SENIOR CERTIFICATE EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN

OCTOBER / NOVEMBER
OKTOBER / NOVEMBER

2004

COMPUTER STUDIES

REKENAARSTUDIE

(Second Paper: Theory)
(Tweede Vraestel: Teorie)

HG **724-1/2**

21 pages
21 bladsye

COMPUTER STUDIES HG: Paper 2
Theory

724 1 2 HG

APPROVED BY UMALUSI / *GOEDGEKEUR DEUR UMALUSI*

GAUTENGSE DEPARTEMENT VAN ONDERWYS

SENIORSERTIFIKAAT-EKSAMEN

REKENAARSTUDIE HG
(Tweede Vraestel: Teorie)

TYD: 3 uur

PUNTE: 200

INSTRUKSIES:

- Beantwoord AL die vrae.
- Lees die vrae noukeurig deur.
- Hierdie vraestel bestaan uit 21 bladsye.
- Nommer jou antwoorde duidelik.
- Die programmeringsgedeelte bestaan uit Pascal en Delphi. Doen slegs **een** van die twee. Pascal- of Delphi-kodering mag in potlood gedoen word.

VRAAG 1
BOOLE-ALGEBRA

1.1 Vereenvoudig die volgende Boole-uitdrukking algebraïes na die minste moontlike terme en veranderlikes:
F(a,b,c,d) = abc + c + a'bc + cd + d' (5)

1.2 'n Elektriese motor werk soos wat in die tabel aangedui word. **H** stel hoog voor en **L** stel laag voor.

Stelsel aan	Rem	Krag	Spoed
H	L	H	H
H	H	H	L
H	H	H	H
H	L	H	L

Maak gebruik van 'n waarheidstabel met vier invoerveranderlikes om aan te dui wanneer die elektriese motor werk of nie. Die afvoer van die funksie is **1** as die motor werk. Stel Hoog(**H**) met **1** en Laag(**L**) met **0** voor. Gebruik die volgende invoerveranderlikes:

W Stelsel aan
X Rem
Y Krag
Z Spoed (5)

GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

COMPUTER STUDIES HG
(Second Paper: Theory)

TIME: 3 hours

MARKS: 200

INSTRUCTIONS:

- Answer ALL the questions.
- Read the questions thoroughly.
- This paper consists of 21 pages.
- Number your answers clearly.
- The programming section consists of Pascal and Delphi. Do only **one** of the two. Pascal or Delphi-coding may be done in pencil.

QUESTION 1
BOOLEAN-ALGEBRA

1.1 Simplify the following Boolean expression algebraically to the least possible terms and variables:
F(a,b,c,d) = abc + c + a'bc + cd + d' (5)

1.2 An electric motor operates as indicated in the table. **H** represents high and **L** represents low.

System on	Brake	Power	Speed
H	L	H	H
H	H	H	L
H	H	H	H
H	L	H	L

Use a truth table with four input variables to indicate when an electric motor operates and when not. The output of the function is **1** if the motor works. Use **1** to indicate High(**H**) and **0** to indicate Low(**L**). Use the following input variables:

W System on
X Brake
Y Power
Z Speed (5)

1.3 Gebruik 'n Karnaugh-diagram om die volgende funksie te vereenvoudig:
$F(W,X,Y,Z) = m_0 + m_2 + m_8 + m_{10} + m_{11} + m_{14} + m_{15}$ (5)
[15]

VRAAG 2
REKENAARARGITEKTUUR

2.1 Die sportorganiseerder van julle skool wil 'n nuwe rekenaar koop. Maak 'n voorstel van watter tipe rekenaar hy moet aankoop. Verwys na die volgende:

2.1.1 Die tipe verwerker en verwerkingspoed

2.1.2 Grootte van die geheue

2.1.3 Kapasiteit van die hardeskyf (4)

2.2 Rekenaars kan oor drie tipes RAM beskik nl. DDR SDRAM, Sinchroniese DRAM en RDRAM.

2.2.1 Noem EEN kenmerkende eienskap van

(a) DDR SDRAM.
(b) Sinchroniese DRAM. (2)

2.2.2 Die Sinchroniese DRAM wat beskikbaar is, staan bekend as PC133. Waarna verwys die **PC133**? (1)

2.2.3 Noem TWEE redes waarom rekenaargebruikers eerder DDR SDRAM en Sinchroniese DRAM sal verkies bo RDRAM. (2)

2.2.4 Byvoeging van meer RAM tot jou rekenaar maak verwerking vinniger. Bespreek hierdie stelling. (2)

2.2.5 Die meeste toepassingsprogramme (sagteware) benodig baie meer geheue as wat beskikbaar is wanneer die program uitgevoer word. Verduidelik hoe hierdie probleem deur die bedryfstelsel opgelos word. (3)

2.3 Noem TWEE faktore wat bydra tot beter werkverrigting van 'n videokaart. (2)

2.4 Wanneer 'n 3D-kaart aangeskaf word, moet jy seker maak dat dit versoenbaar is met die moederbord.

2.4.1 Verduidelik wat hierdie stelling beteken. (2)

2.4.2 Noem TWEE toepassings waarvoor 'n 3D-kaart benodig word. (2)

2.5 Noem DRIE faktore wat daartoe bygedra het dat verwerkers se spoed en werkverrigting met tyd verbeter het. (3)

1.3 Use a Karnaugh diagram to simplify the following function:
$F(W,X,Y,Z) = m_0 + m_2 + m_8 + m_{10} + m_{11} + m_{14} + m_{15}$ (5)
[15]

QUESTION 2
COMPUTER ARCHITECTURE

2.1 The sports organizer at your school wants to buy a new computer. Make a suggestion of the type of computer he must buy. Refer to the following:

2.1.1 The type of processor and processing speed.

2.1.2 Size of memory

2.1.3 Capacity of the hard disk (4)

2.2 Computers can have three types of RAM namely DDR SDRAM, Sinchronic DRAM and RDRAM.

2.2.1 Name ONE exceptional characteristic of

(a) DDR SDRAM.
(b) Sinchronic DRAM. (2)

2.2.2 The Sinchronic DRAM available is known as PC133. What does **PC133** refer to? (1)

2.2.3 Name TWO reasons why computer users will prefer DDR SDRAM and Sinchronic DRAM to RDRAM. (2)

2.2.4 Adding of more RAM to your computer increases processing speed. Discuss this statement. (2)

2.2.5 Most application software requires much more memory than what is available during execution of the program. Explain how this problem is solved by the operating system. (3)

2.3 Name TWO factors that contribute to better performance of a video card. (2)

2.4 When a 3D card is procured, you must ensure that it is compatible with the motherboard.

2.4.1 Explain what is meant by this statement. (2)

2.4.2 Name TWO applications that a 3D-video card is required for. (2)

2.5 Name THREE factors which contribute to the increase in speed and performance of processors over time. (3)

2.6 Maak gebruik van 'n voorbeeld om die doel van apparatuuronderbrekings te verduidelik. (2)

2.7 Gee **een** term vir elk van die volgende beskrywings.

2.7.1 'n Seriepoortspesifikasie wat die koppeling van tot 127 toestelle aan een poort toelaat

2.7.2 'n Tipe seriepoort wat toestelle in staat stel om data teen hoë spoed – ongeveer 400 Mgps – oor te dra

2.7.3 'n Standaard hoëspoed parallel koppelvlak om randapparatuur (hardeskywe, CD, CD-R, CD-RW, DVD, aftasters, ens.) aan 'n rekenaar te koppel

2.7.4 'n Metode van verwerking waar die verwerker in staat is om nuwe instruksies vanaf die geheue te lees voordat die instruksies wat dit besig is om te verwerk, heeltemal klaar verwerk is

