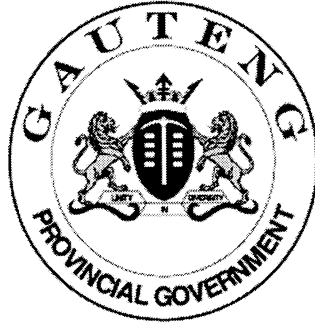


**SENIOR CERTIFICATE
EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN**



**FEBRUARY / FEBRUARIE
MARCH / MAART**

2005

COMPUTER STUDIES

REKENAARSTUDIE

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

HG

724-1/2

**21 pages
21 bladsye**

COMPUTER STUDIES HG: Paper 2
Theory



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X05



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.
- Nommer jou antwoorde duidelik.
- Die programmeringsgedeelte bestaan uit Pascal en Delphi. Doen slegs die een óf die ander.
- Pascal- of Delphi-kodering mag in potlood gedoen word.

**VRAAG 1
BOOLE-ALGEBRA**

Skryf slegs die korrekte letter langs die vraagnommer neer.

1.1 Watter EEN van die volgende stellings is FOUTIEF?

- A. $A + 1 = 1$
- B. $A.A' = 0$
- C. $A + A' = 1$
- D. $A.1 = 1$

1.2 Lei die vereenvoudigde Boole-funksie van die Karnaugh-diagram af.

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

- A. $G(W,X,Y,Z) = W'Y' + W'YZ + WYZ$
- B. $G(W,X,Y,Z) = W'Y' + W'Z' + WYZ$
- C. $G(W,X,Y,Z) = W'Y'Z' + W'Z' + WYZ$
- D. $G(W,X,Y,Z) = W'Y' + W'Z' + WY$

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.
- Number your answers clearly.
- The programming section consists of Pascal and Delphi. Do only either Pascal or Delphi.
- Delphi or Pascal coding may be done in pencil.

**QUESTION 1
BOOLEAN ALGEBRA**

Write down only the correct letter next to the question number.

1.1 Which ONE of the following statements is INCORRECT?

- A. $A + 1 = 1$
- B. $A.A' = 0$
- C. $A + A' = 1$
- D. $A.1 = 1$

1.2 Derive the simplified Boolean function from the Karnaugh diagram.

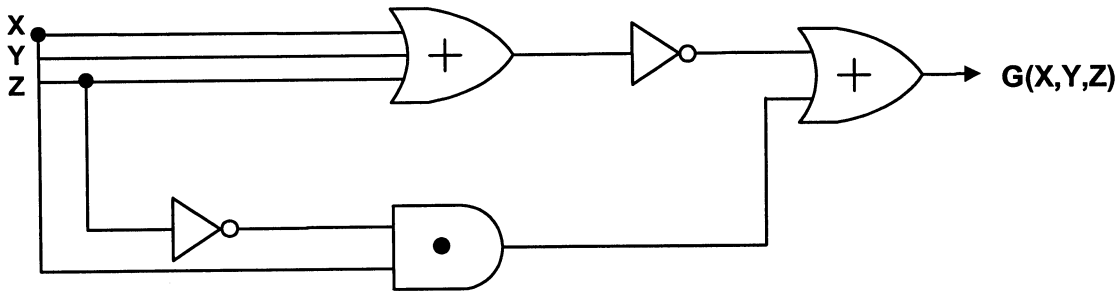
	Y' 00	Y' 01	Y 11	Y 10	
W' 00	1	1		1	X'
W' 01	1	1		1	X
W 11			1		X
W 10			1		X'
	Z'	Z	Z	Z'	

- A. $G(W,X,Y,Z) = W'Y' + W'YZ + WYZ$
- B. $G(W,X,Y,Z) = W'Y' + W'Z' + WYZ$
- C. $G(W,X,Y,Z) = W'Y'Z' + W'Z' + WYZ$
- D. $G(W,X,Y,Z) = W'Y' + W'Z' + WY$

1.3 Die Boole-funksie $F(x,y,z) = x + x'y' + xyz + y'x$ vereenvoudig is:

- A. $x' + y'$
- B. $x' + y$
- C. $x + y$
- D. $x + y'$

1.4 Watter Boole-funksie stel die volgende stroombaan voor?



- A. $G(X,Y,Z) = X + (X + Y + Z)' + Z'$
- B. $G(X,Y,Z) = (X + Y + Z)' \cdot (X + Z')$
- C. $G(X,Y,Z) = (X' + Y' + Z') + (X + Z')$
- D. $G(X,Y,Z) = (X + Y + Z)' + X \cdot Z'$

1.5 Watter EEN van die volgende kombinasies stel die funksies vir die oordrag (C) en som(S) van 'n halfopteller voor?

	Som(S)	Oordrag(C)
A.	$S(X,Y) = X'Y + XY'$	$C(X,Y) = XY$
B.	$S(X,Y,Z) = X'Y'Z + X'YZ' + XY'Z' + XYZ$	$C(X,Y,Z) = XY + XZ + YZ$
C.	$S(X,Y) = X'Y + XY'$	$C(X,Y) = XY + X'Y'$
D.	$S(X,Y,Z) = X'Y'Z + X'YZ' + XY'Z' + XYZ$	$C(X,Y,Z) = XY$

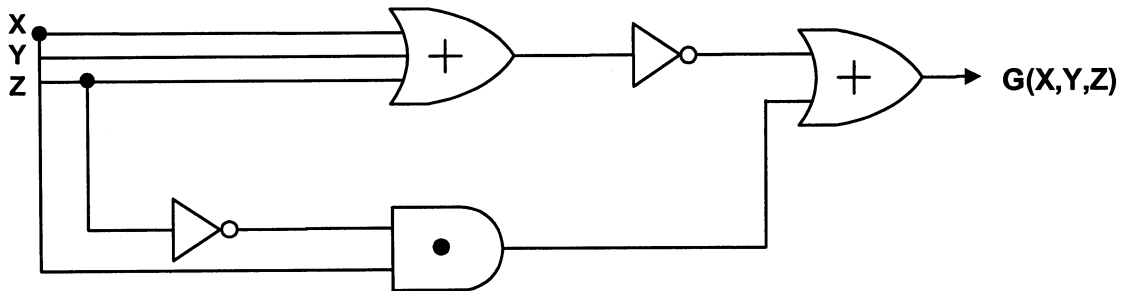
1.6 Gee $F(x,y,z) = x'y + xz'$ as die som van minterme in die *m-notasie*.

- A. $m_2 + m_3 + m_4 + m_6$
- B. $m_2 + m_3 + m_4$
- C. $m_0 + m_1 + m_5 + m_7$
- D. $m_2 + m_4 + m_6$

1.3 The Boolean function $F(x,y,z) = x + x'y' + xyz + y'x$ simplified is:

- A. $x' + y'$
- B. $x' + y$
- C. $x + y$
- D. $x + y'$

1.4 Which Boolean function represents the following circuit?



- A. $G(X,Y,Z) = X + (X + Y + Z)' + Z'$
- B. $G(X,Y,Z) = (X + Y + Z)' \cdot (X + Z')$
- C. $G(X,Y,Z) = (X' + Y' + Z') + (X + Z')$
- D. $G(X,Y,Z) = (X + Y + Z)' + X \cdot Z'$

1.5 Which ONE of the following combinations represents the functions for the transfer (C) and sum(S) of a half-adder?

	Sum(S)	Transfer(C)
A.	$S(X,Y) = X'Y + XY'$	$C(X,Y) = XY$
B.	$S(X,Y,Z) = X'Y'Z + X'YZ' + XY'Z' + XYZ$	$C(X,Y,Z) = XY + XZ + YZ$
C.	$S(X,Y) = X'Y + XY'$	$C(X,Y) = XY + X'Y'$
D.	$S(X,Y,Z) = X'Y'Z + X'YZ' + XY'Z' + XYZ$	$C(X,Y,Z) = XY$

