

**MARK SCHEME for the May/June 2010 question paper
for the guidance of teachers**

9691 COMPUTING

9691/32 Paper 32 (Written Paper), maximum raw mark 90

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- 3 (a)** -Touch/infra-red/ultra-sound/radar sensor
 -to detect obstacles
 -Light sensor
 -to follow predetermined track on floor
 -Weight sensor/pressure sensor
 -to determine when the car has had a component added to it
 -Pressure sensor
 -to show that collision has occurred
 (1 per -, max 2 pairs, max 4) [4]
- (b)** -Paint sprayers
 -arm is programmed to follow a series of actions
 -in predetermined sequence
 -Carrying parts around factory
 -Welders
 -to fix body panels to each other
 -These applications stop a human having to be in a hazardous environment
 -They ensure a high/consistent standard of work
 -Greater precision in work
 -They work continually without breaks
 -Effect on human workforce
 (1 per -, max 6) [6]
- 4 (a)** -A single table...
 -rather than a set of related tables/linked tables
 -Flat files allow only a simple 2D structuring of data
 (1 per -, max 2) [2]
- (b)** -Reduced data duplication
 -Most data items stored once
 -Because tables are linked contents of any table can be accessed from one
 -Improving data privacy
 -Access can be easily controlled
 -Users have their own views of the data
 -Views controlled using access rights
 -Improved data security
 -Regular/automatic backups of data made as part of DBMS
 -Data protected from misguided/malicious processing or alteration
 -Improved data integrity
 -Less chance of contradictory data
 -Improved/simpler search techniques
 -Using facilities provided by DBMS
 (1 per -, max 2 per type, max 3 types, max 6) [6]

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- 5** -Bus because, e.g. of simplicity and speed not important
 -Ring because, e.g. simple but fewer collisions than bus
 -Star because, e.g. of increase in performance/more reliable/greater security
 -Cables can be used because school is new and can be cabelled properly
 -Use of UTP/Twisted pair/Fibre optic/Coaxial (minimum of two types)
 -Low level of traffic may point to UTP or twisted pair
 -Length of cable points away from coaxial
 -Fibre optic is high speed
 -Use of wireless media...
 -allowing physically unrestricted access across site.
 (1 per -, max 6) [6]
- 6 (a)** -Pages are fixed size/rely on physical divisions
 -Segments are variable size/are based on logical divisions
 (1 per -, max 2) [2]
- (b)** -Index of pages is maintained...
 -If an instruction is to be executed it must be in main memory
 -When page is completed it can be over-written...
 -by the next page to be accessed...
 -which may be stored in virtual memory
 -which allows faster access than simply from storage
 -Virtual memory is using backing store to act as memory
 -Page management table...
 -used to keep track of where in memory the pages are stored
 -Pointer to next page
 (1 per -, max 6) [6]
- 7 (a)** -Many lose jobs
 -Many will need training for new tasks
 -Will reduce the dangers to people on production line
 -Semi-skilled jobs will be done by robots/computerised/example
 -Skilled jobs enhanced/become checker/tester/example
 -Non skilled jobs unaffected/keeping factory clean/example
 -New jobs maintaining systems
 -Workforce performance monitored by computer systems
 -May lead to stress in workplace
 (1 per -, max 4) [4]
- (b)** -Quality should improve because robots more precise
 -Quality should become consistent/easy to test production
 -Cannot cope easily with one-offs
 -May not spot faulty materials supplied.
 (1 per -, max 2) [2]

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- 8 (i) -The address in memory of the data/instruction to be accessed
 -Can be changed by contents of PC being copied into it
 -Can be changed by memory address being copied to it from CIR
 (1per -) [3]
- (ii) -The data/instruction to be used
 -Is changed every time an address in MAR is accessed
 -Stores data from Accumulator on its way to being stored in memory.
 (1 per -) [3]
- (iii) -Stores an instruction...
 -while it is being decoded/executed/carried out
 -Contents change when an instruction from memory has been placed in MDR, and then it is copied from MDR to CIR.
 (1 per -) [3]
- 9 (a) -System1 response time will be immediate/real time
 -as the customer must wait until processing is done
 -System 2 will be batch processed/data is collected before processing
 -the system outputs are not time critical
 (1 per -, max 3) [3]
- (b) Hardware:
 -Either need storage device/hard disk
 -System 2 may copy final details to removable storage for backup.
 -System 1 needs bar code reader/keyboard for input
 -System 1 needs screen/printer/sound for output
- Software:
 -System 1 requires file handling software/small amount of arithmetic software
 -Software 2 requires file sorting/merging software
 -Software 2 requires stock control software
 -System 2 requires communications software for automatic ordering
- Data Structures:
 -System 1 must have direct/random access to file
 -System 1 has array/list of customer purchases in order to produce receipt
 -System 2 must have sequential access to file
 -Transaction file must be in serial form/sorted into sequential order
 -Database for products/stock
 (1 per -, max 8) [8]

10 (a) (i) . is not defined [1]

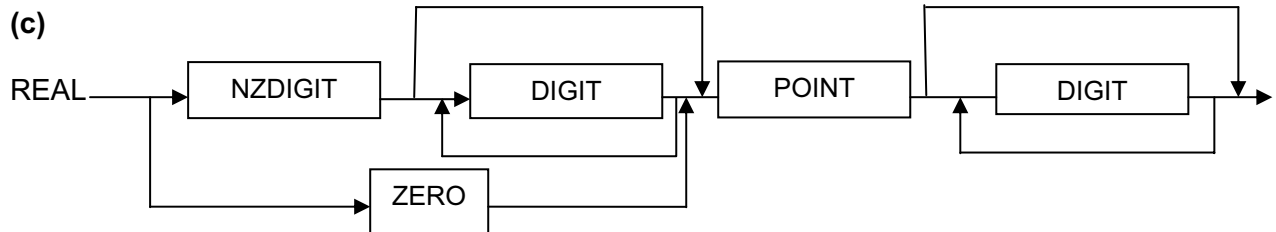
(ii) an integer must not begin with a zero [1]

(b) $\langle \text{REAL} \rangle ::= \langle \text{FIRST} \rangle \langle \text{POINT} \rangle \langle \text{NUMBER} \rangle \mid \langle \text{FIRST} \rangle \langle \text{POINT} \rangle$
 $\langle \text{FIRST} \rangle ::= \langle \text{INTEGER} \rangle \mid \langle \text{ZERO} \rangle$
 $\langle \text{POINT} \rangle ::= .$
 $\langle \text{ZERO} \rangle ::= 0$

Mark points:

- Definition contains . (point)/Definition contains 0
- Definition has integer OR 0 before the point AND number or nothing after the point
- Correct use of notation
- (Note: No marks for redefining meta variables given in question)
- Definition of zero

[3]



Mark Points:

Before point:

- Allows only 0
- NZ Digit alone
- NZ Digit AND unlimited digits

After point:

- Possibility of no digits
- Unlimited digits

(1 per -, max 4)

[4]