2.7.5 'n Proses wat plaasvind wanneer die pulse van die stelselklok met 'n heelgetal of breuk vermenigvuldig word om so die gewenste klokspoed vir die betrokke komponent te verkry

2.7.6 Die komponent wat alle aktiwiteite op die moederbord reguleer

2.7.7 'n Spesiale hoë-spoed geheue wat gereserveer word vir die tydelike stoor van data of instruksies wat die waarskynlikste kans het om volgende deur die verwerker gebruik te word

2.7.8 'n Instruksiestel wat bestaan uit eenvoudige instruksies

2.7.9 Die instruksiestel wat die verwerker in staat stel om een instruksie op baie data gelyk te laat uitvoer

2.7.10 'n Lokale bus wat 'n eie beheerder het en waarvan die data-oordragspoed 66 MHz is (10)
[35]

2.6 By using an example, explain the purpose of hardware interrupts. (2)

2.7 Give **one** term for each of the following descriptions.

2.7.1 A serial port specification allowing up to 127 devices to be connected to one port

2.7.2 A type of serial port that allows devices to transfer data at a high rate – approximately 400 Mbps

2.7.3 A standard high speed parallel interface to connect peripherals (hard drives, CD, CD-R, CD-RW, DVD, scanners, etc.) to a computer

2.7.4 A method of processing which enables the processor to read new instructions from memory before completing the instructions currently being processed

2.7.5 A process which occurs when the pulses of the system clock are multiplied by a whole number or by a fraction to obtain the desired clock speed for the component that needs it

2.7.6 The component that regulates all activities on the motherboard

2.7.7 A special high-speed memory to store data and instructions temporarily which have the most probable chance to be used next by the processor

2.7.8 An instruction set consisting of simple instructions

2.7.9 The instruction set that enables the processor to execute one instruction on multiple pieces of data simultaneously

2.7.10 A local bus which has its own controller with data transfer rate of 66 MHz (10)

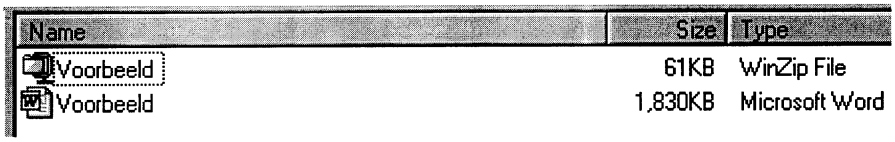
[35]

VRAAG 3
STELSELPROGRAMMATUUR

3.1 Noem **EN** bespreek kortliks VIER funksies van 'n bedryfstelsel. (8)

3.2 LindowsOS is 'n opwindende nuwe kragtige bedryfstelsel wat die stabiliteit en koste-effektiwiteit van Linux kombineer met die gebruikersvriendelikheid van 'n Windows-omgewing. Noem TWEE aspekte wat jy in ag sal moet neem voordat jy jou rekenaar se huidige bedryfstelsel met LindowsOS vervang. (2)

3.3 Die volgende is 'n voorbeeld van 'n Zip- en 'n *Microsoft Word*-lêer.



3.3.1 Wat is 'n **Zip-lêer**? (1)

3.3.2 Wat is die voordeel van 'n **Zip-lêer**? (1)

3.3.3 Noem TWEE eienskappe van 'n lêer wat in die lêergids gestoor word, behalwe die naam. (2)

3.4 Wat is **multitaakverwerking**? Verduidelik en gee 'n praktiese voorbeeld. (2)

3.5 Windows XP het ingeboude sekuriteit. Vul die ontbrekende woord/e in wat handel oor hierdie aspek. Kies die antwoorde uit die volgende lys:

enkripsie, NTFS, wagwoorde, FAT16, nutsfasiliteite, gebruikersrekeninge(*user accounts*).

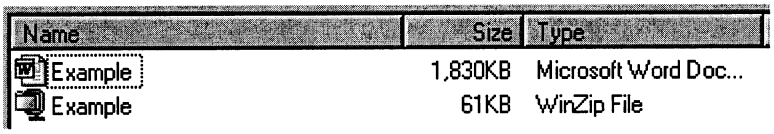
Windows XP maak gebruik van ____3.5.1_____ en nie meer van die ouer weergawes van FAT32 nie. Hierdie kenmerk laat jou toe om gebruik te maak van ____3.5.2_____ wat beter sekuriteit verseker omdat 'n wagwoord of geheime sleutel nodig is om die lêers te lees. Windows XP maak voorsiening vir netwerksekuriteit met die implementering van ____3.5.3_____ en ____3.5.4_____. Dit verseker dat ander gebruikers in die netwerk nie toegang tot jou dokumente en lêers het nie. (4)
[20]

QUESTION 3
SYSTEM SOFTWARE

3.1 Name **AND** briefly discuss FOUR functions of an operating system. (8)

3.2 LindowsOS is an exciting new powerful operating system that combines the stability and cost-efficiency of Linux with the user friendliness of the Windows environment. Name TWO aspects that you will have to consider before replacing your computer's present operating system with LindowsOS. (2)

3.3 The following is an example of a Zip- and a Microsoft Word-file.



3.3.1 What is a **Zip-file**? (1)

3.3.2 What is the advantage of a **Zip-file**? (1)

3.3.3 Name TWO characteristics of a file that are stored in the root directory, other than the name. (2)

3.4 What is **multi-task processing**? Explain and give a practical example. (2)

3.5 Windows XP has built-in security. Fill in the missing words about this aspect. Choose the answers from the following list:

encryption, NTFS, passwords, FAT16, utilities, user accounts.

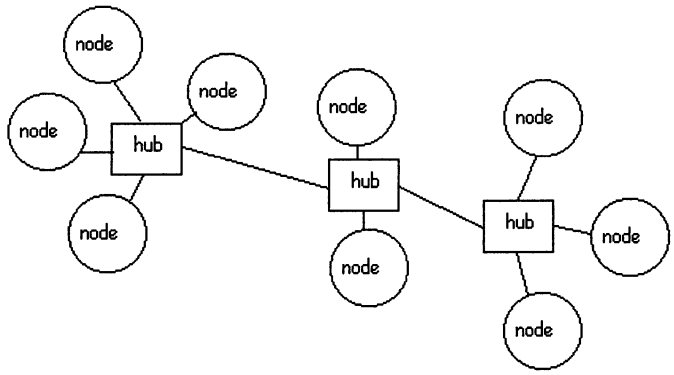
Windows XP makes use of ____3.5.1_____ and no longer uses the old versions of FAT32. This characteristic enables you to make use of ____3.5.2_____ that ensures better security because a password or secret key is required to read the files. Windows XP provides network security with the implementation of ____3.5.3_____ and ____3.5.4_____. It ensures that other users of the network cannot access your documents and files. (4)

[20]

