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COMPUTER STUDIES 1 - THEORY NOV 2000
(For Both School and Private Candidates)

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SECTION A

Answer all questions in this section.

1. (a) Define the following terms:
- (i) Computer
 - (ii) Hardware.

(b) Mention two common secondary storage devices.

(c) Name the two types of software.

2. The argument that computers help to increase unemployment is sometimes opposed by the argument that the new computer-based technology helps to create new jobs which were not existing 20 years ago.

(a) Describe how computers are replacing people in two distinct areas of employment.

(b) Describe two areas of employment, which were not existing before computers became available.

(c) What are the changes in employment pattern that have resulted from the development of computer technology?

3. Name any three computer generations and explain features which distinguish them.

4. (a) (i) what are the hardware elements of a computer system?

(ii) What are the main components of a computer system?

(iii) What is a hard copy?

5. (a) in the early days, programs were written in assembly language. Today, programs are normally written in high level language.

(i) Explain one advantage of the high level language to the programmer.

(ii) An expert programmer is writing a games program. Why might this programmer prefer to use assembly language?

(b) FORTRAN, BASIC and COBOL are high level programming languages. Which of these languages is best suited for

(i) Learning programming?

(ii) Scientific program writing?

(iii) Commercial program writing?

6. (a) define the following:

(i) Word processor

(ii) Document.

(b) A file contains text of a draft document. The order of the paragraphs need to be changed, a new paragraph requires to be inserted and the word “cheap” which occurs several times in the document is to be replaced by “inexpensive”. What type of computer program could be used to perform these changes?

Explain the commands that may be used to perform the stated tasks.

(c) What are the typical similarities and differences between text editor and word processor program?

7. (a) what is the function of a MODEM? Where is it used?

(b) Name four recent developments in data communications that have improved the communication system.

8. (a) define the following:

(i) Computer science

(ii) Flow charts.

(b) The software package that Grace bought is made up of a number of modules. Some of the modules are application packages, others are utility programs. When Grace switches on the computer each morning, the following menu appears on the screen.

1. Set date and time
2. Video Club Management
3. Format floppy disks
4. Backup
5. Video club accounts

(i) give two items on the menu that refer to application packages.

(ii) Give two items on the menu that refer to utility programs.

(iii) Item 4 on the menu is for Grace to make a backup copy of the files.

Explain why Grace needs to make backup copies.

9. Convert these decimals to (a) octal (b) binary (c) hex.

(i) 22

(ii) 26

10. (a) (i) define the term “network” as used in computer science.

(ii) give four advantages of using computer network.

(b) Differentiate view data from telex.

SECTION B

Answer any four questions.

11. (a) the following BASIC statements contain errors. Correct them.

(i) 90 XI = .72*S

(ii) 100 D\$ = 10 – 30 - 75

(iii) B20 LET C = C + 1

(iv) 400 G = 2B + 5/3.11

(b) Assuming the variables A and B have the values 3 and 2 respectively and C\$ holds the string “WEEKDAY”, what results would be produced by the following print statements?

(i) 10 PRINT A, 7, A + B, B – 1

(ii) 15 PRINT “THE ANSWER IS” , A

(iii) 17 PRINT “TUESDAY IS A”, C\$

(iv) 20 PRINT “A=”, A

(v) 25 PRINT C\$

12. (a) if $a = 6.3$, $b = 4.2$ and $x = 0$, supply a BASIC program that will compute y , given that $y = a + bx + cx^2$ and will print the result (output) as follows:

y is the value of y where y is the computed value.

(b) If A has the value of 2, B has the value of 5 and C has the value of 10, write BASIC statements to display the results of following operations.

(i) $A + B + C$

(ii) AB

(iii) $\frac{C}{B - A}$

(iv) $(C - B)(C + B)$

(v) $\frac{B - C}{B - A}$

13. (a) give the output of the following program:

```
10 READ A, B, C
20 IF (A↑ 2 = B ↑ 2 + C ↑ 2) THEN 40
30 PRINT "NOT"
40 PRINT "RIGHT ANGLED"
50 DATA 8,6,7
60 END
```

(b) Device a BASIC program to calculate the values of the following function:

$$f(x) = \begin{cases} 3x - 2 & \text{if } x > 0 \\ 0 & \text{if } x = 0 \\ 4 - 3x & \text{if } x < 0 \end{cases}$$

For all values of x from -3 to 5 in steps of 0.2

14. (a) determine errors in the following subscripted variables and DIM statements and correct them.

(i) 10 DIM A1(40), X1\$(25)

(ii) 10 DATA 12,81,34

20 READ A(1), A(2),A(3)

30 DIM A(3)

(iii) DIM G(15) H (12)

(iv) 10 DIM X 15

20 FOR M = 1 TO 25

30 X (M) = M

40 NEXT M

50 END

(b) Write dimension statements for arrays with

(i) 5 rows, 4 columns

(ii) 3 columns, 1 row

(iii) 6 rows, 1 column.

(C) Define:

(i) Subscripted variables

(ii) Array

15. (a) consider the following program segment;

```
10 READ A, B2$, C9, X$, Y$
```

```
20 DATA 16, "HEIGH", 7, "NOON", "8"
```

What data values are assigned to variables? A , $C9$, $Y\$$, $B2\$$, and $X\$$?

