

**GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION**

**COMPUTER STUDIES HG
(Second Paper: Theory)**

**Possible Answers / Moontlike Antwoorde
Feb / Mar / Maart 2006**

QUESTION 1

1.1

		Y'	Y'	Y	Y	
		00	01	11	10	
W'		1		1	1	X'
00						
W'			1			X
01						
W			1	1		X
11						
W			1	1		X'
10						
		Z'	Z	Z	Z'	

Grouping b

$$F(W,X,Y,Z) = X'WZ'b + W'X'Yb + Y'XZb + WZb \quad (5)$$

$$\begin{aligned}
 1.2 \quad F(w,x,y) &= wxy + wyx' + w'xy + yx' \\
 &= xy(w + w') + yx'(w + 1) b \\
 &= xy + x'yb \\
 &= y(x + x') b \\
 &= yb
 \end{aligned}$$

(4)

1.3 1.3.1

a	b	c	F
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

Table b b b b Deduct one mark for each mistake – maximum 4

(4)

1.3.2 $F(a,b,c) = m_3 + m_5b + m_6 + m_7b$

(2)
[15]

QUESTION 2

- 2.2 2.1.1 Serialb
 2.1.2 Firewireb
 2.1.3 SCSIb
 2.1.4 USBb
 2.1.5 Bluetoothb
 2.1.6 Parallelb (6)
- 2.2 AGP, PCI, ISA (A, C, B) b b Correct order (2)
- 2.3 2.3.1 ISA –mouse, modem, sound, and low speed network cardsb
 2.3.2 PCI – video, sound, SCSI , high speed network cards. b
 2.3.3 AGP – AGP video cardb (3)
- 2.4 Databusb and address busb (2)
- 2.5

RISC	CISC
Simple instructions	complex instructionsb
Instructions the same length	instructions differing in length b (2)

- 2.6 2.6.1 a) The more b transistors on the chip, the more powerful b the chip will be
 b) The smaller the chips the moreb will fit onto a chip the more powerful the chip will be. b (4)
- 2.6.2 SSE/ SSE2b (1)
- 2.6.3 Regulates the activities on the motherboard OR Any 1b (1)
 Vibrate at a fixed rate OR
 Clock pulses moves data at a fixed speed on the motherboard.
- 2.6.4 133 MHzb (1)
- 2.6.5 Clock multiplication refers to the process taking place when the pulse of the systems clock b is multiplied by an integer or fraction b to obtain the desired clock speed for the component concerned. (2)
- 2.6.6 Registersb (1)
- 2.6.7 Has more than one pipeline / more than one instruction are executed per clock cycle b (1)
- 2.6.8 Pipeline processing is a method of processing where the processor is able to read new instructions from the memory b before the instructions being processed are completedb . It accelerates the processing. b (3)
- 2.6.9 The processor must be compatible with the mother board. b (1)

- 2.7 2.7.1 Cache memory b
- 2.7.2 Synchronized DRAM b
- 2.7.3 DDR DRAM b
- 2.7.4 Flash Memory b
- 2.7.5 ROM b (5)

[35]

QUESTION 3

- 3.1 3.1.1 Peer network resources are shared by the work stations without the use of a server. b (2)
Server – in this system each computer is either a client or a server. b
- 3.1.2 Network: Windows NT/2000 Server, Novell, UNIX, LINUX b
Peer: Windows 95/98/XP/NT workstation b (2)
- 3.2 PDA b (1)
- 3.3 Solves a set of very specific problems b / Provides functions in addition to the operating system. (1)
- 3.4 3.4.1 Reduces files size – less storage space. b
Useful when email is sent. b (2)
- 3.4.2 Relatively inexpensive b
Source code is available b Any 2 (2)
A large number of users assist in identifying weaknesses and proposing improvements.
- 3.5 If you lose a file or experience a problem with your computer, you can retrieve lost files. b (1)
- 3.6 It is a program that places a large quantity of printing in a spool file b while waiting for the printer to complete its tasks. b (2)
- 3.7 There is insufficient memory
System properties changes
A program or file does not work correctly.
The system becomes very slow.
Files become corrupted.
An unknown message or foreign element on the computer
Loses data Any 2 b b (2)
- 3.8 Virtual memory b uses space on the disc b to enable the operating system to trick the user and the computer into thinking that more memory is available b than the computer in fact possesses. (3)

- 3.9 Multitask processing is a processing mode that lets it appear as if the operating system is executing more than one task (program) at a time. (2)
[20]