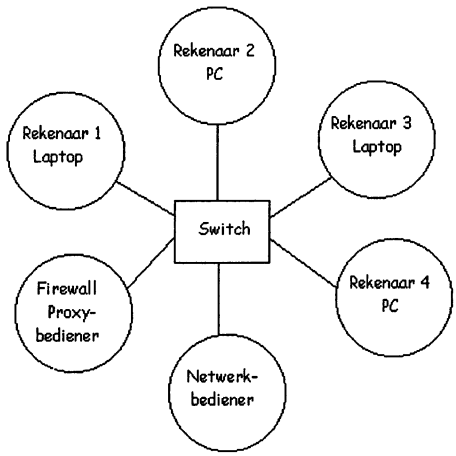
VRAAG 4
DATAKOMMUNIKASIE

4.1 Die volgende diagramme stel twee LAN's voor.

NETWERK A



NETWERK B



4.1.1 Watter topologie word voorgestel in NETWERK B? (1)

4.1.2 Behalwe rekenaars(nodusse) en hubs, noem nog TWEE ander komponente wat nodig is om 'n LAN op te stel. (2)

4.1.3 Wat is die funksie van 'n hub? (1)

4.1.4 Wat is doel van RAID-tegnologie? (2)

4.1.5 Watter komponent in NETWERK B maak waarskynlik van RAID-tegnologie gebruik? (1)

4.1.6 Wat is 'n **Proxy-Bediener**? (2)

4.1.7 Gee TWEE redes waarom dit sinvol kon wees om 'n geskakelde hub (*switch*) in NETWERK B te gebruik? (2)

4.1.8 Noem DRIE verskille tussen 'n eweknie- en bedienergesteunde netwerk. (3)

4.1.9 NETWERK B word gebruik deur 'n besigheid wat 'n ander tak in dieselfde stad het. Noem die netwerktoestel wat nodig is om netwerke te verbind waarvan die argitektuur verskil. (1)

4.2 Diginet is 'n voorbeeld van 'n Suid-Afrikaanse WAN.

4.2.1 Watter tipe lyn word gebruik vir versending in 'n Diginet WAN? (1)

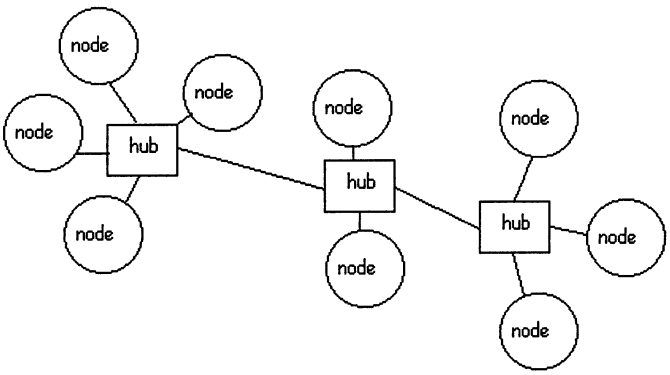
4.2.2 Noem TWEE voordele van 'n Diginetlyn. (2)

4.3 Wat is 'n **IP-adres**? (2)

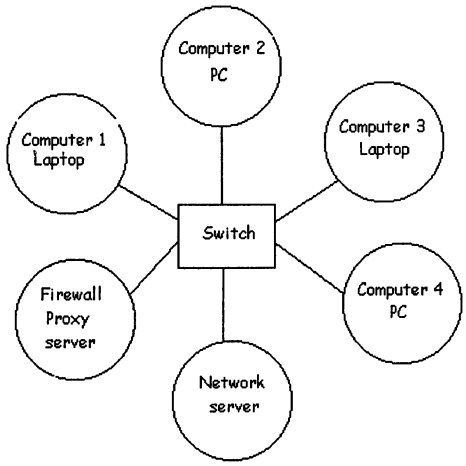
QUESTION 4
DATA COMMUNICATION

4.1 The following diagrams represent two LANs.

NETWORK A



NETWORK B



4.1.1 Which topology is represented in NETWORK B? (1)

4.1.2 Except for computers (nodes) and hubs, name TWO other components required to set up a LAN. (2)

4.1.3 What is the function of a hub? (1)

4.1.4 What is the purpose of RAID-technology? (2)

4.1.5 Which component in NETWORK B probably uses RAID-technology? (1)

4.1.6 What is a **Proxy Server**? (2)

4.1.7 Give TWO reasons why it could be meaningful to use a switch in NETWORK B. (2)

4.1.8 Name THREE differences between a peer-to-peer network and a server supported network. (3)

4.1.9 NETWORK B is used by a business which has another branch in the same city. Name the network device required to link networks of which the architecture differs. (1)

4.2 Diginet is an example of a South African WAN.

4.2.1 What type of line is used for transmission in a Diginet WAN? (1)

4.2.2 Name TWO advantages of a Diginet line. (2)

4.3 What is an **IP-address**? (2)

4.4 4.4.1 Beskryf kortliks wat 'n **skakeltegniek** is. (2)

4.4.2 Bespreek pakkieskakeling kortliks. (4)

4.5 Gee 'n praktiese toepassing van waar infrarooi as transmissiemedium gebruik word. (1)

4.6 Toegang tot die Internet kan deur middel van handtoestelle verkry word.

4.6.1 Watter protokol word vir bogenoemde tipe toegang gebruik? (1)

4.6.2 Noem **een** voorbeeld van 'n handtoestel waarmee toegang tot die Internet verkry kan word. (1)

4.7 Definieer **Bluetooth**. (3)

4.8 Verduidelik die betekenis van elk van die volgende afkortings (akronieme). (Daar sal nie punte gegee word vir die uitbreiding van die afkorting nie.)

4.8.1 ISDN (2)

4.8.2 ADSL (2)

4.8.3 ATM (2)

4.8.4 FDDI (2)
[40]

VRAAG 5
SOSIALE IMPLIKASIES

5.1 Die statistiek oor inbreek op rekenaarstelsels is kommerwekkend.

5.1.1 Waarom het inbreek op rekenaarstelsels so 'n groot probleem geword? (1)

5.1.2 *Firewalls* kan gebruik word om die inbreek op rekenaarstelsels te verminder. Wat is 'n ***firewall***? (2)

5.1.3 Verduidelik watter koste-implikasie die inbreek op stelsels vir enige sake-onderneming het. (1)

5.2 Noem TWEE maniere waarop **webtuistes** meer toeganklik gemaak word vir gesiggestremde mense. (2)

5.3 Noem DRIE **voorbeelde** hoe 'n sake-onderneming die Internet tot sy voordeel kan gebruik. (3)

4.4 4.4.1 Briefly describe what a **switching technique** is. (2)

4.4.2 Briefly discuss packet switching. (4)

4.5 Give a practical application where infrared is used as medium of transmission. (1)

4.6 Access to the Internet can be gained via handheld devices.

4.6.1 Which protocol is used for the above-mentioned access? (1)

4.6.2 Name **one** example of a handheld device which can be used to gain access to the Internet. (1)

4.7 Define **Bluetooth**. (3)

4.8 Explain the meaning of each of the following abbreviations (acronyms):
(Marks will not be given for expansion of the abbreviations.)

4.8.1 ISDN (2)

4.8.2 ADSL (2)

4.8.3 ATM (2)

4.8.4 FDDI (2)
[40]

QUESTION 5
SOCIAL IMPLICATIONS

5.1 The statistics concerning hacking into computer systems is a matter of great concern.

5.1.1 Why did hacking into computer systems become such a big problem? (1)

5.1.2 Firewalls can be used to reduce hacking into computer systems. What is a **firewall**? (2)

5.1.3 Explain the cost implication that hacking into systems has for any business. (1)

5.2 Name TWO ways in which **web-sites** can be made more accessible to visually handicapped people. (2)

5.3 Name THREE **examples** how a business can use the Internet to its advantage. (3)

5.4 Bespreek die reg op privaatheid na aanleiding van die volgende geval:
'n Sekere maatskappy het vir die diensverskaffer van XXXXX.co.za gevra om alle inligting van 'n sekere groep persone van die webblad XXXXX.co.za te verwyder. Die diensverskaffer het aan die versoek gehoor gegee en die inligting verwyder. (2)

5.5 Op die 18de Februarie 2002 het die Suid-Afrikaanse regering aangekondig dat die tradisionele ID-boekies vervang moet word met slimkaarte (*smart cards*).