(b) What data values will be assigned to A , B , C , D and E in the following program segment?

```

10 READ A, B

20 DATA 5, 6,7,8,9

30 RESTORE
40 READ C, D, E

```

16. (a) supply statement definition functions for the following equations:

- (i) $S = \frac{1}{2} (a + b + c)$
- (ii)
$$\text{var} = \frac{ nab(a + b - n) }{ (a + b)^2 (a + b - 1) } \\ (a + b)^2 (a + b - 1)$$
- (iii) $A = \sqrt{S(S - A)(S - B)(S - C)}$ A

(b) correct errors that occur in the following statements:

(i) 10 PRINT "SALES REPORT"
20 GOSUB 200
.
.
.
199
.
.
.
280 RETURN
999 END

(ii) 100 GOSUB 500

110 READ A,B

120 GOTO 500
.
.
.
500 PRINT "HEADINGS"
.
.
.
800 RETURN
900 END

(C) List three built – in – functions in BASIC.



SOLUTIONS SCHEME

SECTION A

1.(a) (i) computer – is an electronic device that can accept data in a prescribed form,store,process it and output the result.

(ii) Hardware is any physical component of a computer.

(b) (i) Hard disk and floppy disks are secondary storage devices are those that store data permanently even when the computer is turned off.

(c)Software is generally categorized into system software, which is used to manage the computers resources (eg. Window 98) and application software for doing specific problems (e.g Ms Word)

2.(a) In banking industry ATM (Automatic Teller Machines) are replacing people such that you can go to use them and see your bank account balance or draw money without interacting with human beings.

Another area where computers are replacing people is the manufacturing industry where CAD/CAM (Computer Aided Design and Computer Aided Manufacturing) replaces people and most operations are fully computerized

(b) (i) e-business: where people can conduct business through Internet i.e. buying and selling, Internet Cafés & Secretarial services are areas of industry that the existence of computers has made possible.

(c) More technology intensive occupation are opening up in almost all sectors of life in Education, Manufacturing Service, Medicine etc which require computer qualified personnel.

Globalization has become a reality such that effects of anything happening anywhere in the world can be quickly felt in other parts of the globe.

3(i) First generation: The computer circuits were made using vacuum tubes and the computers were programmed using machine language. These were Huge Machines that encompassed whole building and that were difficult to maintain.

(ii) Second generation .In this generation vacuum tubes were replaced by transistors which resulted in manufacturing smaller computers . Assembly language replaced the machines language.

(iii) Third generation: In this generation transistors were replaced by Ic's i.e integrated circuits and high level language using English like structures replaced the assembly language.

4.(a) (i) Hardware elements that constitute a computer are:-

- Input (device)
- CPU, containing the control unit, Arithmetic and logic Unit and the internal memory & Motherboard
- Output devices
- Storage devices secondary.

(iii) Hardware, software and data.

(iii) A print out copy from the printer.

5 (a) (i) High level languages use structures close to the English language and are thus easier to learn than assembly.

(ii) Assembly language uses symbolic codes known as “mnemonics” assembly language is a low level language close to machine language, the language which computers understand directly. A good Assembly language programmer can produce more efficient and faster code than that produced by a compiler (translator) for a high-level language. This was especially case in the past. To day with more advanced compilers and more powerful machines this advantage is diminishing.

(b)(i) Learning programming – BASIC - Beginners All purpose Symbolic Instruction Code was specifically designed for beginners

(ii) FORTRAN – stands for Formula translation and was designed for scientific programming

(iii) COBOL- stands for Common Business Oriented Language

6 (a) (i) A word processor – is a computer program which is used to create, edit, format ,store and print documents that primarily contain words..

(ii) A document – is any Information compiled that can be printed or viewed for human consumption.

(b) A word processor would be used

After selecting the desired paragraph you can apply copy and paste commands to copy the required paragraph and paste it. To replace ‘cheap’ with ‘ inexpensive’ you can use the replace functions . Replace ‘cheap’ with inexpensive to exchange the words in any part of the document.

(c)

Text Editor	Word processor Program
Writes text materials in plain text without any format - Mainly used to write programs or short notes	Writes text materials as documents that are formatted i.e. colours,fontsize, styles, borders, underlines can be applied

7.(a) The function of a MODEM is to convert a digital signal to an analogue signal and vice versa. It is commonly used when data has to pass through telephones lines between computers.

(b) Four recent developments in Data Communications are:-

(i) The growing use of fiber Optic Cable. This kind of cable has a very high data transfer rate and low error rate compared to traditional copper wire. Thus stations connected through Fiber-optic cable are capable of conducting data intensive Applications such as Videoconference of remote on-line music.

(ii) The advanced Satellite technology. Satellites have made it possible to make the entire globe reachable for data communication.

(iii) Microwave Technology. This technology has made it possible to replace cables with a wireless medium. When a cable cannot be used e.g. communicating across two sides of a highway then radio or microwaves technology may be the only option.