1.6 Give $F(x,y,z) = x'y + xz'$ as the sum of minterms in the *m-notation*.

- A. $m_2 + m_3 + m_4 + m_6$
- B. $m_2 + m_3 + m_4$
- C. $m_0 + m_1 + m_5 + m_7$
- D. $m_2 + m_4 + m_6$

1.7 Bepaal $G(X,Y,Z)$ in terme van minterme waar $G(X,Y,Z) = F1.F2$ en $F2(X,Y,Z) = XY + X'YZ'$

X	Y	Z	F1
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

- A. $G(X,Y,Z) = X'Z + X'YZ'$
- B. $G(X,Y,Z) = XYZ + X'YZ'$
- C. $G(X,Y,Z) = XYZ + X'Y$
- D. $G(X,Y,Z) = XY'Z + X'YZ'$

1.8 Watter hek word deur die waarheidstabel voorgestel?

X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0

- A. EN (AND)
- B. XOF (XOR)
- C. OF (OR)
- D. NIE (NOT)

1.9 As $G(a,b,c) = a'bc + ab'c' + ab$ dan is $G'(a,b,c) =$

- A. $m_3 + m_4 + m_0 + m_6$
- B. $m_0 + m_1 + m_2 + m_5$
- C. $m_3 + m_4 + m_2$
- D. $m_0 + m_1 + m_2$

1.10 Watter EEN van die volgende stellings is FOUTIEF?

- A. $(x + y)' = x'y'$
- B. $(x.y)' = x' + y'$
- C. $(x + y)' = x' + y'$
- D. $x + x'y = x + y$

10x2=[20]

- 1.7 Determine $G(X,Y,Z)$ in terms of minterms where $G(X,Y,Z) = F1 \cdot F2$ and $F2(X,Y,Z) = XY + X'YZ'$

X	Y	Z	F1
0	0	0	0
0	0	1	0
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

- A. $G(X,Y,Z) = X'Z + X'YZ'$
 B. $G(X,Y,Z) = XYZ + X'YZ'$
 C. $G(X,Y,Z) = XYZ + X'Y$
 D. $G(X,Y,Z) = XY'Z + X'YZ'$

- 1.8 Which gate is represented by the truth table?

X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0

- A. AND
 B. XOR
 C. OR
 D. NOT

- 1.9 If $G(a,b,c) = a'bc + ab'c' + ab$ then $G'(a,b,c) =$

- A. $m_3 + m_4 + m_0 + m_6$
 B. $m_0 + m_1 + m_2 + m_5$
 C. $m_3 + m_4 + m_2$
 D. $m_0 + m_1 + m_2$

- 1.10 Which ONE of the following statements is INCORRECT?

- A. $(x + y)' = x'y'$
 B. $(x.y)' = x' + y'$
 C. $(x + y)' = x' + y'$
 D. $x + x'y = x + y$

10x2=[20]

VRAAG 2
REKENAARARGITEKTUUR

- 2.1 Die eerste Pentium 4's het slegs Rambus-geheue bevat. Noem EEN nadeel van Rambus-geheue. (1)
- 2.2 Die daaropvolgende Pentium 4-modelle het DDR SDRAM of Sinchroniese DRAM bevat vir beter werkverrigting. Verduidelik kortliks die verskil tussen DDR SDRAM en Sinchroniese DRAM. (4)
- 2.3 Met die Pentium 4 het Intel die kasgeheue (L2) vanaf 256 K tot 512K verhoog. Hoe kan die verhoging van kasgeheue bydra tot vinniger verwerking? (3)
- 2.4 Die spoed van die Pentium 4-stelselbus het verhoog van 433 MHz tot 533 MHz.
- 2.4.1 Tussen watter komponente van 'n rekenaar is die stelselbus 'n skakel? (2)
- 2.4.2 Die stelselbus bestaan uit drie tipes interne busse. Watter een van hierdie busse het 'n invloed op die verwerkingspoed van die rekenaar? Motiveer jou antwoord. (2)
- 2.4.3 Watter komponent op die moederbord reguleer die stelselbus se spoed? (1)
- 2.4.4 Verduidelik wat **klokvermenigvuldiging** is. (2)
- 2.4.5 Die spoed van die stelselbus is vinniger as die van eksterne busse. Noem TWEE voorbeelde van eksterne busse. (2)
- 2.5 Sommige moederborde beskik deesdae oor 'n fasiliteit (*tranceiving unit*) wat die rekenaar instaat stel om met *Bluetooth*-toestelle te kommunikeer.
- 2.5.1 Wat is **Bluetooth**? (2)
- 2.5.2 Noem TWEE voorbeelde van *Bluetooth*-toestelle waarmee die moederbord kan kommunikeer. (2)
- 2.6 Die USB-poort word gebruik wanneer rekenaars met Bluetooth-tegnologie wil kommunikeer. Noem DRIE ander redes waarom USB een van die gewildste maniere is om randapparatuur te koppel. (3)
- 2.7 Die Pentium 4 bevat onder andere die volgende eienskappe:
- Die pyplyndiepte is verdubbel na 20 stadiums.
 - Verbeterde wisselpunt-eenheid
 - Die RLE werk teen twee keer die spoed van die stelselklok.
- 2.7.1 Verduidelik wat **pyplynverwerking** is. (3)
- 2.7.2 Watter invloed het die aantal stadiums in 'n pyplyn op die werkverrigting van die rekenaar? (1)

QUESTION 2
COMPUTER ARCHITECTURE

- 2.1 The first Pentium 4s had only Rambus Memory. Name ONE disadvantage of Rambus memory. (1)
- 2.2 The Pentium 4 models thereafter had DDR SDRAM or Synchronous DRAM for better performance. Briefly explain the difference between DDR SDRAM and Synchronous DRAM. (4)
- 2.3 With the Pentium 4 Intel increased the cache memory (L2) from 256 K to 512 K. How can the increase in cache memory contribute to faster processing? (3)
- 2.4 The system bus speed of the Pentium 4 has increased from 433 MHz to 533 MHz.
- 2.4.1 Between which components of a computer is the system bus a link? (2)
- 2.4.2 The system bus consists of three types of internal buses. Which one of these buses has an influence on the processing speed of the computer? Substantiate your answer. (2)
- 2.4.3 Which component on the motherboard regulates the system bus speed? (1)
- 2.4.4 Explain what clock **multiplication** is. (2)
- 2.4.5 The speed of the system bus is faster than that of the external buses. Name TWO examples of external buses. (2)
- 2.5 Some motherboards these days contain a facility called tranceiving unit to enable the computer to communicate with Bluetooth devices.
- 2.5.1 What is **Bluetooth**? (2)
- 2.5.2 Name TWO examples of *Bluetooth* devices the motherboard can communicate with. (2)
- 2.6 The USB port is used when computers communicate with Bluetooth technology. Name THREE other reasons why USB is one of the most popular ways to connect peripherals. (3)
- 2.7 The Pentium 4 has among others the following characteristics:
- The pipeline depth was doubled to 20 stages.
 - Improved floating-point unit
 - The ALU operates at twice the speed of the system clock.
- 2.7.1 Explain what **pipeline processing** is. (3)
- 2.7.2 What influence does the number of stages in a pipeline have on the performance of a computer? (1)

- 2.7.3 Watter tipe toepassings sal baat vind by verbeterde wisselpunt-eenhede? (2)
- 2.7.4 Wat is die funksie van die RLE? (2)
- 2.8 Bespreek kortliks watter invloed die aantal transistors (op die SVE) op die samestelling en die werkverrigting van die SVE en die rekenaar het. (3)
- [35]**

VRAAG 3 STELSELPGRAMMATUUR

3.1 **“Moet ek opgradeer?”**

Hierdie is 'n vraag wat heel dikwels gevra word wanneer daar 'n nuwe weergawe van 'n bedryfstelsel vrygestel word bv. Windows XP.