5.5.1 Noem DRIE voordele van slimkaarte (*smart cards*) soos wat dit vandag in die handel gebruik word. (3)

5.5.2 Biometrie kan gebruik word om kaarthouers te identifiseer. Verduidelik wat **biometrie** is en gee TWEE voorbeelde. (3)

5.5.3 Wat is die nadeel daarvan om slimkaarte te gebruik in plaas van ID-boekies? (1)

5.6 "'n Nuwe elektroniese filter wat ongewenste e-pos identifiseer gee nuwe hoop om ontslae te raak van *spam*".

5.6.1 Wat is ***spam***? (1)

5.6.2 Gee 'n wenk om te voorkom dat virusse wat jy deur e-pos ontvang, jou rekenaarstelsel besmet. (1)
[20]

Doen óf die TURBO PASCAL- óf die DELPHI-afdeling.

TURBO PASCAL-AFDELING

VRAAG 6
TURBO PASCAL

6.1 Gebruik die volgende veranderlikes en skryf die Pascal-kode vir elk van die beskrywings neer:

```
Var
   eerste, tweede, derde, karstr      : STRING;
   karakter                           : CHAR;
   heelgetal, kode, aantal            : INTEGER;
   Dataler                            : FILE OF rekordveranderlike;
```

6.1.1 Voeg twee stringe saam om 'n derde string te vorm. (2)

6.1.2 Voeg 'n karakter in die derde posisie in 'n ander karakterstring in. (2)

6.1.3 Plaas die merker (cursor) op 'n spesifieke plek op die skerm. (1)

6.1.4 Vertoon die ordinale waarde van enige karakter. (1)

5.4 Discuss the right to privacy with regard to the following case: A certain company requested the service provider XXXXX.co.za to remove all information on a certain group of persons from the web page XXXXX.co.za. The service provider complied with the request and removed the information. (2)

5.5 On the 18th of February 2002 the South African Government announced that traditional ID books will be replaced by smart cards.

5.5.1 Name THREE advantages of smart cards used in commerce today. (3)

5.5.2 Biometry can be used to identify card holders. Explain what **biometry** is and give TWO examples. (3)

5.5.3 What is the disadvantage of using smart cards instead of ID-books? (1)

5.6 "A new electronic filter that identifies unwanted e-mail gives new hope to get rid of spam."

5.6.1 What is ***spam***? (1)

5.6.2 Give a hint on how to prevent infection of your computer system by viruses received via e-mail. (1)
[20]

Do either the TURBO PASCAL or the DELPHI section.

TURBO PASCAL SECTION

QUESTION 6
TURBO PASCAL

6.1 Use the following variables and write down the Pascal-code for each of the descriptions:

```
Var
   first, second, third, characterstring   : STRING;
   character                               : CHAR;
   integernumber, code, number             : INTEGER;
   Datafile                                : FILE OF recordtype;
```

6.1.1 Combine two strings to make a third. (2)

6.1.2 Insert a character in the third position into another character string. (2)

6.1.3 Place the cursor on a specific position on the screen. (1)

6.1.4 Display the ordinal value of any character. (1)

6.1.5 Onttrek die eerste drie karakters van 'n stringveranderlike en ken hierdie gedeelte toe aan 'n veranderlike. (2)

6.1.6 Skakel 'n string om na 'n heelgetal. (2)

6.1.7 Skakel elke karakter in 'n stringveranderlike om na hoofletters. (3)

6.1.8 Bepaal die aantal rekords in 'n datalêer. (1)

6.1.9 Verander 'n heelgetalwaarde na 'n stringveranderlike. (1)

6.2 Wat sal die afvoer van die volgende prosedure wees?

```
type
   KLEURE = (rooi, oranje, geel, groen, blou, pers,
   violet);
 VAR
    Col :KLEURE;
begin
    for Col := oranje to blou do
        writeln(ord(Col));
end;
```
(2)

6.3 Skryf TWEE geldige deelgebiedtipe verklarings neer uit die volgende lys.

```
Type
     Positief = 1..MAXINT;
     Grade = 0.00..4.00;
     Numbers = integer;
     Alfabet = 'Z'..'A';
     Aantal = '0'..'9';
     Name = 'Arien'..'Wim';
```
(2)

6.4 Verduidelik wat **ordinale datatipes** is. (2)

6.1.5 Copy the first three characters of a string variable and assign this part to a variable. (2)

6.1.6 Convert a string to an integer. (2)

6.1.7 Convert each character in a string variable to uppercase. (3)

6.1.8 Determine the number of records in a data file. (1)

6.1.9 Convert an integer value to a string variable. (1)

6.2 What will the output of the following procedure be?

```
type
   COLOURS = (red, orange, yellow, green, blue, indigo,
   violet);
 VAR
    Col :COLOURS;
begin
    for Col := orange to blue do
        writeln(ord(Col));
  end;
```
(2)

6.3 Write down TWO valid subrange type declarations from the following list.

```
Type
     Positive = 1..MAXINT;
     Grade = 0.00..4.00;
     Numbers = integer;
     Alphabet = 'Z'..'A';
     Quantity = '0'..'9';
     Name = 'Adrian'..'Jim';
```
(2)

6.4 Explain what **ordinal data types** are. (2)

6.5 Elke rekord in 'n sekere datalêer bevat die naam en van van 'n persoon. Die inhoud van die datalêer is as volg:

John	Basch
Jeanne	Louw
Sam	Mbeki
Vanessa	Smith
Jimmy	Brown

Skryf neer wat die inhoud van die datalêer sal wees nadat die volgende programsegment uitgevoer is.

```
Assign(dataler,'DATA.DAT');
Reset(dataler);
Seek(dataler,2);
Read(dataler,persoon);
While not eof(dataler) do
Begin
     Read(dataler,persoon);
     Seek(dataler, filepos(dataler)-2);
     Write(dataler, persoon);
     Seek(dataler, filepos(dataler)+1);
end;
Seek(dataler,filepos(dataler)-1);
truncate(dataler);
Close(dataler);
```

(4)

6.6 Die funksie TOETSGELDIG lees 'n karakter herhaaldelik in totdat 'n geldige karakter (T, S, of L) ingesleutel word.

```
program eksamen;
uses crt;

var
  KEUSE, REKENINGTIPE :char;

function TOETSGELDIG(INVOER:char):boolean;
VAR
 TOETS:boolean;
```

6.5 Each record in a certain data file contains the name and surname of a person. The contents of the data file is as follows:

John	Basch
Jeanne	Louw
Sam	Mbeki
Vanessa	Smith
Jimmy	Brown

Write down the content of the data file after execution of the following program segment.

```
Assign(datafil,'DATA.DAT');
Reset(datafil);
Seek(datafil,2);
Read(datafil,person);
While not eof(datafil) do
Begin
     Read(datafil,person);
     Seek(datafil, filepos(datafil)-2);
     Write(datafil, person);
     Seek(datafil, filepos(datafil)+1);
end;
Seek(datafil,filepos(datafil)-1);
truncate(datafil);
Close(datafil);
```

(4)

6.6 The function TESTVALID repetitively reads a character until a valid character (T, S, or L) is entered.

```
program exam;
uses crt;

var
  CHOICE , ACCOUNTTYPE:char;

function TESTVALID(INPUT:char):boolean;
VAR
 TEST:boolean;
```

```
begin
     gotoxy(47,10);
     INVOER:= readkey;
     TOETS := upcase(INVOER) = ['T','S','L'];
     if not TOETS then
     begin
        gotoxy(10,24);
        writeln('SLegs T, S, L kan ingesleutel word');
        sound(300);
        delay(1000);
        nosound;
        gotoxy(10,24);
        clreol;
        gotoxy(47,10);
        clreol;
    end;
end;


begin  {HOOFPROGRAM}
   clrscr;
   gotoxy(25,10);
   writeln('TIPE REKENING(T,S,L): ');
   repeat
   until TOETSGELDIG(KEUSE);
   REKENINGTIPE := KEUSE;
end.
```