QUESTION 4

- 4.1 Digital – Speed of data transfer much higher than analogue. (2)
Digital – much more reliable than analogue / less interference than analogue. (2)
- 4.2 Use digital communication networks
Line switching
Fast fault free communication –
Image, voice, music, text, and video are transmitted.
Large bandwidth – maximum speed of 2 Mbps.
More expensive than ordinary telephone calls Any 3 (3)
- 4.3 4.3.1 Fibre optic cables
Twisted pair cable
Co-axial cables (3)
Infra red
Radio waves
Cellular radio
Satellite
Microwaves } Wireless
Any 3 (6)
- 4.3.2 Busy sites such as entrance and reception areas.
Isolated areas and buildings
Buildings where cabling will be difficult such as historic buildings
If the telephone system at the scene of an accident is out of order. Any 3 (3)
- 4.4 4.4.1 Can share a modem and gain access to the internet.
Can share a printer.
Cost effective Any 2 (2)
- 4.4.6 A router can connect two networks that do not use the same architecture. (3)
It can identify the best possible route to the segment where the signal must be sent to. (3)
Provides more security to the network. (3)
- 4.4.3 The physical connection and placing of computers in a network. (1)
- 4.4.4 Star (1)
- 4.4.5 Many stations have access to the line [multiple access]. (3)
Before transmitting, sensing whether the line is busy. (carrier sense)
In the case of a collision occurring, collision detection is activated (collision detection) (3)

- 4.4.7 Consists of twisted pair telephone lines
Multi-task access medium. Can speak on the telephone whilst surfing the Internet. Continuous connection
Asymmetric / Bigger bandwidth from ISP to client. Any 3 b b b (3)
- 4.4.7 When information is down-loaded from the internet b , it is much faster because of the greater bandwidth from ISP to computer. b (2)
- 4.4.8 Packet switching b (1)
- [30]

QUESTION 5

- 5.1 5.1.1 Program theft b - Large expenditure is incurred in the writing of programs. Companies lose large amounts of money through persons copying programs. b (2)
- 5.1.2 Privacy b – client information can be abused by others for example by emailing b (2)
- 5.2 5.2.1 Biometrics b – personal identification by using the appearance of the body. b (2)
- 5.2.2 Encryption – making use of a program to convert b that which is sent into gibberish b by applying a certain formula or algorithm (2)
- 5.2.3 Digital signature (2)
- 5.2.4 Digital certificate (2)
- 5.2.5 Computer virus – a program b that changes other programs without the intention, permission, or knowledge of the user. b (2)
- 5.2.6 *Firewall* –Systems designed to prevent unauthorized access b to or from a private network. b (2)
- 5.3 Parity – if a modem uses even parity b , there must be an even number of one's b for example 011001111 / for uneven parity, an uneven number of one's .
Check-sum - each message is accompanied by a numerical value b that indicates the number of one's b in the message for example 011111000 - 5 one's. (4)
- 5.4 Attachments b sent with email contains a virus (1)
- 5.5 5.5.1 The programs are called browsers. b Example: Netscape Navigator / Netscape Communicator / Internet Explorer b (2)
- 5.5.2 Yahoo, Altavista, and Google are search engines. b A search engine is a sophisticated index system that assists us to find information and to gain access to it. b (2)

[25]

QUESTION 6
DELPHI AND PASCAL

- 6.1 6.1.1 Longint, b shortint, word. Any 1 (1)
- 6.1.2 If a string value is given that can not be transformed into numbersb ,
the value of the errcode > 0b (2)
- 6.1.3 No, b no structured data type present in a parameter listb (2)
- 6.1.4 No, b div may only be used with whole number type data. b (2)
- 6.1.5 Value parameter b – cwr d. Reference parameter - cnumber. b (2)
- 6.2 var
let :str1;
- ```
begin
 if cnumber > 9b then
 case cnumber ofb
 10: let := 'A';
 11: let := 'B';
 12 : let := 'C';
 13 : let := 'D';
 14 : let := 'E';
 15 : let := 'F';
 end
 else
 str(cnumber, let); b
 changeoversingledigit := let; b
end;
```
- } b b
- 6.3 converts('1011',number) b (1)
- 6.4 A local variable is declared within a procedure and can only be used there. b A global  
variable can be used by all the procedures. b (2)

[18]

## QUESTION 7

7.1

| i <b>k</b> | iNumber <b>b</b> | iNumber > 0 <b>b</b> | aArray                  |
|------------|------------------|----------------------|-------------------------|
| 0          | 10               | Yes                  |                         |
| 1          |                  |                      | aArray[1] = 10 <b>b</b> |
|            | 7                |                      |                         |
|            |                  | Yes                  |                         |
| 2          |                  |                      | aArray[2] = 14 <b>b</b> |
|            | 4                |                      |                         |
|            |                  | Yes                  |                         |
| 3          |                  |                      | aArray[3] = 12 <b>b</b> |
|            | 1                |                      |                         |
|            |                  | Yes                  |                         |
| 4          |                  |                      | aArray[4] = 4 <b>b</b>  |
|            | -2               |                      |                         |
|            |                  | No                   |                         |

(7)

7.2 if  $iNumber \bmod 2 = 1$  **b** then  $iCentre := aElement[iNumber \div 2 + 1]$  **b** else  
 $(iCentre := aElement[iNumber \div 2] \bmod + aElement[iNumber \div 2 + 1] \bmod) / 2$ ; **b**

(5)

7.3 7.3.1  $twodim[2000..2004 \bmod, 1..4 \bmod]$  of integer; **b**

(3)