- 3.1.1 Afgesien van koste, noem TWEE ander faktore wat jy in oorweging moet neem voordat jy 'n nuwe bedryfstelsel aanskaf. (2)
- 3.1.2 Noem DRIE voordele van Windows XP bo vorige Windows bedryfstelsels. (3)
- 3.2 In 'n ondersoek is gevind dat slegs die helfte van alle klein sake-ondernemings anti-virusprogramme weekliks (of minder gereeld) opdateer.
- 3.2.1 Hoe kan rekenaarvirusse binne minute oor groot dele van die wêreld versprei word? (1)
- 3.2.2 Noem EEN rede waarom dit belangrik is vir besighede om anti-virusprogramme gereeld op te dateer. (1)
- 3.2.3 Behalwe gereelde opdatering van anti-virusprogrammatuur, gee DRIE ander wenke aan die werknemers om 'n sakeonderneming se rekenaars teen rekenaarvirusse te beskerm. (3)
- 3.3 Gee in elke geval een term vir elk van die volgende beskrywings.
- 3.3.1 Die deel van die bedryfstelsel wat eerste in die hoofgeheue gelaai word en in die geheue bly vir die hele tyd wat die bedryfstelsel gelaai is
- 3.3.2 Programme wat die bedryfstelsel instaat stel om apparatuur wat nie deur die BIOS ondersteun word nie, te beheer
- 3.3.3 'n Spesiale vlokkie op die moederbord wat die basiese opstelling van die rekenaarstelsel bevat soos byvoorbeeld die datum en tyd. Die vlokkie behou selfs die data as die krag afgeskakel word.
- 3.3.4 'n Tabel wat intern deur die bedryfstelsel gebruik word om rekord te hou van die plek waar lêers fisies op 'n skyf gestoor word

- 2.7.3 Which type of applications will benefit from improved floating point units? (2)
- 2.7.4 What is the function of the ALU? (2)
- 2.8 Briefly discuss the influence that the number of transistors (on the CPU) has on the composition and the performance of the CPU and the computer. (3)

[35]

**QUESTION 3
SYSTEM SOFTWARE**

3.1 “Do I have to upgrade?”

This is a question asked quite often when a new version of an operating system is released, for example Windows XP.

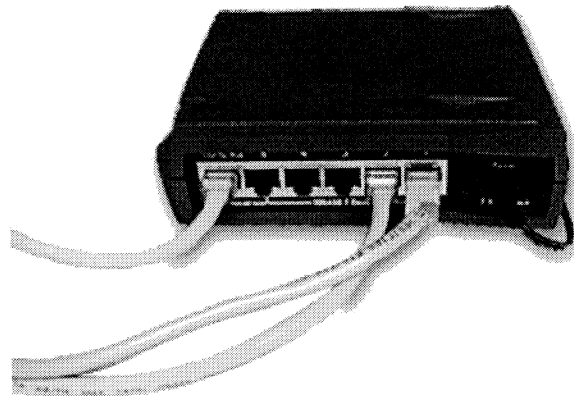
- 3.1.1 Except for cost, name TWO other factors you should take into account before procuring a new operating system? (2)
- 3.1.2 Name THREE advantages of Windows XP compared to previous Windows operating systems. (3)
- 3.2 In a survey it was found that only half of all small businesses update their anti-virus software weekly (or less often).
- 3.2.1 How can computer viruses be distributed over large areas of the world within minutes? (1)
- 3.2.2 Name ONE reason why it is important for businesses to update anti-virus software regularly. (1)
- 3.2.3 Except for regular updating of anti-virus software, give THREE other hints to the employees to protect a business' computers against computer viruses. (3)
- 3.3 In each case, give one term for each of the following descriptions.
- 3.3.1 The part of the operating system which is loaded into the main memory first, and stays in the memory for the entire time the operating system is loaded
- 3.3.2 Software that enables the operating system to control devices not supported by the BIOS
- 3.3.3 A special chip on the motherboard that contains the basic setup of the computer system, for instance the date and time. The chip retains the data even if the power is switched off.
- 3.3.4 A table used internally by the operating system to keep record of the place where files are physically stored on a disk

- 3.3.5 Die deel van die bedryfstelsel wat bevele uitvoer en optree as koppelvlak tussen die gebruiker en bedryfstelsel
- 3.3.6 'n Program wat 'n bronprogram volledig na 'n objekprogram in masjientaal omskakel
- 3.3.7 Die tegniek waar 'n bedryfstelsel verskillende dele van dieselfde program gelyktydig kan verwerk
- 3.3.8 'n Oopbron("Open source") bedryfstelsel wat vrylik beskikbaar is en toeneem in gewildheid
- 3.3.9 Die tegniek wat dit laat voorkom asof die bedryfstelsel meer as een taak (program) op dieselfde tydstep uitvoer
- 3.3.10 Die tipe geheue wat van spasie op die hardeskyf gebruik maak om die gebruiker en rekenaar te flous en te laat dink dat daar meer geheue beskikbaar is as wat die rekenaar fisies besit

(10)
[20]

VRAAG 4 DATAKOMMUNIKASIE

- 4.1 Noem TWEE redes waarom Ethernet een van die gewildste netwerk-tegnologieë is. (2)
- 4.2 Identifiseer die onderstaande toestel wat in 'n Ethernet-netwerk gebruik word. (1)



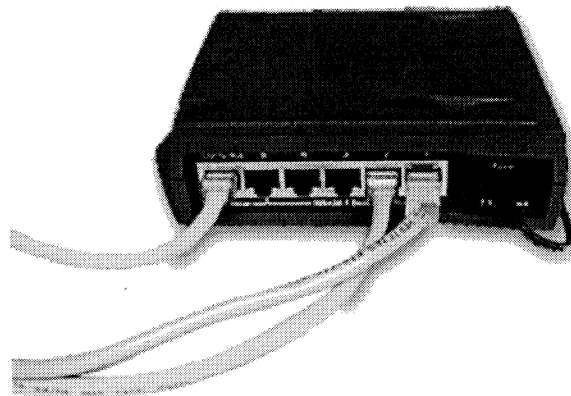
- 4.3 Noem TWEE funksies van die toestel genoem in Vraag 4.2. (2)
- 4.4 Watter tipe kabel word in die diagram in Vraag 4.2 gebruik? (1)
- 4.5 Watter ander tipe kables kan ook in Ethernet-netwerke gebruik word? (1)
- 4.6 Noem TWEE funksie van 'n netwerkkaart. (2)

- 3.3.5 The part of the operating system that executes commands and is the interface between the user and the operating system
- 3.3.6 A program which translates the complete source program into a machine language program, called the object program
- 3.3.7 The technique whereby an operating system can process different parts of the same program simultaneously
- 3.3.8 An open source operating system that is freely available and is becoming increasingly popular
- 3.3.9 The technique that enables the operating system appear to work on more than one task at the same time.
- 3.3.10 This type of memory uses hard disk space to fool the user and the computer into letting them think more memory is available than what the computer physically contains.