Beantwoord die volgende vrae:

6.6.1 Onderskei tussen globale en lokale veranderlikes deur voorbeelde van elk uit die program te noem. (2)

6.6.2 Wat is die funksie van `clreol`? (1)

6.6.3 'n Sintaksfout kom voor by die volgende Pascal-stelling:
`TOETS := upcase(INVOER) = ['T','S','L'];`
Skryf die stelling korrek neer. (1)

6.6.4 Die program werk nie reg nie. Voeg een stelling by die funksie sodat die program reg sal uitvoer. (1)
[30]

```
begin
     gotoxy(47,10);
     INPUT:= readkey;
     TEST := upcase(INPUT) = ['T','S','L'];
     if not TEST then
     begin
        gotoxy(10,24);
        writeln('Only T, S, L can be typed in');
        sound(300);
        delay(1000);
        nosound;
        gotoxy(10,24);
        clreol;
        gotoxy(47,10);
        clreol;
    end;
end;

begin  {MAIN PROGRAM}
   clrscr;
   gotoxy(25,10);
   writeln('TYPE OF ACCOUNT(T,S,L): ');
   repeat
   until TESTVALID(CHOICE);
   ACCOUNTTYPE := CHOICE;
end.
```

Answer the following questions:

6.6.1 Distinguish between global and local variables by giving examples of each from the program. (2)

6.6.2 What is the function of `clreol`? (1)

6.6.3 A syntax error occurs in the following Pascal statement:
`TEST := upcase(INPUT) = ['T','S','L'];`
Write down the correct statement. (1)

6.6.4 The program does not work correctly. Add one statement to the function in order for the program to work (execute) correctly. (1)
[30]

VRAAG 7
TWEEDIMENSIONELE SKIKKINGS

Die volgende vrae hou verband met 'n tweedimensionele skikking (3 x 4). 'n Aantal programsegmente word gegee.

A.
totaal := 0;
for k := 1 to 3 do
totaal := totaal + twee[k,1];
	B.
	totaal := 0;
	for k := 1 to 3 do
	totaal := totaal + twee[k,2]

C.
som:= 0;
for k := 1 to 3 do
for j := 1 to 4 do
som := som + twee[k,j];
ant := som/12;
	D.
	for j := 1 to 3 do
	for k := 1 to 4 do
	twee[j,k] := random(100)+1;

E.
for j := 1 to 3 do
begin
for k := 1 to 4 do
write(twee[j,k]:4);
writeln;
end;
	F.
	totaal := 0;
	for j := 1 to 4 do
	totaal := totaal + twee[1,j];

G.
for j := 1 to 3 do
begin
for k := 1 to 4 do
twee[j,k] := random(100);
end;
	H.
	for k := 1 to 3 do
	begin
	som := 0;
	for j := 1 to 4 do
	som := som + twee[k,j];
	ant := som/12;
	end;

I.
totaal := 0;
for k := 1 to 3 do
totaal := totaal + twee[2,k];
	J.
	for j := 1 to 3 do
	for k := 1 to 4 do
	write(twee[j,k]:4);
	writeln;

Bepaal watter programsegment elk van die take wat in 7.1 tot 7.5 beskryf word suksesvol sal uitvoer. Skryf die nommer van die taak en die letter van die korrekte programsegment neer bv. 7.6 K.

7.1 Elemente van die tweedimensionele skikking (3 x 4) word ewekansig toegeken. Die ewekansige getalle kan enige waarde vanaf 1 tot 100 wees.

7.2 Bereken die gemiddeld van al die getalle in die tweedimensionele skikking.

7.3 Bepaal die totaal van die elemente in die eerste ry.

7.4 Bepaal die totaal van die elemente in die tweede kolom.

7.5 Druk die elemente van die tweedimensionele skikking op die skerm, elke ry op 'n opeenvolgende lyn. **[10]**

QUESTION 7
TWO-DIMENSIONAL ARRAYS

The following questions are related to a two dimensional array (3 X 4). A number of program segments are given.

A.
total := 0;
for k := 1 to 3 do
total := total + two[k,1];
	B.
	total := 0;
	for k := 1 to 3 do
	total := total + two[k,2]

C.
sum:= 0;
for k := 1 to 3 do
for j := 1 to 4 do
sum := sum + two[k,j];
ans := sum/12;
	D.
	for j := 1 to 3 do
	for k := 1 to 4 do
	two[j,k] := random(100)+1;

E.
for j := 1 to 3 do
begin
for k := 1 to 4 do
write(two[j,k]:4);
writeln;
end;
	F.
	total := 0;
	for j := 1 to 4 do
	total := total + two[1,j];

G.
for j := 1 to 3 do
begin
for k := 1 to 4 do
two[j,k] := random(100);
end;
	H.
	for k := 1 to 3 do
	begin
	sum := 0;
	for j := 1 to 4 do
	sum := sum + two[k,j];
	ans := sum/12;
	end;

I.
total := 0;
for k := 1 to 3 do
total := total + two[2,k];
	J.
	for j := 1 to 3 do
	for k := 1 to 4 do
	write(two[j,k]:4);
	writeln;

Determine which program segment will complete the tasks as described in 7.1 to 7.5 successfully. Write down the number of the task and the letter of the correct program segment for example 7.6 K.

7.1 Elements of the two-dimensional array (3 x 4) are allocated randomly. The random numbers can be any value from 1 to 100.

7.2 Calculate the average of all the elements in the two-dimensional array.

7.3 Determine the total of the elements in the first row.

7.4 Determine the total of the elements in the second column.

7.5 Print the elements of the two-dimensional array on the screen, each row on a successive line. **[10]**

VRAAG 8
SKIKKINGS

Beskou die volgende program en beantwoord dan die vrae:

```
program skikkings;

uses crt;
type
     skik = array[1..10] of char;

VAR
    LET: skik;
    tel,j:integer;
    k:char;
Begin
     clrscr;
     tel := 0;
     for k := 'A' to 'F' do
     begin
          inc(tel);
          LET[tel] := k;
     end;

     for j := 2 to 7 do
        LET[j] := LET[j-1];

        LET[1] := 'G';

     for j := 1 to  6 do
         write(LET[j]);
     readln;
end.
```

8.1 Watter TWEE eienskappe van hierdie program verhoog die leesbaarheid? (2)

8.2 Wat sal op die skerm gedruk word as die program uitgevoer word? (2)

8.3 Watter van die volgende toekennings-stellings is ONGELDIG? Skryf slegs die letter/s van die ongeldige stellings neer.

A. LET['A'] := 9;
B. LET[11] := 'A';
C. LET[9] := 'a';
D. SKIK[10] := 'A';
E. LET[1+10 div 2] := 1; (4)

8.4 Wat sal die afvoer van die program wees as die stelling `for j := 2 to 7 do` verander word na `for j := 7 downto 2 do`? (2)

[10]

QUESTION 8
ARRAYS

Study the following program, then answer the questions:

```
program arrays;

uses crt;
type
     arr = array[1..10] of char;

VAR
    LET: arr;
    count,j:integer;
    k:char;
Begin
     clrscr;
     count := 0;
     for k := 'A' to 'F' do
     begin
          inc(count);
          LET[count] := k;
     end;

     for j := 2 to 7 do
        LET[j] := LET[j-1];

        LET[1] := 'G';

     for j := 1 to  6 do
         write(LET[j]);
     readln;
end.
```

8.1 Which TWO characteristics of this program increase the readability? (2)

8.2 What will be printed on the screen if the program is executed? (2)

8.3 Which of the following assign statements are INVALID? Write down only the letter/s of the invalid statements.

A. LET['A'] := 9;
B. LET[11] := 'A';
C. LET[9] := 'a';
D. ARR[10] := 'A';
E. LET[1 + 10 div 2] := 1; (4)

8.4 What will the output of the program be if the statement `for j := 2 to 7 do` is changed to `for j := 7 downto 2 do`? (2)

[10]

VRAAG 9
TEKSLEÊRS

Voltooi die ontbrekende stellings 9.1 tot 9.10. Die prosedure lees data uit 'n tekslêer TEKSL.TXT en skryf 'n naam en van as rekordveranderlike na die datalêer INLIG.DAT.