(iv) The use of UTP cable. Formally many networks were connected through coaxial cable the star topology that comes with UTP is less prone to network failures than the bus topology of coaxial cable.

8 a) computer science is the science of processing information through Technology it encompasses amongst others the fields of Hardware, software, peoples management, IT in Organizations and Network infrastructure.

(b)Flowcharts .are Diagrams which show how to solve particular tasks (problems) In Computer Science they are used to visualize Algorithms.

(c) (i) Video club management, Video club accounts. This is because application packages are used to solve a particular problem of the client.

(ii) Set date & time, format floppy disks this is because utilities are part of the Operating system and are used to manage the computers resources.

(iii) For security reasons back up copies are very important in case of any disaster, data can then be recovered and used in other computers. Thus hardware can be replaced but not the

data. This is valuable and unique asset of a company. Back ups protect this asset.

9. To convert the following decimals to (a) octal,(b) binary (c)hex

(i) 22

$$\begin{array}{l} 8\sqrt{22} \\ 2 / 6 \end{array} \quad \therefore 22_{10} = 26_8$$

$$2\sqrt{22} \quad \therefore 22_{10} = 10110_2$$

$$2\sqrt{11/0}$$

$$2\sqrt{5/1}$$

$$2\sqrt{2/1}$$

$$1/0$$

$$\begin{array}{l} 16\sqrt{22} \\ 1/6 \end{array} \quad \therefore 22_{10} = 16_{16}$$

(ii) 26

$$\begin{array}{l} 8\sqrt{26} \\ 3/2 \end{array} \quad \therefore 26_{10} = 32_8$$

$$2\sqrt{26}$$

$$2\sqrt{13/0}$$

$$2\sqrt{6/1} \quad \therefore 26_{10} = 11010_2$$

$$2\sqrt{3/0}$$

$$1/1$$

$$16\sqrt{26}$$

$$1/10 \quad \therefore 26_{10} = 1A_{16}$$

$$\text{but } 10 = A$$

10 (i) Network is a connection of two or more computers that can share resources and communicate.

(ii) Advantages of using computer network

- It removes the tyranny of geography i.e resources placed in different areas can be shared
- It removes/reduces cost. Instead of buying any two printers, single printer can be used in a network
- Files and programs can be shared
- Provides high reliability by having alternative sources of supply.

(b) View data- public retrieval system of information ,it is a broadcast technology Telex –Machine used to receive and transmit text material through telephone line and is a point to point technology.

11.(a) (i) No error

(ii) 10-30-75 should be in quotes

(iii) B20 cannot be used as a line number B should be removed

(iv) Missing operator between 2B .It should be 2*B

(b) (i) 3,7,5,1

(ii) THE ANSWER IS 3

(iii) TUESDAY IS A WEEKDAY

(iv) A =3

(v) WEEKDAY

12.(a) 5 CLS

10 INPUT C

20 READ A,B,X

```

30 Y = A + B*X + C*X^2
40 PRINT Y;"IS THE VALUE OF Y
WHERE"; Y; "Is THE COMPUTED VALUE"
45 DATA
50 END 6.3,4.2,0

```

(b) (i) PRINT A +B+C

(ii) PRINT A*B

(iii) PRINT C/(B-A)

(iv) PRINT (C-B) *(C+B)

(v) PRINT B*C/(B-A)

13 (a) NOT RIGHT ANGLED

```

(b) 10 FOR x = -3 to 5 step 0.2
    20 IF x > 0 THEN 50
    30 IF x = 0 THEN 60
    40 IF x < 0 THEN 70
    50 y = 3*x^2-2: GOTO 80
    60 y = 0: GOTO 80
    70 y = 4-3*x : GOTO 80
    80 PRINT y
    90 NEXT x
    100 END

```

14 (a) (i) No errors

(ii) DIM A(3) should appear on top before reading the values because declarations of variables come before usage in Basic.

(iii) Missing comma it should be DIM G(15),H(12)

(iv) Size of the array is 15 while the loop varies from 1 to 25 . Brackets are missing , should be DIM X(15)

(b) (i) DIM A(5,4)

(ii) DIM B(1,3)

(iii) DIM C(6,1)

(c) (i) Subscripted variable: Data structure which is used to store a fixed no. of data items

all of the same type, can be one dimensional or multidimensional.

(ii) Array – Data structure which is used to state fixed no of data item in one dimension also known as a list.

```

15 a) A = 16
    C9 = 7
    Y$ = "8"
    B2$ = "HIGH"
    X$ = "NOON"

```

(b) A = 5

B = 6

C = 5

C = 6

E = 7

16 (a) (i) $S = \frac{1}{2} * (a + b + c)$

(ii) $Var = n * a * b * (a + b - n) / (a + b)^{28} (a = b - 1)$

(iii) $A = SQR (S * (S - A) * (S - B) * (S - C))$

(b) (i) END in line 200 should be removed

(ii) GOTO 500 in line 120 should be removed

(c) Three built –in functions in BASIC are

(i) SQR (x) (square root function) – gives square root of number (x)

(ii) INT (x) (integer function) –gives integer part of a number (x)

(iii) Cos (x) (gives the Cosine of a number (x)