(10)
[20]

QUESTION 4
DATA COMMUNICATION

- 4.1 Name TWO reasons why Ethernet is one of the most popular network technologies. (2)
- 4.2 Identify the device below which is used in an Ethernet network. (1)



- 4.3 Name TWO functions of the device named in Question 4.2. (2)
- 4.4 Which type of cable is used in the diagram in Question 4.2? (1)
- 4.5 Which other type of cables can also be used in Ethernet networks? (1)
- 4.6 Name TWO functions of a network card. (2)

- 4.7 Gee kortliks 'n beskrywing van die toegangsmetode wat in Ethernet-netwerke gebruik word. (3)
- 4.8 Die volgende opsies is beskikbaar vir Internet-toegang:
- Skakellyn
 - Analooq toegewyde lyn
 - Diginet toegewyde lyn
 - ISDN
 - ADSL
 - Satelliet
- 4.8.1 Noem TWEE verskille tussen 'n skakellyn en ISDN? (2)
- 4.8.2 ADSL-tegnologie is asimmetries. Wat beteken **asimmetries** in hierdie verband? (2)
- 4.8.3 Noem DRIE kenmerke van 'n Diginetlyn. (3)
- 4.8.4 Wat is 'n **toegewyde lyn**? (1)
- 4.8.5 Verduidelik wat 'n **skakeltegniek** is. (2)
- 4.8.6 ISDN maak gebruik van lynskakeling. Bespreek **lynskakeling** kortliks. (3)
- 4.8.7 Noem EEN voordeel van satelliet-transmissie. (1)
- 4.9 4.9.1 Noem VIER spesifikasies ten opsigte van die manier van kommunikasie wat vasgestel word deur 'n kommunikasie-protokol. (4)
- 4.9.2 Watter EEN van die volgende is NIE 'n kommunikasie-protokol NIE?
TCP/IP, IPX/SPX, ATM, FDDI, X.25 (1)
- 4.9.3 Wat is 'n **IP(Internet Protokol)-adres**? (2)
- 4.10 Gee die definisie van elk van die volgende terme:
- 4.10.1 *Firewall* (2)
- 4.10.2 Roeteerder (*Router*) (2)
- 4.10.3 Deurgangspoort (*Gateway*) (3)

[40]

- 4.7 Give a brief description of the access method used in Ethernet networks. (3)
- 4.8 The following options are available for access to the Internet:
- Dial-up line
 - Analog dedicated line
 - Diginet dedicated line
 - ISDN
 - ADSL
 - Satellite
- 4.8.1 Name TWO differences between a dial-up line and ISDN? (2)
- 4.8.2 ADSL technology is asymmetric. What does **asymmetric** mean in this context? (2)
- 4.8.3 Name THREE characteristics of a Diginet line. (3)
- 4.8.4 What is a **dedicated line**? (1)
- 4.8.5 Explain what a **switching technique** is. (2)
- 4.8.6 ISDN uses line switching. Briefly discuss **line switching**. (3)
- 4.8.7 Name ONE advantage of satellite transmission. (1)
- 4.9 4.9.1 Name FOUR specifications related to the method of communication that is stipulated by a communication protocol. (4)
- 4.9.2 Which ONE of the following is NOT a communication protocol?
TCP/IP, IPX/SPX, ATM, FDDI, X.25 (1)
- 4.9.3 What is an **IP(Internet Protocol)-address**? (2)
- 4.10 Give the definition of each of the following terms:
- 4.10.1 Firewall (2)
- 4.10.2 Router (2)
- 4.10.3 Gateway (3)

[40]

VRAAG 5 SOSIALE IMPLIKASIES

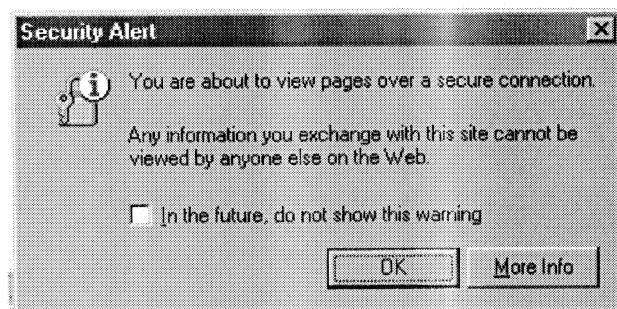
5.1 Privaatheid en programmatuurroof

- 5.1.1 Volgens 'n BSA (Business Software Alliance)-opname word ongelisensieërde programmatuur op meer as 38% van nuwe rekenaars wat verkoop word, gelaai. Waarom is dit belangrik dat gebruikers programmatuur aankoop en nie roofkopieë gebruik nie? (2)
- 5.1.2 Noem TWEE voorbeelde van wat gedoen word om programmatuurroof te verminder. (2)
- 5.1.3 Gebruik 'n praktiese voorbeeld om te verduidelik hoe 'n persoon se privaatheid in gedrang kan kom wanneer persoonlike inligting beskikbaar is. (3)

5.2 Die onderstaande opskrif verwys na 'n artikel wat die voordele van aankope oor die Internet uitwys.

“Klik vir jou gerief”

- 5.2.1 Noem DRIE voordele om kruideniersware oor die Internet te koop. (3)
- 5.2.2 Wanneer na die webtuiste van die maatskappy gegaan word, verskyn die onderstaande blok met inligting. Verduidelik wat dit beteken. (2)



5.3 PDA's is meer bekostigbaar en baie meer bruikbaar as voorheen. Noem DRIE toepassings van PDA's. (3)

[15]

Doen OF die PASCAL OF DELPHI-afdeling.
--

QUESTION 5
SOCIAL IMPLICATIONS

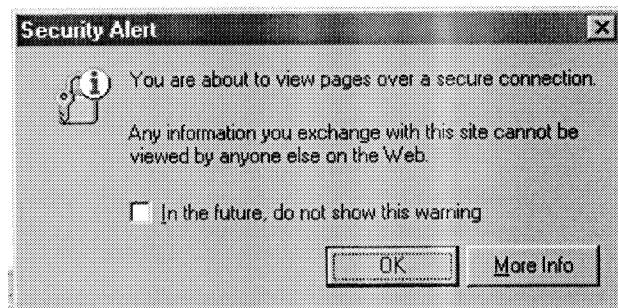
5.1 Privacy and Piracy

- 5.1.1 According to a BSA (Business Software Alliance) survey, unlicensed software is loaded on more than 38% of new computers sold. Why is it important that users buy and not pirate software? (2)
- 5.1.2 Name TWO examples of actions being taken to reduce software piracy. (2)
- 5.1.3 Use a practical example to explain how a person's privacy can be compromised if personal information is available. (3)

5.2 The heading below refers to an article that shows the advantages of shopping via the Internet.

"Click for your comfort"

- 5.2.1 Name THREE advantages of buying groceries via the Internet. (3)
- 5.2.2 When accessing the website of the company, the block below with information appears. Explain what it means. (2)



5.3 PDAs are more affordable and much more useful than before. Name THREE applications of PDAs. (3)
[15]

Do either the PASCAL or DELPHI section.