Die tekslêer TEKSL.TXT se uitleg is as volg (die naam en van word geskei deur 'n komma):

Peter,Sirmon
Janet,Fouche
Ann,Baker
Hanneke,Van der Westhuizen

```
type
   rekordtipe = record
       naam,van:string[20];
   end;
var
  teksler : TEXT;
  dataler : file of rekordtipe;
  persoon : rekordtipe;
  plek    : integer;
  lyn     : string;

Procedure Files;
begin
  assign(  9.1  );
  reset(  9.2  );
  assign(  9.3  );
  rewrite(  9.4  );
  while not eof(  9.5  ) do
  begin
    readln(  9.6  );
    plek := pos(  9.7  );
    persoon.naam:= copy(  9.8  );
    delete(  9.9  );
    persoon.van := lyn;
    write(  9.10  );
  end;
  close(teksler);
  close(dataler);
end;
```

[10]

QUESTION 9
TEXT FILES

Complete the missing statements 9.1 to 9.10. The procedure reads data from a text file TEXT.TXT and writes a name and surname as record variable to the data file INFO.DAT.

The layout of the text file TEXT.TXT is as follows (the name and surname are separated by a comma):

Peter,Sirmon
Janet,Fouche
Ann,Baker
Hanneke,Van der Westhuizen

```
type
   rekordtype = record
       name,surname:string[20];
   end;
var
  textF: TEXT;
  datafile: file of rekordtype;
  person  : rekordtype;
  place   : integer;
  line    : string;

Procedure Files;
begin
  assign( 9.1 );
  reset( 9.2 );
  assign( 9.3 );
  rewrite( 9.4 );
  while not eof( 9.5 ) do
  begin
    readln( 9.6 );
    place := pos( 9.7 );
    person.name:= copy( 9.8 );
    delete( 9.9 );
    person.surname := line;
    write( 9.10 );
  end;
  close(textF);
  close(datafile);
end;
```

[10]

VRAAG 10
ALGORITME

Skryf 'n Pascal-prosedure wat die grootste en kleinste letter (volgens die alfabet) in 'n karakterstring sal bepaal en as parameters sal terugstuur na die hoofprogram. Die karakterstring is die waardeparameter en die grootste en kleinste letter is verwysingsparameters.
Voorbeeld:
Karakterstring as toevoer: computer
Kleinste letter: c
Grootste letter: u **[10]**

TOTAAL: 200

OF

DELPHI-AFDELING
VRAAG 6

6.1 Gebruik die volgende veranderlikes en skryf die Delphi-kode vir elk van die beskrywings neer:

```
Var
   eerste, tweede, derde, karstr     : STRING;
   karakter                          : CHAR;
   heelgetal, kode, aantal           : INTEGER;
   Dataler                           : FILE OF rekordveranderlike;
   rGetal                            : REAL:
```

6.1.1 Voeg twee stringe saam om 'n derde string te vorm. (2)

6.1.2 Voeg 'n karakter in die derde posisie in 'n ander karakterstring in. (2)

6.1.3 Skakel 'n reële getal om na 'n string sodat die getal twee syfers na die desimale punt sal vertoon op 'n Label. (3)

6.1.4 Vertoon die ordinale waarde van enige karakter. (1)

6.1.5 Kopieer die eerste drie karakters van 'n stringveranderlike en ken hierdie gedeelte toe aan 'n veranderlike. (2)

6.1.6 Skakel 'n string om na 'n heelgetal. (2)

6.1.7 Skakel elke karakter in 'n stringveranderlike om na hoofletters. (1)

6.1.8 Bepaal die aantal rekords in 'n datalêer. (1)

6.1.9 Verander 'n heelgetalwaarde na 'n stringveranderlike. (1)

QUESTION 10
ALGORITHM

Write a Pascal procedure that determines the largest and the smallest letter (according to the alphabet) in a character string and sends it back as parameters to the main program. The character string is the value parameter and the largest and smallest letters are the reference parameters.
Example:
Character string as input: computer
Smallest letter: c
Largest letter: u **[10]**

TOTAL: 200

OR

DELPHI SECTION
QUESTION 6

6.1 Use the following variables and write down the Delphi-code for each of the descriptions:

```
Var
   first, second, third, characterstring  : STRING;
   Character                              : CHAR;
   integernumber, code, number            : INTEGER;
   Datafile                               : FILE OF recordtype;
   rNumber                                : REAL;
```

6.1.1 Combine two strings to make a third. (2)

6.1.2 Insert a character in the third position into another character string. (2)

6.1.3 Convert a real number to a string so the number will be displayed on a Label showing two digits after the decimal point. (3)

6.1.4 Display the ordinal value of any character. (1)

6.1.5 Copy the first three characters of a string variable and assign this part to a variable. (2)

6.1.6 Convert a string to an integer. (2)

6.1.7 Convert each character in a string variable to uppercase. (1)

6.1.8 Determine the number of records in a data file. (1)

6.1.9 Convert an integer value to a string variable. (1)

6.2 Wat sal die afvoer van die volgende prosedure wees?

```
type
   KLEURE = (rooi, oranje, geel, groen, blou, pers,
   violet);
 VAR
    Col :KLEURE;
begin
    for Col := oranje to blou do
        lstAfvoer.Lines.Add(intToStr((ord(Col)));
 end;
```

(2)

6.3 Skryf TWEE geldige deelgebiedtipe-verklarings neer uit die volgende lys.

```
Type
     Positief = 1..MAXINT;
     Grade = 0.00..4.00;
     Numbers = integer;
     Alfabet = 'Z'..'A';
     Aantal = '0'..'9';
     Name = 'Arien'..'Wim';
```

(2)

6.4 Verduidelik wat **ordinale datatipes** is. (2)

6.5 Elke rekord in 'n sekere datalêer bevat die naam en van van 'n persoon. Die inhoud van die datalêer is as volg:

John	Basch
Jeanne	Louw
Sam	Mbeki
Vanessa	Smith
Jimmy	Brown

Skryf neer wat die inhoud van die datalêer sal wees nadat die volgende programsegment uitgevoer is.

```
AssignFile(dataler,'DATA.DAT');
Reset(dataler);
Seek(dataler,2);
Read(dataler,persoon);
While not eof(dataler) do
Begin
     Read(dataler,persoon);
     Seek(dataler, filepos(dataler)-2);
     Write(dataler, persoon);
     Seek(dataler, filepos(dataler)+1);
end;
Seek(dataler,filepos(dataler)-1);
truncate(dataler);
CloseFile(dataler);
```

(4)

6.2 What will the output of the following procedure be?

```
type
   COLOURS = (red, orange, yellow, green, blue, indigo,
   violet);
 VAR
    Col :COLOURS;
begin
    for Col := orange to blue do
        lstOutput.Items.Add(intToStr(ord(Col)));
 end;
```

(2)

6.3 Write down TWO valid subrange types declarations from the following list.

```
Type
     Positive = 1..MAXINT;
     Grade = 0.00..4.00;
     Numbers = integer;
     Alphabet = 'Z'..'A';
     Quantity = '0'..'9';
     Name = 'Adrian'..'Jim';
```

