LAKSHYA INSTITUTE OF TECHNOLOGY

BCA

3ᴿᴰ SEM OLD UNIVERSITY QUESTION

2020

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

Group – A

Answer ALL. [8×1=8

(a) Define ALU.

(b) State the role of control unit.

(c) Assembly language is a _____ level language.

(d) State the use of MOV instruction.

(e) _____ is used to interconnect different components in a computer.

(f) Define Micro-instruction.

(g) _____ is executed by the processor at the time when a interrupt occurs.

(h) Define a Conditional instruction.

Group – B

Answer any 8 : [8x1.5

(a) State the basic components of a computer.

[Cont....

(b) Write the assembly instruction to store a 8-bit data in main memory ?

(c) Differentiate between arithmetic overflow and underflow ?

(d) State the role of cache during execution ?

(e) Define DMA ?

(f) Give examples of data hazards in pipelining ?

(g) Define USB ?

(h) State the role of a Program counter.

(i) What is DDRAM ?

(j) Define status register.

Group – C

Answer any 8 :   [8x2

(a) What is straight line sequencing ? Explain with diagram.

(b) State types of buses based on the contents transferred.

(c) Define addressing mode ? Give examples of direct and indirect addressing mode.

(d) State the methods of representing positive and negative numbers in binary system ?

(e) State few properties of cache memory.

(f) Define instruction level parallelism.

(g) Differentiate between Synchronous and Asynchronous Bus.

(h) State the advantages of multiple bus organization over single bus organization.

(i) State the IEEE format for representing floating point numbers.

(j) Differentiate between CISC and RISC.

Group – D

[4x6

UNIT – I

1. State the different types of register used within a CPU. Discuss the notations used for register transfer.

OR

2. Using 2's and 1's complement perform the following computer arithmetic :

$-15 + (-26)$

$-(-32) + (-18)$

UNIT – II

1. Diagrammatically discuss micro programmed control unit method.

[Cont....

OR

2. What is cache memory mapping ? Discuss the Direct mapping technique.

UNIT – III

1. Diagrammatically explain the organization of a DMA Controller.

OR

2. Write short notes :

   - PCI Bus

   - SCSI Bus

UNIT – IV

1. Discuss various solutions for handling Data Hazards.

OR

2. Discuss the characteristics of superscalar architecture.

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III - S - BCA - (CO) - CC - 5

2021

Full Marks - 70

Time - As in the Programme

Answer ALL Questions.

Each question carries equal marks

1.(a) Explain the different types of a Computer.

(b) Explain the bus structure of a Computer.

OR

(c) Perform the following arithmetic using 2s. complement

$$(51)_{10} - (5)_{10}$$

$$(55)_{10} - (15)_{10}$$

$$(11)_{10} - (66)_{10}$$

2.(a) Define the term flip-flop ? What are the different types of flip-flop used in a system ? State the functionalities of JK flip flop.

(b) Write short notes on : Programmable Logic Devices (PLD).

OR

(c) Simplifies the following Boolean function :

$$F(A,B,C) = (0,2,4,5,6)$$

(d) Draw the truth table and logic diagram of the following Boolean function :

$$F = x\,y\,z + x\,y\,z$$

3. (a) Write short notes on : Single Bus Organization.

(b) Define the term Addressing Mode and state the functionalities of Relative Addressing Mode with example.

OR

(c) Write the functionalities of Shift and rotate Instruction.

(d) Write down the steps to execute an instruction.

4. (a) Differentiate between EEPROM and PROM.

(b) Write short notes on : Cache Memory

OR

(c) Explain the concept of "Virtual Memory"

(d). What are the different types of output devices used in system ? Explain each one in brief.

5.(a) Explain the concept of "Storage Hierarchy".

(b) Write the functionalities of operating System.

OR

(c) What do you mean by System Call. What are the different types of system calls used in system ? Explain each one in brief.

(d) Differenciate between Soft real time operating system and Hard real time operating system operating system.

I - S - BCA - CBCS - CC - II -
(Computer Organization) - (B)

2021

Full marks – 50

Time – As in the Programme

The figure in the right hand margin indicates marks.

Answer ALL questions.

Group – A

1. Answer the following questions :-   [1x10=10]

   a. What are the functions of ALU?

   b. Whether $(876)_8$ is a valid octal number or not? Explain.

   c. What do you mean by software? How many types of software are used?

   d. Explain truth table of Logic Gate NAND?

   e. Define primary memory?

   f. Why secondary memory is used?

   g. What is process state?

   h. What is the output of $(A.\bar{A}) + (A + \bar{A})$? Explain.

   i. What is flip-flop?

   j. What is the use of input units? Give example.