TURBO PASCAL SECTION

QUESTION 6

6.1 What will the output of the following program segments be?

6.1.1 `collect := [1..14];`
`number := 12;`
`if NOT(number IN collect) then`
`writeln('Yes') else writeln('No');` (2)

6.1.2 `type`
`transport = (motor, bicycle, motorcycle, airplane,`
`bus, train);`

`var`
`transporttool : transport;`
`begin`
`transporttool := motorcycle;`
`inc(transporttool,2);`
`writeln(ord(transporttool));`
`end;` (2)

6.2 Name THREE characteristics a good program must conform to from the programmer's point of view. (3)

6.3 Explain the function of the compiler directive in the following program segment below.

```
{ $I- }  
  Reset (DatFile);  
{ $I+ }  
if (IOResult > 0) then Rewrite (DatFile);
```

 (3)
[10]

VRAAG 7 TEKS- EN DATALEËRS

- 7.1 'n Datalêer bestaan uit 'n aantal rekords. Lees die kommentaar wat 'n programmeerder gee soos beskryf in 7.1.1 en 7.1.2. Verduidelik telkens wat die moontlike fout kan wees of gee 'n programsegment waarin die fout duidelik na vore kom. Indien nodig kan die volgende verklaring gebruik word.

```

type
rekorduitleg = record
    naam,van : string[20];
    telefoon : string[10];
end;
var
    data      : rekorduitleg;
    dataler   : file of rekorduitleg;

```

7.1.1 "My program vertoon slegs die laaste rekord in die lêer." (2)

7.1.2 "Ek het 'n program geskryf om die derde rekord in 'n lêer se data te verander. Elke keer wanneer ek die program uitvoer bly die derde rekord in die lêer dieselfde en die vierde rekord bevat die nuwe data." (3)

- 7.2 'n Tekslêer DATA.TXT met 'n onbekende aantal reëls teks daarin, is reeds geskep. Die onderstaande program moet 'n sekere reël wat deur die gebruiker gespesifiseer word, vertoon. Die reël moet in rooi min of meer in die middel van die skerm vertoon word. Skryf die ontbrekende gedeelte van die program neer.

```

Var
    Teksler      : TEXT;
    Tel, x       : integer;
    Karakterstring : string;
Begin
    Writeln('Watter lyn moet gedruk word?');
    Readln(x);
    Assign(Teksler, 'DATA.TXT');
    {Voltooi hierdie gedeelte}
readln;
end.

```

(10)
[15]

QUESTION 7
TEXT AND DATA FILES

- 7.1 A data file consists of a number of records. Read the comment that the programmer has given as described in 7.1.1 and 7.1.2. Explain in each case, the possible error, or give a program segment where the error is clearly indicated. If necessary, use the following declaration.

```

type
recordlayout = record
    name, surname   : string[20];
    telephone       : string[10];
end;
var
    data           : recordlayout;
    datafil        : file of recordlayout;

```

7.1.1 "My program displays only the last record in the file." (2)

7.1.2 "I have written a program to edit the data in the third record in a file. Every time I execute the program the third record in the file remains the same and the fourth record contains the new data." (3)

- 7.2 A text file DATA.TXT with an unknown number of lines of text has been created. The program below has to display a certain line, specified by the user. The line must be displayed in red, approximately in the centre of the screen. Write down the missing part of the program.

```

Var
    Textf           : TEXT;
    Count, x        : integer;
    Characterstring: string;
Begin
    Writeln('Which line must be printed?');
    Readln(x);
    Assign(Textf, 'DATA.TXT');
    {Complete this part}
readln;
end.

```

(10)
[15]

VRAAG 8
EEN- EN TWEEDIMENSIONELE SKIKKINGS

8.1 Gegee:

Getal : array[-1..3, 'A'..'C'] of integer;

Hoeveel getalle kan in die tweedimensionele skikking Getal ingelees word? (1)

8.2 In watter van die volgende geval(le) sal dit noodsaaklik wees om van 'n skikking gebruik te maak? Skryf slegs die letter/s neer.

- A. Vind die grootste van 20 getalle.
- B. Bepaal die som van 20 getalle.
- C. Rangskik 20 getalle van groot na klein. (1)

8.3 Gegee:

```

Procedure SORTTEER(VAR skik:eendim);
Var
  k,j,ruil :integer;
begin
  for k := 1 to 2 do
    for j := k+1 to 3 do
      if skik[k] > skik[j] then
        begin
          ruil := skik[k];
          skik[j] := skik[k];
          skik[k] := ruil;
        end;
    end;
  end;
end;

```

8.3.1 Wat sal die waardes van die skikking SKIK wees nadat die sorteer-algoritme uitgevoer is? Die tabel dui die oorspronklike volgorde van die waardes in die skikking aan:

skik[1]	skik[2]	skik[3]
6	12	3

(3)

8.3.2 Waarom word die waardes nie korrek gesorteer nie? (1)

QUESTION 8
ONE- AND TWO-DIMENSIONAL ARRAYS

8.1 Given:

Number : array[-1..3, 'A'..'C'] of integer;

How many numbers can be read into the two-dimensional array Number? (1)

8.2 In which of the following case(s) is it necessary to use an array? Write down the letter/s only.

- A. Find the largest of 20 numbers.
- B. Determine the sum of 20 numbers.
- C. Arrange 20 numbers from the highest to the lowest. (1)

8.3 Given:

```

Procedure SORT(VAR arr:onedim);
Var
    k,j,swop :integer;
begin
    for k := 1 to 2 do
        for j := k+1 to 3 do
            if arr[k] > arr[j] then
                begin
                    swop := arr[k];
                    arr[j] := arr[k];
                    arr[k] := swop;
                end;
        end;
    end;
end;

```

8.3.1 What will the values of the array ARR be after execution of the given sorting algorithm? The table indicates the original order of the values in the array.

arr[1]	arr[2]	arr[3]
6	12	3

(3)

8.3.2 Why are the values not sorted correctly? (1)

8.4 Die volgende verklaargedeelte word gegee:

```

type
  persoon = record
    naam, van :string[20];
  end;
  rekskik = array[1..10] of persoon;
var
  mens          :rekskik;
  eenpersoon    :persoon;
  k             :integer;

```

Dui in elke geval aan of die toekenning geldig of ongeldig is. Indien ongeldig gee 'n rede.

8.4.1 mens[3] := eenpersoon;

8.4.2 begin
 k := 2;
 mens[k].naam := eenpersoon.naam;
 end;

8.4.3 persoon := mens[1];

8.4.4 eenpersoon := mens;

(4)

8.5 Die volgende prosedure moet ewekansig enkele karakters uit die ACSII tabel kies en in 'n tweedimensionele skikking plaas. Skryf die ontbrekende gedeelte van die program neer.
 LET WEL: Daar is 256 karakters in die ASCII-tabel waarvan die eerste 32 karakters kontrolekarakters is, wat nie gekies kan word nie. Voorbeeld van die inhoud van die skikking:

	1	2	3	4	5
1	¢	A	π	²	M
2	5	ƒ	D	k	Ó
3	a	s	}	G	ƒ
4	ć	-	8	√	o
5	π	V	/	D	S

8.4 The following declaration part is given:

```

type
  person = record
    name, surname :string[20];
  end;
  recarr = array[1..10] of person;
var
  manyper      :recarr;
  oneper       :person;
  k            :integer;

```

In each case, indicate if the assignment statement is valid or invalid. If invalid give a reason.

8.4.1 manyper[3] := oneper;

8.4.2 begin
 k := 2;
 manyper[k].name := oneper.name;
 end;

8.4.3 person := manyper[1];

8.4.4 oneper := manyper;

(4)

8.5 The following procedure has to randomly select single characters from the ASCII table, and has to place them in a two-dimensional array. Write down the missing part of the program.