(2)

6.4 Explain what **ordinal data types** are. (2)

6.5 Each record in a data file contains the name and surname of a person. The contents of the data file is as follows:

John	Basch
Jeanne	Louw
Sam	Mbeki
Vanessa	Smith
Jimmy	Brown

Write down the content of the data file after execution of the following program segment.

```
AssignFile(datafil,'DATA.DAT');
Reset(datafil);
Seek(datafil,2);
Read(datafil,person);
While not eof(datafil) do
Begin
     Read(datafil,person);
     Seek(datafil, filepos(datafil)-2);
     Write(datafil, person);
     Seek(datafil, filepos(datafil)+1);
end;
Seek(datafil,filepos(datafil)-1);
truncate(datafil);
CloseFile(datafil);
```

(4)

6.6 Die funksie TOETSGELDIG lees 'n karakter herhaaldelik in totdat 'n geldige karakter (**T**, **S**, of **L**) ingesleutel word.

```
var
  frmInput: TfrmInput;
  KEUSE, REKENINGTIPE :char;

implementation

{$R *.dfm}

function TOETSGELDIG(INVOER:char):boolean;
VAR
 TOETS : boolean;
 INVOERSTRING :string;
begin
     INVOERSTRING:= InputBox('Rekeningtipe', 'Sleutel in T,
     S of L','');
     INVOER := INVOERSTRING[1];
     TOETS := upcase(INVOER) = ['T','S','L'];
     if not TOETS then
     begin
        Beep;
        MessageDlgPos('Foutiewe invoer', mtError,
        [mbOK], 0 , 500, 300);
     end;
end;

procedure TfrmInput.btnGoClickClick(Sender: TObject);
begin
  repeat
  until TOETSGELDIG(KEUSE);
  REKENINGTIPE := KEUSE;
end;
```

Beantwoord die volgende vrae:

6.6.1 Onderskei tussen **globale** en **lokale veranderlikes** deur voorbeelde van elk uit die program te noem. (2)

6.6.2 'n *Message box* bv. *MessageDlgPos* is 'n eenvoudige Delphi-vorm wat verskyn terwyl 'n toepassing uitgevoer word. Noem nog 'n voorbeeld van 'n *Message box*. (1)

6.6.3 'n Sintaksfout kom voor by die volgende stelling:
`TOETS := upcase(INVOER) = ['T','S','L'];`
Skryf die stelling korrek neer. (1)

6.6.4 Die program werk nie reg nie. Voeg een stelling by die funksie sodat die program reg sal uitvoer. (1)
[30]

6.6 The function TESTVALID repetitively reads a character until a valid character (**T**, **S**, or **L**) is entered.

```
var
  frmInput: TfrmInput;
  CHOICE, ACCOUNTTYPE :char;
implementation

{$R *.dfm}

function TESTVALID(INPUT:char):boolean;
VAR
 TEST:BOOLEAN;
 INPUTSTRING :string;
begin
     INPUTSTRING:= InputBox('Account type', 'Type in T, S or
     L','');
     INPUT := InputString[1];
     TEST := upcase(INPUT) = ['T','S','L'];
     if not TEST then
     begin
        Beep;
        MessageDlgPos('Foutiewe invoer', mtError,
        [mbOK], 0 , 500, 300);
     end;
end;


procedure TfrmInput.btnGoClickClick(Sender: TObject);
begin
  repeat
  until TESTVALID(CHOICE);
  ACCOUNTTYPE := CHOICE;
end;
```

Answer the following questions:

6.6.1 Distinguish between **global** and **local variables** by giving examples of each from the program. (2)

6.6.2 A Message box is a simple Delphi form that appears on top of a running application, for example MessageDlgPos. Name another example of a Message box. (1)

6.6.3 A syntax error occurs in the following statement:
```
TEST := upcase(INPUT) = ['T','S','L'];
```
Write down the correct statement. (1)

6.6.4 The program does not work correctly. Add one statement to the function in order for the program to work correctly. (1)

[30]

VRAAG 7
TWEEDIMENSIONELE SKIKKINGS

Die volgende vrae hou verband met 'n tweedimensionele skikking (3 x 4). 'n Aantal programsegmente word gegee.

A.
```
totaal := 0;
for k := 0 to 3 do
  totaal := totaal + StrToInt(stgTwee.Cells[k,  0]);
lblAntwoordA.Caption := 'A: ' +  IntToStr(totaal);
```

B.
```
totaal := 0;
for j := 0 to 3 do
totaal := totaal + StrToInt(stgTwee.Cells[0,j]);
lblAntwoordB.Caption := 'B : ' + IntToStr(totaal);
```

C.
```
som := 0;
for k := 0 to 3 do
for j := 0 to 2 do
   som := som + StrToInt(stgTwee.Cells[k,j]);
antw := som / 12;
lblAntwoordC.Caption := 'C:' + FloatToStr(antw);
```

D.
```
for k:= 0 to 3 do
begin
for j := 0 to 2 do
stgTwee.Cells[k, j] := IntToStr(random(100) + 1);
end;
```

E.
```
som := 0;
for k := 0 to 3 do
for j := 0 to 2 do
      som := StrToInt(stgTwee.Cells[k,j]);
lblAntwoordE.Caption := 'E:' + IntToStr(som);
```

F.
```
totaal := 0;
for j := 0 to 2 do
totaal := totaal + StrToInt(stgTwee.Cells[1, j]);
lblAntwoordF.Caption := 'F: ' + IntToStr(totaal);
```

G.
```
for k:= 0 to 3 do
begin
 for j := 0 to 2 do
stgTwee.Cells[k, j] := IntToStr(random(100));
end;
```

H.
```
for k := 0 to 3 do
begin
som := 0;
for j := 0 to 2 do
  som := som + StrToInt(stgTwee.Cells[k, j]);
  antw := som /12;
end;
lblAntwoordH.Caption := 'H: ' + FloatToStr(antw);
```

I.
```
totaal := 0;
for k := 0 to 3 do
  totaal := totaal + StrToInt(stgTwee.Cells[k, 1]);
lblAntwoordI.Caption := 'I: ' + IntToStr(totaal);
```

J.
```
som := 0;
for k := 0 to 3 do
for j := 0 to 2 do
   som := som + StrToInt(stgTwee.Cells[k,j]);
lblAntwoordJ.Caption := 'J:' + IntToStr(som);
```

Bepaal watter programsegment elk van die take wat in 7.1 tot 7.5 beskryf word, suksesvol sal uitvoer. Skryf die nommer van die taak en die letter van die korrekte programsegment neer bv. 7.6 K.

7.1 Elemente van die tweedimensionele skikking (3 x 4) word ewekansig toegeken. Die ewekansige getalle kan enige waarde vanaf 1 tot 100 wees.

7.2 Bereken die gemiddeld van al die getalle in die tweedimensionele skikking.

7.3 Bepaal die totaal van die elemente in die eerste ry.

7.4 Bepaal die totaal van die elemente in die tweede kolom.

7.5 Bepaal die totaal van al die elemente in die tweedimensionele skikking. **[10]**

QUESTION 7
TWO-DIMENSIONAL ARRAYS

The following questions are related to a two-dimensional array (3 X 4). A number of program segments are given.

