 3-, max 6)

[6]

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- 9 (a)** -Reserved word is isolated...
 -if not in list of reserved words (then error)
 -(If reserved word identified then syntax table) checked for expected form of statement...
 -matched to statement provided and error issued if different
 -Variable names checked against rules for variable names
 -Check for variable declarations
 (1 per -, max 4) [4]
- (b)** -All errors due to incorrect use of language have been corrected
 -When variables are first met in code generation, an address is assigned to them
 -Intermediate code is produced
 -Machine code/executable code produced (from intermediate code)
 -Optimisation of code carried out
 (1 per -, max 4) [4]
- 10 (a) (i)** -A particular fact that fits the rule
 -e.g. If fresh (X) then guppy is an instance of X/X is instantiated to guppy [2]
- (ii)** -The intention to find all instances that satisfy a rule/fact
 -e.g. If rule is fresh (X) then the goal is to find guppy, roach [2]
- (iii)** -If the result of one rule does not apply in a second rule, then go back to find another result of the first rule
 e.g. -find a salt water eater of roach
 -eats (guppy, roach) is found
 -fresh (guppy) shows guppy is a fresh water fish
 -eats (salmon, roach)
 -salt (salmon) shows salmon is a salt water fish
 -salmon satisfies the rule
 (1 per -, max 4) [4]