NOTE: The ASCII table contains 256 characters. The first 32 are control characters, and cannot be selected. Example of the content of the array:

	1	2	3	4	5
1	ϕ	A	π	²	M
2	5	ƒ	D	k	Ó
3	a	s	}	G	ƒ
4	ć	–	8	√	o
5	π	V	/	D	S

```

procedure tweedim;
VAR
  R,K :INTEGER;
  TWEE :ARRAY[1..5,1..5] OF CHAR;
  GETAL : BYTE;
begin
  CLRSCR;
  RANDOMIZE;
  { Voltooi die gedeelte}
readln;
end;

```

(5)
[15]

VRAAG 9 KARAKTERHANtering EN ALGORITME

'n Funksie subprogram ontvang 'n karakterstring bestaande uit 8 karakters met parameteroordrag. Die karakterstring stel 'n getal voor in eksponentnotasie. Die funksie subprogram moet die eksponentnotasievoorstelling van die getal omskakel na 'n reële getal, byvoorbeeld:

1.23E+02	word ontvang en die reële waarde is 123	(1.23*100)
1.56E+01	word ontvang en die reële waarde is 15.6	(1.56*10)
8.37E-01	word ontvang en die reële waarde is 0.837	(8.37/10)

'n Algoritme word gegee vir die funksie subprogram. Voltooi die funksie-stelling function OMSKAKEL ... (9.1)... en kodeer elke stelling genummer 9.2 – 9.10 van die algoritme in Pascal.

```

Program vraag9;
Uses crt;
Type
  str8 = string[8];
Var
  karakter :str8;
  antwoord :real;

function OMSKAKEL.....{9.1}.....
var
  WAARDE           :longint;
  FOUTKODE, J      :integer;
  EERSTE, TEKEN, EKSPONENT :str8;
  GETALEERSTE, GETALWAARDE :real;
  GETALEKSPONENT   :integer;

```

(2)

```
begin
```

9.2 Kopieer die eerste vier karakters van die karakterstring (tot voor die letter E) en ken die substring toe aan die veranderlike EERSTE.

(1)

```

procedure twodim;

VAR
  R,K :INTEGER;
  TWO :ARRAY[1..5,1..5] OF CHAR;
  NUMBER : BYTE;

begin
  CLRSCR;
  RANDOMIZE;
  { Complete this part }
readln;
end;

```

(5)
[15]

QUESTION 9 CHARACTER HANDLING AND ALGORITHM

A function subprogram receives a character string consisting of 8 characters with parameter transfer. The character string represents a number in exponential notation. The function subprogram has to convert the exponential notation into a real number, for example:

1.23E+02	is received and the real value is 123	(1.23*100)
1.56E+01	is received and the real value is 15.6	(1.56*10)
8.37E-01	is received and the real value is 0.837	(8.37/10)

An algorithm is given for the function subprogram. Complete the function statement function CONVERT.. (9.1) and code each statement numbered 9.2 - 9.10 of the algorithm into Pascal.

```

Program question9;
Uses crt;
Type
  str8 = string[8];
Var
  character :str8;
  answer    :real;

```

```
function CONVERT.....{9.1}.....
```

(2)

```

var
  VALUE                :longint;
  ERRORCODE, J         :integer;
  FIRST, SIGN, EXPONENT :str8;
  NUMBERFIRST,NUMBERVALUE :real;
  NUMBEREXPONENT       :integer;

```

```
begin
```

9.2 Copy the first four characters of the character string (up to the character preceding the letter E) and assign the sub string to the variable FIRST.

(1)

- 9.3 Skakel die substring (veranderlike EERSTE) om na 'n getalwaarde (veranderlike GETALEERSTE). (2)
- 9.4 Kopieer die eksponentgedeelte van die karakterstring, met ander woorde die laaste twee karakters, na die veranderlike EKSPONENT. (1)
- 9.5 Skakel die substring (veranderlike EKSPONENT) om na 'n getalwaarde (veranderlike GETALEKSPONENT) (1)
- 9.6 Bereken die waarde (veranderlike WAARDE) waarmee die getal vermenigvuldig moet word bv.
- as die eksponentgedeelte 01 is, is die waarde 10.
as die eksponentgedeelte 02 is, is die waarde 100.
as die eksponentgedeelte 03 is, is die waarde 1000, ens. (3)
- 9.7 Kopieer die teken van die eksponent na die veranderlike TEKEN. (1)
- 9.8 Bereken nou die getalwaarde (veranderlike GETALWAARDE) deur die eerste gedeelte (veranderlikes EERSTE) te vermenigvuldig (+teken) of te deel(-teken) met die getalwaarde bereken in 9.6. (3)
- 9.9 Ken die getalwaarde toe aan die funksienaam (1)
- end;

[15]

VRAAG 10 EENHEDE

'n Kriptogram skakel teks om na geheime kode. Dit word gedoen deur elke letter in die teks te vervang met 'n ander karakter of letter. Daar is verskillende maniere waarop die vervanging gedoen kan word. Een manier is om elke karakter te vervang met die volgende karakter in die ASCII-tabel bv. a met b, c met d ens.

Voorbeeld:

Toevoer: Hallo Zelda
Afvoer: lbmmp [fmeb

'n UNIT bevat 'n prosedure KRIPTOGRAM wat 'n karakterstring ontvang en omskakel na 'n geheime kode deur elke karakter te vervang met die volgende karakter. Die prosedure bevat twee parameters naamlik die oorspronklike string en die geënkripteerde string.

- 10.1 Skryf die volledige prosedure KRIPTOGRAM neer. (10)
- 10.2 Skryf die algemene struktuur van die UNIT neer waarin die prosedure KRIPTOGRAM geplaas moet word. Dit is nie nodig om die volledige prosedure uit te skryf nie, dui net die posisie aan waar die prosedure in die UNIT ingeplaas moet word. (5)

[15]

TOTAAL: 200

b.o.

- 9.3 Convert the sub string (variable FIRST) into a number value (variable NUMBERFIRST). (2)
- 9.4 Copy the exponent part of the character string, in other words the last two characters and assign it to the variable EXPONENT. (1)
- 9.5 Convert the sub string (variable EXPONENT) into a number value (variable NUMBEREXPONENT). (1)
- 9.6 Calculate the value (variable VALUE) that the number has to be multiplied by, for example.

if the exponent part is 01, the value is 10.
if the exponent part is 02, the value is 100.
if the exponent part is 03, then the value is 1000, etc. (3)
- 9.7 Copy the sign of the exponent to the variable SIGN. (1)
- 9.8 Now calculate the number value (variable NUMBERVALUE) by multiplying (+ sign) or dividing (-sign) the first part (variable FIRST) with the number value calculated in 9.6. (3)
- 9.9 Assign the number value to the function name (1)
- end;
- [15]**

QUESTION 10 UNITS

A cryptogram converts text to a secret code. It is done by replacing each letter in the text with another character or letter. There are different ways to do the replacement. One method is to replace each character with the next character in the ASCII table for instance a with b, c with d, etc.

Example:

Input: Hallo Zelda
Output: lhmmp [fmeb

A UNIT contains a procedure CRYPTOGRAM that receives the character string and converts it to secret code by replacing each character with the next character. The procedure has two parameters, namely the original string and the encrypted string.