A.
total := 0;
for k := 0 to 3 do
total := total + StrToInt(stgTwo.Cells[k, 0]);
lblAnswerA.Caption := 'A: ' + IntToStr(total);
	B.
	total := 0;
	for j := 0 to 3 do
	total := total + StrToInt(stgTwo.Cells[0,j]);
	lblAnswerB.Caption := 'B : ' + IntToStr(total);

C.
sum := 0;
for k := 0 to 3 do
for j := 0 to 2 do
sum := sum + StrToInt(stgTwo.Cells[k,j]);
answ := sum / 12;
lblAnswerC.Caption := 'C:' + FloatToStr(answ);
	D.
	for k:= 0 to 3 do
	begin
	for j := 0 to 2 do
	stgTwo.Cells[k, j] := IntToStr(random(100) + 1);
	end;

E.
sum := 0;
for k := 0 to 3 do
for j := 0 to 2 do
sum := StrToInt(stgTwo.Cells[k,j]);
lblAnswerE.Caption := 'E:' + IntToStr(sum);
	F.
	total := 0;
	for j := 0 to 2 do
	total := total + StrToInt(stgTwo.Cells[1, j]);
	lblAnswerF.Caption := 'F: ' + IntToStr(total);

G.
for k:= 0 to 3 do
begin
for j := 0 to 2 do
stgTwo.Cells[k, j] := IntToStr(random(100));
end;
	H.
	for k := 0 to 3 do
	begin
	sum := 0;
	for j := 0 to 2 do
	sum := sum + StrToInt(stgTwo.Cells[k, j]);
	answ := sum /12;
	end;
	lblAnswerH.Caption := 'H: ' + FloatToStr(answ);

I.
total := 0;
for k := 0 to 3 do
total := total + StrToInt(stgTwo.Cells[k, 1]);
lblAnswerI.Caption := 'I: ' + IntToStr(total);
	J.
	sum := 0;
	for k := 0 to 3 do
	for j := 0 to 2 do
	sum := sum + StrToInt(stgTwo.Cells[k,j]);
	lblAnswerJ.Caption := 'J:' + IntToStr(sum);

Determine which program segment will complete the tasks as described in 7.1 to 7.5 successfully. Write down the number of the task and the letter of the correct program segment for example 7.6 K.

7.1 Elements of the two-dimensional array (3 x 4) are allocated randomly. The random numbers can be any value from 1 to 100.

7.2 Calculate the average of all the elements in the two-dimensional array.

7.3 Determine the total of the elements in the first row.

7.4 Determine the total of the elements in the second column.

7.5 Determine the total of all the elements in the two-dimensional array. **[10]**

VRAAG 8
SKIKKINGS

Beskou die volgende program en beantwoord dan die vrae:

```
Procedure TfrmArrays.btnGoClick(Sender:TObject);

type
     skik = array[1..10] of char;

VAR
    LET: skik;
    tel,j:integer;
    k:char;

Begin
     clrscr;
     tel := 0;
     for k := 'A' to 'F' do
     begin
          inc(tel);
          LET[tel] := k;
     end;

     for j := 2 to 7 do
        LET[j] := LET[j-1];

        LET[1] := 'G';

     for j := 1 to  6 do
         lstAfvoer.Items.Add(LET[j]);
 end;
```

8.1 Watter TWEE eienskappe van hierdie prosedure verhoog die leesbaarheid? (2)

8.2 Wat sal in die *list box* verskyn as die prosedure uitgevoer word? (2)

8.3 Watter van die volgende toekennings-stellings is ONGELDIG? Skryf slegs die letter/s van die ongeldige stellings neer.

A. LET['A'] := 9;
B. LET[11] := 'A';
C. LET[9] := 'a';
D. SKIK[10] := 'A';
E. LET[1+10 div 2] := 1; (4)

8.4 Wat sal die afvoer van die program wees as die stelling `for j := 2 to 7 do` verander word na `for j := 7 downto 2 do`? (2)

[10]

QUESTION 8
ARRAYS

Study the following program and then answer the questions:

```
Procedure TfrmArrays.btnGoClick(Sender:TObject);

type
     arr = array[1..10] of char;

VAR
    LET: arr;
    count,j:integer;
    k:char;

Begin
     clrscr;
     count := 0;
     for k := 'A' to 'F' do
     begin
          inc(count);
          LET[count] := k;
     end;

     for j := 2 to 7 do
        LET[j] := LET[j-1];

        LET[1] := 'G';

     for j := 1 to  6 do
         lstOutput.Items.Add(LET[j]);
  end;
```

8.1 Which TWO characteristics of this procedure increase the readability? (2)

8.2 What will be displayed in the list box if the procedure is executed? (2)

8.3 Which of the following assign statements are INVALID? Write down only the letter/s of the invalid statements.

A. LET['A'] := 9;
B. LET[11] := 'A';
C. LET[9] := 'a';
D. ARR[10] := 'A';
E. LET[1 + 10 div 2] := 1; (4)

8.4 What will the output of the program be if the statement `for j := 2 to 7 do` is changed to `for j := 7 downto 2 do`? (2)

[10]

VRAAG 9
TEKSLEÊRS

Voltooi die ontbrekende stellings 9.1 tot 9.10. Die prosedure lees data uit 'n tekslêer TEKSL.TXT en skryf 'n naam en van as rekordveranderlike na die datalêer INLIG.DAT.

Die tekslêer TEKSL.TXT se uitleg is as volg (die naam en van word geskei deur 'n komma):

Peter,Sirmon
Janet,Fouche
Ann,Baker
Hanneke,Van der Westhuizen

```
type
   rekordtipe = record
       naam,van:string[20];
   end;
var
  teksler : TextFile;
  dataler : file of rekordtipe;
  persoon : rekordtipe;
  plek    : integer;
  lyn     : string;

Procedure Files;
begin
  assignFile(  9.1  );
  reset(  9.2  );
  assignFile(  9.3  );
  rewrite(  9.4  );
  while not eof(  9.5  ) do
  begin
    readln(  9.6  );
    plek := pos(  9.7  );
    persoon.naam:= copy(  9.8  );
    delete(  9.9  );
    persoon.van := lyn;
    write(  9.10  );
  end;
  closeFile(teksler);
  closeFile(dataler);
end;
```

[10]

QUESTION 9
TEXT FILES

Complete the missing statements 9.1 to 9.10. The procedure reads data from a text file TEXT.TXT and writes a name and surname as record variable to the data file INFO.DAT.

The layout of the text file TEXT.TXT is as follows (the name and surname are separated by a comma):

Peter,Sirmon
Janet,Fouche
Ann,Baker
Hanneke,Van der Westhuizen

```
type
   rekordtype = record
       name, surname:string[20];
   end;
var
  textF: TextFile;
  datafile: file of rekordtype;
  person  : rekordtype;
  place   : integer;
  line    : string;

Procedure Files;
begin
  assignFile(  9.1  );
  reset(  9.2  );
  assignFile(  9.3  );
  rewrite(  9.4  );
  while not eof(  9.5  ) do
  begin
    readln(  9.6  );
    place := pos(  9.7  );
    person.name:= copy(  9.8  );
    delete(  9.9  );
    person.surname := line;
    write(  9.10  );
  end;
  closeFile(textF);
  closeFile(datafile);
end;
```

[10]

VRAAG 10
ALGORITME

Skryf 'n prosedure wat die grootste en kleinste letter(volgens die alfabet) in 'n karakterstring sal bepaal en as parameters sal terugstuur na die roepstelling. Die karakterstring is die waardeparameter en die grootste en kleinste letter is verwysingsparameters.
Voorbeeld:
Karakterstring as toevoer: computer
Kleinste letter: c
Grootste letter: u **[10]**

TOTAAL: 200

EINDE

QUESTION 10
ALGORITHM

Write a procedure that determines the largest and the smallest letter (according to the alphabet) in a character string and sends it back as parameters to the call statement. The character string is the value parameter and the largest and smallest letters are the reference parameters.
Example:
Character string as input: computer
Smallest letter: c
Largest letter: u **[10]**

TOTAL: 200

END