Group – B

2. Discuss about various components of a computer system. [8]

OR

Explain the different types of addressing modes with suitable examples.

3. What is flip flop? Explain different types of flip flop used with example. [8]

OR

Short notes on the following:-
a) Decoder
b) PLDs
c) CPLDs
d) FPGA

4. Explain different number systems with example. Convert $(426)_{10}$ decimal number to binary, octal and hexadecimal number system. [8]

OR

(a) Explain different types of Logic gates used with their Truth Table.
(b) Simplify the Boolean function
F(A,B,C,D)=m(1,3,4,7,9,10,11,12,15)

5. Short notes on any two ARM processor :- [8]
a. Branch instruction
b. Register move instruction
c. Logic instruction

OR

a) Explain arithmetic and logical instructions of ARM processor.
b) Explain the basic INPUT / OUTPUT operations.

6. Short Notes on the following : [8]
a. Asynchronous DRAMS
b. Static memories
c. Optical disks
d. Rambus memory

OR

Explain the entire memory structure of a computer system.

(c) What is Flip flop ? Draw and explain the logic circuit of JK flip flop.

OR

Explain types of ROM and their advantages.

(d) Define Interrupt. Discuss its type.

OR

Discuss the need of multiplexer ? Draw the logic diagram of 4 × 1 multiplexer.

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I - S - B.Sc. - Comp. Sc. -
P - Core - II - (Computer Organization)

2023

Full Marks - 80
Time - As in the Programme
The figure in the right hand margin indicates marks.

Answer All questions

1. Answer the following Questions.   [1 × 12=12

(a) Which memory is a nonvolatile memory ?

(b) Convert $(516)_8$ into decimal.

(c) What is ring counter ?

(d) Convert $(234)_{10} = ()_2$

(e) What is the use of Guard bits ?

(f) Which gate is known as coincidence detector ?

(g) Write the use of controlled invertor.

(h) Write the use of register file.

(i) What is transmission gate ?

(j) What do you mean by min-term and max-term ?

(k) Find the 2's complement of 31.

(l) What is floating point number ?

2. Answer any eight of the following Questions.

[2 × 8=16

(a) Write the difference between latch and flip-flop.

(b) What is tri-state buffer ?

[P.T.O.

(c) What is edge-triggered flip-flop ?

(d) What is the use of booth algorithm ?

(e) How truncation generated in floating point numbers ?

(f) Write the differences between mealy and Moore state machine.

(g) Prove the pair of expression for equivalence.
$(x \lor y)' \equiv x'y'$

(h) Write an example of 2-to-1 mux.

(i) Show that the NAND gate is universal.

(j) How to execute a full subtractor from a full adder ?

3. Answer any eight of the following Questions.

[3 × 8=24

(a) Define Amdahl's law.

(b) Difference between Computer organization and computer architecture.

(c) What is the use of PAL ?

(d) Define the speed of processor ? How it is measured ?

(e) Difference between SRAM and DRAM.

(f) Define Field Programmable Gate Array.

(g) What are the advantages of ROM ?

(h) What is the need of UP/DOWN counters ?

(i) Find the decimal equivalent of the unsigned binary number $(1101.0101)_2$.

(j) What is the use of bidirectional shift register ?

(k) Find the decimal equivalent of the 2's complement number $(10110101)_2$.

(l) Explain carry save addition with example.

(m) Difference between EPROM and EEPROM.

4. Answer any four of the following Questions.

[7 × 4=28

(a) Minimize the following Boolean expression using Boolean law.
(a) $AB + \overline{AC} + \overline{ABC}(AB + C)$
(b) $\overline{x}\,\overline{y}\,\overline{z} + \overline{x}\,y\,\overline{z} + x\,\overline{y}\,\overline{z} + x\,y\,z$

OR

Convert the following into octal and hexadecimal.

(i) $(1030)_{10}$

(ii) $(0101100110110111)_2$

(iii) $(230)_{10}$

(iv) $(1456)_{10}$

(b) Define binary adder. Explain the truth table and circuit diagram of different types of adders.

OR

What is finite state machine (FSM) ? Discuss different types of FSM.

Write short notes (Answer any TWO) :

(i)   Direct Memory Access.

(ii) Universal Serial Bus.

(iii) Booth Algorithm.

(iv) Interface Circuit

(d) What is Data Hazard ? Discuss how it is handled in Software. What are its side effects ?

OR

Write short notes (Answer any TWO) :

(i)   Pipeline Performance.

(ii) Out of Order Execution.

(iii) Addressing Modes.

(iv) RISC Processor.