- 10.1 Write the complete procedure CRYPTOGRAM. (10)
- 10.2 Write down the general structure of the UNIT. It is not necessary to write down the complete procedure, only indicate the position of the procedure CRYPTOGRAM in the UNIT. (5)

[15]

TOTAL: 200

DELPHI-AFDELING

VRAAG 6

6.1 Wat sal die afvoer van die volgende programsegmente wees?

```
6.1.1  vers := [1..14];
       getal := 12;
       if NOT(getal IN vers) then
         lblGetal.Caption := 'Ja' else lblGetal.Caption :=
         'Nee';
```

(2)

```
6.1.2  type
       vervoer = (motor, fiets, motorfiets,
                 vliegtuig, bus, trein);
       var
         vervoermiddel : vervoer;

       begin
         vervoermiddel := motorfiets;
         inc(vervoermiddel,2);
         lblAfvoer.Caption :=
         intToStr(ord(vervoermiddel));
       end;
```

(2)

6.2 Noem DRIE eienskappe waaraan 'n goeie program moet voldoen uit die programmeerder se oogpunt. (3)

6.3 Verduidelik wat die funksie van die vertalerdirektiewe in die volgende programsegment is.

```
{ $I- }
  Reset(Ler);
{ $I+ }
if (IOResult > 0) then Rewrite(Ler);
```

(3)

[10]

DELPHI SECTION

QUESTION 6

6.1 What will the output of the following program segments be?

6.1.1 `collect := [1..14];
number := 12;
if NOT(number IN collect) then
 lblNumber.Caption := 'Yes' else lblNumber.Caption :=
 'No';` (2)

6.1.2 `type
 transport = (motor, bicycle, motorcycle, airplane,
 bus, train);

var
 transporttool : transport;

begin
 transporttool := motorcycle;
 inc(transporttool,2);
 lblOutput.Caption :=
 intToStr(ord(transporttool));
end;` (2)

6.2 Name THREE characteristics to which a good program must conform to from the programmer's point of view. (3)

6.3 Explain the function of the compiler directive in the following program segment.

```
{ $I- }  
  Reset(DatFile);  
{ $I+ }  
if (IOResult > 0) then Rewrite(DatFile);
```

 (3)
[10]

VRAAG 7 TEKS- EN DATALÊERS

- 7.1 'n Datalêer bestaan uit 'n aantal rekords. Lees die kommentaar wat 'n programmeerder gee soos beskryf in 7.1.1 en 7.1.2. Verduidelik telkens wat die moontlike fout kan wees of gee 'n programsegment waarin die fout duidelik na vore kom. Indien nodig kan die volgende verklaring gebruik word.

```

type
rekorduitleg = record
    naam, van : string[20];
    telefoon : string[10];
end;
var
    data      : rekorduitleg;
    dataler   : file of rekorduitleg;

```

7.1.1 "My program vertoon slegs die laaste rekord in die lêer." (2)

7.1.2 "Ek het 'n program geskryf om die derde rekord in 'n lêer se data te verander. Elke keer wanneer ek die program uitvoer bly die derde rekord in die lêer dieselfde en die vierde rekord bevat die nuwe data." (3)

- 7.2 'n Tekslêer DATA.TXT met 'n onbekende aantal reëls teks daarin, is reeds geskep. Die onderstaande program moet 'n sekere reël wat deur die gebruiker gespesifiseer word, vertoon. Die reël moet in rooi op die skerm vertoon word. Skryf die ontbrekende gedeelte van die program neer.

```

Var
    Teksler      : TextFile;
    Tel, x       : integer;
    Karakterstring : string;
Begin
    x := StrToInt(edtWatterlyn.Text);
    AssignFile(Teksler, 'DATA.TXT');
    {Voltooi hierdie gedeelte}
end;

```

(10)
[15]

QUESTION 7
TEXT AND DATA FILES

- 7.1 A data file consists of a number of records. Read the comment that the programmer has given as described in 7.1.1 and 7.1.2. Explain in each case, the possible error, or give a program segment where the error is clearly indicated. If necessary, use the following declaration.

```

type
recordlayout = record
    name, surname : string[20];
    telephone     : string[10];
end;
var
    data      : recordlayout;
    datafil   : file of recordlayout;

```

7.1.1 "My program displays only the last record in the file." (2)

7.1.2 "I have written a program to edit the data in the third record in a file. Every time I execute the program the third record in the file remains the same and the fourth record contains the new data." (3)

- 7.2 A text file DATA.TXT with an unknown number of lines of text has been created. The program below has to display a certain line, specified by the user. The line must be displayed in red, on the screen. Write down the missing part of the program.

```

Var
    Textf      : TextFile;
    Count, x   : integer;
    Characterstring: string;
Begin
    x := StrToInt(edtWhichLine.Text);
    AssignFile(TextF, 'DATA.TXT');
    {Complete this part}
end;

```

(10)
[15]

VRAAG 8
EEN- EN TWEEDIMENSIONELE SKIKKINGS

8.1 Gegee:

Getal : array[-1..3, 'A'..'C'] of integer;

Hoeveel getalle kan in die tweedimensionele skikking Getal ingelees word? (1)

8.2 In watter van die volgende geval(le) sal dit noodsaaklik wees om van 'n skikking gebruik te maak? Skryf slegs die letter/s neer.

- A. Vind die grootste van 20 getalle.
- B. Bepaal die som van 20 getalle.
- C. Rangskik 20 getalle van groot na klein. (1)

8.3 Gegee:

```

Procedure SORTEER(VAR skik:eendim);
Var
  k,j,ruil :integer;
begin
  for k := 1 to 2 do
    for j := k+1 to 3 do
      if skik[k] > skik[j] then
        begin
          ruil := skik[k];
          skik[j] := skik[k];
          skik[k] := ruil;
        end;
    end;
  end;
end;

```

8.3.1 Wat sal die waardes van die skikking SKIK wees nadat die sorteer-algoritme uitgevoer is? Die tabel dui die oorspronklike volgorde van die waardes in die skikking aan:

skik[1]	skik[2]	skik[3]
6	12	3

(3)

8.3.2 Waarom word die waardes nie korrek gesorteer nie? (1)

QUESTION 8
ONE- AND TWO-DIMENSIONAL ARRAYS

8.1 Given:

Number : array[-1..3, 'A'..'C'] of integer;

How many numbers can be read into the two-dimensional array Number? (1)

8.2 In which of the following case(s) is it necessary to use an array? Write down the letter/s only.

- A. Find the largest of 20 numbers.
- B. Determine the sum of 20 numbers.
- C. Arrange 20 numbers from the highest to the lowest. (1)

8.3 Given:

```

Procedure SORT(VAR arr:onedim);
Var
    k,j,swop :integer;
begin
    for k := 1 to 2 do
        for j := k+1 to 3 do
            if arr[k] > arr[j] then
                begin
                    swop := arr[k];
                    arr[j] := arr[k];
                    arr[k] := swop;
                end;
        end;
    end;
end;

```

8.3.1 What will the values of the array ARR be after execution of the given sorting algorithm? The table indicates the original order of the values in the array.

arr[1]	arr[2]	arr[3]
6	12	3

(3)

8.3.2 Why are the values not sorted correctly? (1)

8.4 Die volgende verklaargedeelte word gegee:

```

type
  persoon = record
    naam, van :string[20];
  end;
  rekskik = array[1..10] of persoon;
var
  mens          :rekskik;
  eenpersoon    :persoon;
  k             :integer;

```

Dui in elke geval aan of die toekenning geldig of ongeldig is. Indien ongeldig gee 'n rede.

8.4.1 mens[3] := eenpersoon;

8.4.2 begin
 k := 2;
 mens[k].naam := eenpersoon.naam;
 end;

8.4.3 persoon := mens[1];

8.4.4 eenpersoon := mens;

(4)

8.5 Die volgende prosedure moet ewekansig enkele karakters uit die ACSII-tabel kies en in 'n tweedimensionele skikking plaas. Skryf die ontbrekende gedeelte van die program neer.

LET WEL: Daar is 256 karakters in die ASCII-tabel waarvan die eerste 32 karakters kontrolekarakters is, wat nie gekies kan word nie. Voorbeeld van die inhoud van die skikking:

	1	2	3	4	5
1	¢	A	π	²	M
2	5	ƒ	D	k	Ó
3	a	s	}	G	ƒ
4	ć	-	8	√	o
5	π	V	/	D	S

8.4 The following declaration part is given:

```

type
  person = record
    name, surname :string[20];
  end;
  recarr = array[1..10] of person;
var
  manyper      :recarr;
  oneper       :person;
  k            :integer;

```

In each case, indicate if the assignment statement is valid or invalid. If invalid give a reason.