## DELPHI

```
7.3.2 case rgpYear.ItemIndexb of
 0 : year := 2000;
 1 : year := 2001;
 2 : Year := 2002;
 3 : Year := 2003;
 4 : Year := 2004;
end;
```

```
sedT1.Value := twodim[jaar,1];
sedT2.Value := twodim[jaar,2];
sedT3.Value := twodim[jaar,3]; b b
sedT4.Value := twodim[jaar,4];
```

(3)

```
7.3.3 iLargest := 0;
for x := 2000 to 2004 dob
 for y := 1 to 4 dob
 if twodim[x,y] > iLargest thenb
 iLargest := twodim[x,y];b
 lblMost.Caption := 'The most learners per term for all the
years were ' + intToStr(iLargest);b b
```

(6)

**PASCAL**

```
7.3.2 for column := 1 to 4 do
begin
write(two[year,column] b:8);
end;
```

(3)

```
7.3.3 Largest := 0;
for row := 2000 to 2004 do
begin
for column := 1 to 4 do
begin
if two[row,column] > largest then
largest := two[row,column];
end;
end;
writeln('The most learners per term for all the years were ',largest);
```

(5)

**[22]**

**QUESTION 8  
DELPHI AND PASCAL**

- 8.1 8.1.1 Assign/File –Connect the internal file variable to the external disc. b
- 8.1.2 Reset –Open an existing file for reading and additions. b
- 8.1.3 Rewrite –Open a new file for writing b and position the marker at the beginning.
- 8.1.4 Read –Read the present record. b
- 8.1.5 Seek –Shift the marker to a specific position. b
- 8.1.6 FileSize - Determine the number of records in the file. b
- 8.1.7 Write –b Write the present record to the fileb
- 8.1.8 Filepos – Determine the physical position of a record. b (8)
- 8.2 8.2.1 Show all the records b of the data file. b (2)

**DELPHI**

- 8.2.2 Used to intercept problems b so that a file may be closed and to protect data. b (2)
- 8.2.3 Datab (1)
- 8.3 FileExists tests whether the file is created b . If not, the file is created. b (2)



**PASCAL**

- 8.2.2 Datab (1)
- 8.2.3 There is no data in the file – any description of reading problems from the file. b b (2)
- Try reading from the file when the file marker is at the end of the file.  
The record layout is not the same as it was created in the file.
- 8.3 A translator directive tests whether the file is created. b . If not, the file is created. b (2)

**[15]****QUESTION 9  
DELPHI**

- 9.1 9.1.1 Checkboxb
- 9.1.2 Editb
- 9.1.3 Memo/ Richedit / Listboxb
- 9.1.4 Radiobutton / Radiogroupb (4)
- 9.2 **number := random(100) (+1( (2)**
- 9.3 9.3.1 **lblAfvoer.Caption := edtNaam.Text+ ( ' your average percentage is ' +FloatToStr( ( rAvergae) (; (2)**
- 9.3.2 **if grpChoice.Itemindex = 0 (then inc(rValue); {rValue must be INTEGER} ( (2)**

**QUESTION 9  
PASCAL**

- 9.1 9.1.1 `sound(300); b  
delay(2000); b (2)`
- 9.1.2 `gotoxy( (80,25) b (2)`
- 9.1.3 `dellineb (1)`
- 9.1.4 `number := random(100) b +1b (2)`
- 9.2 `with person do  
writeln(name,' ':20-length(name) b ,surname,' ':20-  
length(surname) b ,ageb ); (3)`

**[10]**

**QUESTION 10**  
**DELPHI**

```

procedure TfrmQuestion10.btnDetermineClick(Sender: TObject);
var
 wrd :string[20];
 k, countlet, countnumbers :integer;

 begin
 countlet := 0;
 countnumbers := 0;
 }
 wrd := edtWrld.Text; b
 for k := 1 to length(wrd) do b
 begin
 if upcase(wrd[k]) b in ['A'..'Z'] b then
 inc(countlet) b
 else
 if wrd[k] in ['0'..'9'] b then
 inc(countnumbers); b
 end;
 edtLetters.Text := intToStr(countlet); b
 edtNumbers.Text := intToStr(countnumbers); b
end;

```

**Initialise variables at any location eg. FormActivate**

**[10]**

**QUESTION 10**  
**PASCAL**

```

program vb;
uses crt;
var
 wrd :string[20];
 k, countlet, countlnumbers :integer;
begin
 countlet := 0;
 countnumbers := 0;b
 wrd := 'ISDC 15420';b / Lees wrd in
 for k := 1 to length(wrd) do b
 begin
 if upcase(wrd[k])b in ['A'..'Z']b then
 inc(countlet)b
 else
 if wrd[k] in ['0'..'9']b then
 inc(countnumbers);b
 end;
 writeln('Aantal letters ',countlet);b
 writeln('Aantal syfers ',countnumbers);b
 readln;
end.

```

**[10]**  
**TOTAL: 200**