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II - S - B.Sc. - (ITM) - Code - Core - 3 -
(Computer Organisation)

II - S - B.Sc. - (ITM) - Code - Core - 3 -
(Computer Organisation)

2024

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.
Answer ALL questions.

1.   Answer the following questions :   [1 x 8 = 8

(a) What is the use of program counter ?

(b) Find the addition result of $(1011)_2 + (1011)_2$.

(c) What is the 2's complement of 10011 ?

(d) How much input and output needed for multiplexer ?

(e) Convert $(516)_8$ into decimal.

(f) Write the use of cache memory ?

(g) Define Amdahl's Law.

(h) Which logic gates are known as universal gates ?

2.   Answer any EIGHT of the following questions :

[1.5 x 8 = 12

(a) Write the differences between PROM and EPROM.

(b) Define Clock Rate. How it is Calculated ?

(c) What is T flip flop ?

[P.T.O...

(d) What is floating point number ?

(e) Convert $(7320)_8$ in to binary form.

(f) What is universal Logic gate ?

(g) Find the equivalent of X + XY.

(h) Write the differences between SRAM and DRAM.

(i) Write the use of processor clock.

(j) What is Interrupts ?

3. Answer any EIGHT of the following questions :

[2 x 8 = 16

(a) How do you explain combinational circuit and sequential circuit ?

(b) Write about D flip flop with an example.

(c) What is the need of register ?

(d) What is data path ?

(e) At what situation multiprocessing techniques are used ?

(f) Explain how register stores data in computer system ?

(g) Give short note on system software.

(h) Differentiate between synchronous and asynchronous bus.

(i) Write the use of virtual memory ?

(j) Briefly explain the use of associate memory.

4. Answer any FOUR of the following questions :

[8 x 4 = 32

(a) Discuss the basic structure of computer organization.

OR

Write short notes (Answer any TWO) :

(i) Relative Addressing.

(ii) Instruction Types.

(iii) Byte Addressability.

(iv) Number Representation.

(b) Briefly explain the logic diagram of multiplexer. Give example 4 x 1 multiplexer.

OR

Write short notes (Answer any TWO) :

(i) Micro Instructions.

(ii) Emulations

(iii) K-map

(iv) Branch Addressing.

(c) Discuss the reasons of getting interrupts. How are they handled ?

OR

Write the reasons of getting interrupts. Write the process how to enable and disable the interrupts.

(d) What is superscalar architecture ? Discuss different types of superscalar operation with example.

OR

Explain different types of hazards that occur in a pipeline.

✦

II - S - B.Sc. (ITM) - Core - 3 - (Computer Organisation)

2023

Full Marks - 60
Time - As in the Programme
The figures in the right hand margin indicate marks.
Answer ALL questions.

1. Answer the following questions : [1 x 8 = 8

   (a) What is program counter ?

   (b) Write the functional units of computer.

   (c) What are the key component of 3rd generation of computer ?

   (d) What is cache memory ?

   (e) What is use of register ?

   (f) Define deadlock.

   (g) What is multiprocessing ?

   (h) Define data path.

2. Answer any EIGHT of the following questions :
   [1.5 x 8 = 12

   (a) What is clock cycle ?

   (b) How to measure CPU performance ?

   (c) Define stack and queue.

   (d) What is pipelining ?

[P.T.O.

(e) Define address bus ?

(f) What is guard bit ?

(g) Define underflow in floating point.

(h) What is a bus ? What are the different buses in a CPU ?

(i) Define memory Hierarchy.

(j) Write the use of latency.

3. Answer any EIGHT of the following questions :

[2 x 8 = 16

(a) Discuss about 3rd generation of computer.

(b) Explain the functional unit of a computer by the help of suitable diagram.

(c) Brief explain about relative addressing mode.

(d) Write the advantages of USB.

(e) Convert the following expression.

(i) $(1100101001)_2 = (?)_8$

(ii) $(936)_{10} = (?)_{16}$

(iii) $(3AB)_{16} = (?)_2$

(iv) $(564)_8 = (?)_{10}$

(f) Define hit ratio.

(g) What is RAM ? Discuss about its types.

(h) Write the advantages of Booth's algorithm.

(i) Write difference between RISC and CISC.

(j) What is control bus ? Why it is unidirectional ?

4. Answer any FOUR of the following questions :

[6 x 4 = 24

(a) Write short notes (answer any TWO) :

(i) Bus Structure

(ii) Relative Addressing

(iii) Byte addressability

OR

Discuss various types of instruction with example.

(b) What is microprogrammed control unit ? Discuss its characteristics.