8.4.1 manyper[3] := oneper;

8.4.2 begin
 k := 2;
 manyper[k].name := oneper.name;
 end;

8.4.3 person := manyper[1];

8.4.4 oneper := manyper;

(4)

8.5 The following procedure has to randomly select single characters from the ASCII table, and has to place them in a two-dimensional array. Write down the missing part of the program.

NOTE: The ASCII table contains 256 characters of which the 32 are control characters, and cannot be selected.

Example of the content of the array:

	1	2	3	4	5
1	¢	A	π	²	M
2	5	ƒ	D	k	Ó
3	a	s	}	G	ƒ
4	ć	-	8	√	o
5	π	V	/	D	S

```

procedure tweedim;

VAR
  R,K :INTEGER;
  TWEE :ARRAY[1..5,1..5] OF CHAR;
  GETAL : BYTE;
begin
  RANDOMIZE;
  { Voltooi die gedeelte}
end;
```

(5)
[15]

VRAAG 9 KARAKTERHANtering EN ALGORITME

'n Funksie subprogram ontvang 'n karakterstring bestaande uit 8 karakters as parameter. Die karakterstring stel 'n getal voor in eksponentnotasie. Die funksie subprogram moet die eksponentnotasievoorstelling van die getal omskakel na 'n reële getal, byvoorbeeld:

1.23E+02	word ontvang en die reële waarde is 123	(1.23*100)
1.56E+01	word ontvang en die reële waarde is 15.6	(1.56*10)
8.37E-01	word ontvang en die reële waarde is 0.837	(8.37/10)

'n Algoritme word gegee vir die funksie subprogram. Voltooi die funksie-stelling function OMSKAKEL (9.1).... en kodeer elke stelling genummer 9.2 – 9.10 van die algoritme in Delphi.

```

function OMSKAKEL.....{9.1}.....
var
  WAARDE                :longint;
  FOUTKODE, J           :integer;
  EERSTE, TEKEN, EKSPONENT :string;
  GETALEERSTE, GETALWAARDE :real;
  GETALEKSPONENT        :integer;
```

(2)

```
begin
```

- 9.2 Kopieer die eerste vier karakters van die karakterstring (tot voor die letter E) en ken die substring toe aan die veranderlike EERSTE. (1)
- 9.3 Skakel die substring (veranderlike EERSTE) om na 'n getalwaarde (veranderlike GETALEERSTE). (2)
- 9.4 Kopieer die eksponentgedeelte van die karakterstring, met ander woorde die laaste twee karakters, na die veranderlike EKSPONENT. (1)
- 9.5 Skakel die substring (veranderlike EKSPONENT) om na 'n getalwaarde (veranderlike GETALEKSPONENT). (1)

```

procedure twodim;

VAR
  R, K : INTEGER;
  TWO : ARRAY[1..5, 1..5] OF CHAR;
  NUMBER : BYTE;
begin
  RANDOMIZE;
  { Complete this part }
end;

```

(5)
[15]

QUESTION 9 CHARACTER HANDLING AND ALGORITHM

A function subprogram receives a character string consisting of 8 characters with parameter transfer. The character string represents a number in exponent notation. The function subprogram has to convert the exponent notation into a real number, for example:

1.23E+02	is received and the real value is 123	(1.23*100)
1.56E+01	is received and the real value is 15.6	(1.56*10)
8.37E-01	is received and the real value is 0.837	(8.37/10)

An algorithm is given for the function subprogram. Complete the function statement function CONVERT.. (9.1) and code each statement numbered 9.2 - 9.10 of the algorithm into Delphi

```

function CONVERT.....{9.1}.....
var
  VALUE                : longint;
  ERRORCODE, J         : integer;
  FIRST, SIGN, EXPONENT : string;
  NUMBERFIRST, NUMBERVALUE : real;
  NUMBEREXPONENT       : integer;

```

(2)

```
begin
```

- | | | |
|-----|--|-----|
| 9.2 | Copy the first four characters of the character string (up to the character preceding the letter E) and assign the sub string to the variable FIRST. | (1) |
| 9.3 | Convert the sub string (variable FIRST) into a number value (variable NUMBERFIRST). | (2) |
| 9.4 | Copy the exponent part of the character string, in other words the last two characters and assign it to the variable EXPONENT. | (1) |
| 9.5 | Convert the sub string (variable EXPONENT) into a number value (variable NUMBEREXPONENT). | (1) |

- 9.6 Bereken die waarde (veranderlike WAARDE) waarmee die getal vermenigvuldig moet word bv.
- as die eksponentgedeelte 01 is, is die waarde 10
as die eksponentgedeelte 02 is, is die waarde 100
as die eksponentgedeelte 03 is, is die waarde 1000 ens. (3)
- 9.7 Kopieer die teken van die eksponent na die veranderlike TEKEN. (1)
- 9.8 Bereken nou die getalwaarde (veranderlike GETALWAARDE) deur die eerste gedeelte (veranderlikes EERSTE) te vermenigvuldig (+teken) of te deel(-teken) met die getalwaarde bereken in 9.6. (3)
- 9.9 Ken die getalwaarde toe aan die funksienaam (1)
- end; [15]

VRAAG 10
EENHEDE

'n Kriptogram skakel teks om na geheime kode. Dit word gedoen deur elke letter in die teks te vervang met 'n ander karakter of letter. Daar is verskillende maniere waarop die vervanging gedoen kan word. Een manier is om elke karakter te vervang met die volgende karakter in die ASCII-tabel bv. a met b, c met d ens.

Voorbeeld:

Toevoer: Hallo Zelda
Afvoer: lbmmp [fmeb

'n UNIT bevat 'n prosedure KRIPTOGRAM wat 'n karakterstring ontvang en omskakel na 'n geheime kode deur elke karakter te vervang met die volgende karakter. Die prosedure bevat twee parameters naamlik die oorspronklike string en die geenkripteerde string.

- 10.1 Skryf die volledige prosedure KRIPTOGRAM neer. (10)
- 10.2 Skryf die algemene struktuur van die UNIT neer. Dit is nie nodig om die volledige prosedure uit te skryf nie, dui net die posisie aan waar die KRIPTOGRAM in die UNIT ingeplaas moet word. (5)

TOTAAL: 200

EINDE

- 9.6 Calculate the value (variable VALUE) that the number has to be multiplied by for example
- if the exponent part is 01, the value is 10.
if the exponent part is 02, then value is 100.
if the exponent part is 03, then the value is 1000 etc. (3)
- 9.7 Copy the sign of the exponent to the variable SIGN. (1)
- 9.8 Now calculate the number value (variable NUMBERVALUE) by multiplying (+ sign) or dividing (-sign) the first part (variable FIRST) with the number value calculated in 9.6. (3)
- 9.9 Assign the number value to the function name (1)
- end; [15]

QUESTION 10 UNITS

A cryptogram converts text to a secret code. It is done by replacing each letter in the text with another character or letter. There are different ways to do the replacement. One method is to replace each character with the next character in the ASCII table for instance a with b, c with d, etc.

Example:

Input: Hallo Zelda
Output: lbmmp [fmueb

A UNIT contains a procedure CRYPTOGRAM that receives the character string and converts it to secret code by replacing each character with the next character. The procedure has two parameters, namely the original string and the encrypted string.

- 10.1 Write the complete procedure CRYPTOGRAM. (10)
- 10.2 Write down the general structure of the UNIT. It is not necessary to write down the complete procedure, only indicate the position of the procedure CRYPTOGRAM in the UNIT. (5)
- [15]**

TOTAL: 200

END