Instructions: answer any five questions (Two hours)

1. (a) briefly describe the following terms in relation to data security
   - **(i)** Data Encryption **(2 marks)**
   - **(ii)** Backup **(2 marks)**
   - **(iii)** Fire wall **(2 marks)**

   (b) Briefly explain what is meant by data integrity **(3 marks)**

   (c) state the difference between data verification and data validation **(4 marks)**

   (d) (i) Briefly explain what you understand by computer simulation **(2 marks)**

   (ii) state two advantages and two disadvantages of computer simulation **(4 marks)**

2. (a) Explain briefly the following data processing methods
   - **(i)** Batch processing **(2 marks)**
   - **(ii)** Online processing **(2 marks)**

   (b) Describe the following types of human-computer interface

   (i) Command line interface **(3 marks)**

   (ii) Graphical User Interface **(3 marks)**

   (iii) Menu-driven interface **(3 marks)**

   (c) State the main role of each of the following network devices

   (i) Bridge **(1 mark)**

   (ii) Router **(2 mark)**

   (iii) Modem **(2 marks)**

   (d) Explain the difference between synchronous and asynchronous data transmission **(2 marks)**

3. (a) Draw a labelled diagram showing the basic components of a Central Processing Unit **(4 marks)**
   (b) State three system buses that connect the components in (a) above **(3 marks)**
   (c) Name four steps in the machine instruction cycle **(4 marks)**
   (d) The following algorithm is intended to read three numbers and determine their product.

```
            Start
1. Set Count = 1
2. While Product = 1
3. While (Count <= 3) Do
4. Get a Number, N
5. Set Product = Product * N
6. Set Count = Count + 1
7. Print Product
8. Endwhile
        END
```

Assume that the three numbers that are read in line 4 are 2,3 and 5

(i) Determine the output that is printed on line 7 each time the loop instructions are executed. **(3 marks)**

(ii) Draw a flow chart for the algorithm **(6 marks)**

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4. (a) Given the logic circuit below:
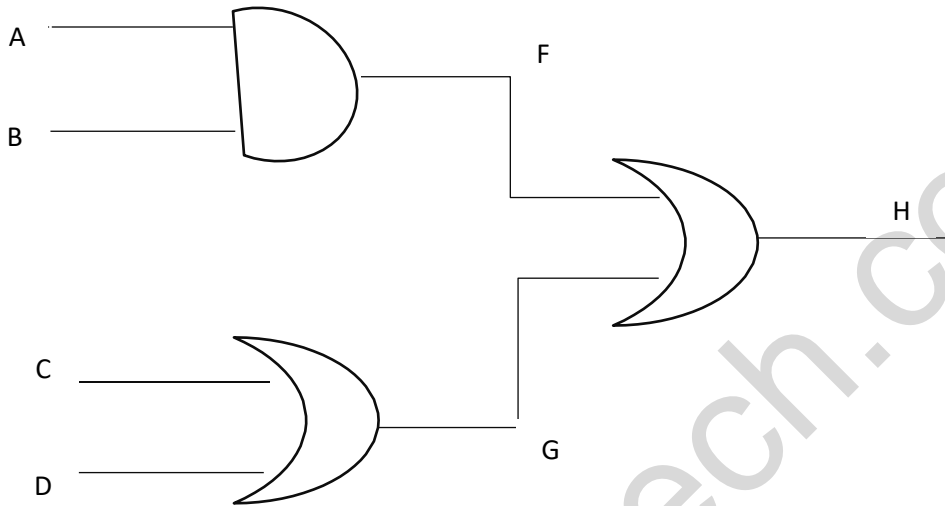
(I) Write the logical expression for F and G **(2 marks)**

(II) Write TWO logic expression for H, first in terms of F and G, and then in terms of A, B, C and D **(3 marks)**

(III) Given the following inputs to the logic circuit: A = TRUE, B = FALSE, C = FALSE, D = TRUE, determine the values of F, G and H **(3 marks)**

(b) With aid of a suitable example in each case, state the meaning of:

(i) Input device **(2 marks)**

(ii) Output device **(2 marks)**

(iii) Input/output device **(2 marks)**

(c) Use binary arithmetic to evaluate

(i) 1100101 – 1010 **(2 marks)**

(ii) 1101011 + 1101 **(2 marks)**

(d) Convert the octal number 505 to a binary number **(2 marks)**

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5. (a) Give simple definitions or explanations for the terms: - **character, field, record, file, and database (5 marks)**
(b) Assume you want to create a database of employees of a company, the departments they work for, and their salaries. The tables below show sample data in the database.

EMPLOYEE

ID	FNAME	LNAME	DEPTCODE	SALCODE
1	John	Doe	EN	S1
3	Mary	Hopkins	MK	S2
4	Peter	Miles	HR	S2
6	Chris	Jenkins	EN	S3
8	Susan	Jenkins	MK	S1

DEPARTMENT

DEPTCODE	DEPARTMENT
EN	Engineering
MK	Marketing
HR	Human Relations

SALARY

SALCODE	SALARY
S1	300000
S2	250000
S3	200000
S4	100000

(I) State the number of fields and records in the EMPLOYEE table **(2 marks)**

(II) What do you understand by the term key database? **(2 marks)**

(III) What is the most appropriate key for each of the three tables **(3 marks)**

(IV) With the keys chosen above, if the company has another employee whose FNAME, LNAME, DEPTCODE and SALCODE are the same as for john Doe, how can the database management system distinguish between these two employees? **(2 marks)**

(V) Would it be possible to add another employee called johnny Walker whose ID is 6? Explain your answer. **(2 marks)**

(VI) Explain the problem that will arise if you try to add an employee whose SALCODE is S10, without making any other change in the database. What change would you make so that this employee's data can be stored in the database? **(4 marks)**

6. John wants to set up a company to train people on **Computer Literacy**. Some of the people to train only wants to know about using machines running the Microsoft Windows **Operating System**, while others only want to know about using machines running the Linux operating system. John decides to set up two personal computer laboratories: Lab A with Microsoft Windows and Lab B with Linux computers

Answer the following questions in relation to the scenario presented above.

(a) (i) What do you understand by the terms computer literacy? **(2 marks)**

(ii) State FOUR functions of an operating system. **(4 marks)**

(b) Answer the questions in this section to explain the types of training that john should provide his trainees

(I) List five hardware components that the trainees need to know about so that they can understand what happens from the time they type in a document to the time a hardcopy is produced **(2 marks)**

(II) Name one hardware device, and the most relevant kind of application software that can be used to improve the typing skills of the trainees **(2 marks)**

(III) State the category of network application software that must be installed on each computer to enable easy access to the Web? Give two examples of his category of software **(4 marks)**

(IV) List four important categories of application software that should include inn the training. For each of them, state what it is used for. Your list should NOT include your answer in (iii) above **(6 marks)**

7. (a) Implementation is one of the stages of SDLC, explain the following four conversation methods that can be used during the implementation:

(i)	Parallel conversion	**(2 marks)**
(ii)	Plunge conversion	**(2 marks)**
(iii)	Pilot conversion	**(2 marks)**
(iv)	Piecemeal conversion	**(2 marks)**

(b) Explain the following in relation to programming languages

(i) Machine Language **(3 marks)**

(ii) Assembly language **(3 marks)**

(iii) High level language **(3 marks)**

(c) State two disadvantages and one advantage of a machine language **(3 marks)**