OR

Write short notes (answer any TWO) :

(i) Execution of instruction

(ii) Wide-branch Addressing

(iii) Emulation

(c) Write short notes (answer any TWO) :

(i) PCI Bus

(ii) Interface Circuit

(iii) Controlling Device Request

OR

2022

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

1.   Answer all the questions :   [1 x 8 = 8

 (a)   What is the full form of IEEE ?

 (b) $(11000001100001001)_2 = (\ )_{16}$.

 (c)   What is DMA ?

 (d)   What are PROM ?

 (e)   What is the capacity of hard disk, if it consists 20 usable plates having 40 tracks and sector each ?

 (f)   Which memory holds the information when the power supply is switched off ?

 (g)   What is TLB ?

 (h)   What is the use of cache memory ?

2.   Answer any EIGHT of the following questions :

                              [1.5 x 8 = 12

 (a)   Differentiate between SRAM and DRAM.

[P.T.O...

(b) What is control state ?

(c) What is the need of processor clock ?

(d) Define clock rate. How it is calculated ?

(e) Define memory cycle time.

(f) What is TLB ?

(g) What is flash memory ?

(h) Give two example of instruction hazard.

(i) Write the uses of stack and queue in computer organization.

(j) Draw the basic function units of the computer.

3. Write short notes : [2 x 8 = 16

(a) Define multiprocessing. How it is differ from multiprogramming ?

(b) What is register ? How it stores data in computer system ?

(c) Give short note on system software.

(d) Differentiate between synchronous and asynchronous bus.

(e) What is DVD ?

(f) Define virtual memory ? What is its need ?

(g) What is associate memory ?

(h) Define deadlock. How it is overcome ?

(i) What is delayed branching ?

(j) What is data path ?

4. Answer any FOUR of the following questions :

[6 x 4 = 24

(a) Explain BUS structure of computer system.

OR

Discuss about different types of addressing modes.

(b) Explain various data transfer modes used in DMA.

OR

Draw and explain typical hardware control unit.

(c) Define interrupts ? What are the reasons of getting such interrupts ? How are they handled ?

OR

Write a short notes on the following :

(i) Magnetic disk drive.

(ii) Optical drive.

(d) Explain different types of hazards that occur in a pipeline.

OR

Explain the basic concepts of pipelining and compare it with sequence processing with neat diagram.

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II - S - B.Sc. - (ITM) - Core - 3 -
(Computer Organisation) - (NC)

2023

Time :As in Programme

Full Marks : 60

The figures in the right-hand margin indicate marks.

*Answer **all** questions.*

PART-I

1. Answer the following questions.   1x8

    a.   In RDBMS, R stands for ____.

    b.   In ER diagram we can depict ____ types of attribute of any entity.

    c.   The basic structure of the database can be called as ____,

    d.   The elimination of multivalued attributes can be guaranteed, if the relation is in ____ Normal Form.

    e.   ____ Normal Form is also known as 3.5 Normal form.

    f.   In the Relational Algebra, JOIN operation can be expressed as ____.

    g,   SQL stands for ____.

    h.   The correctness of non-serial schedule may be checked through ____.

PART-II

2. Answer any eight within two to three sentences.   1.5x8

    a.   What is the use of weak entity in ER diagram ?

(Turn Over)

COMP.SC.-215(4)

b. What is the meaning of data model ?

c. Define constraints that are applicable to a relation.

d. What is data abstraction ?

e. What is Functional dependency ?

f. State the conditions to be satisfied if a relation is on BCNF.

g. Write the syntax of UPDATE command.

h. What is the significance of relational calculus ?

i. What is Lock ? State the name of any two variants of two-phase locking protocol.

j. What is the essence of Time Stamp in Transaction processing ?

PART-III

3. Answer any eight of the following (in maximum 75 words.)   2x8

a. Compare Specialization and Generalization.

b. What is Key ? Distinguish between Super Key and Candidate Key.

c. What is 2nd Normal Form ?

d. Compare 3rd Normal Form with BCNF.

e. What is DDL ? State any two command of DDL.

f. What is the essence of Natural join in database.

g. Compare the Natural join with theta Join.

h. What is schedule ? State the 2 types of schedule commonly used in transaction processing.

i. Compare Exclusive Lock with Shared Lock.

j. What is precedence graph ?

PART-IV

Answer within 500 words each.   6x4

4. Design a ER diagram to showcase the University database that have three entities, such as Teacher, Student and Staff.

OR

What is Attribute ? State the different types of attributes with their graphical notation and examples.

5. What is Join Dependency ? Explain Fifth Normal form with suitable example.

OR

What is Normal Form ? Explain 1st, 2nd and 3rd Normal form by considering a simple relation.

6. Write the SQL Code for the following operations :

a. Create a table **Student** having attributes (Roll, Name, Course, Year_of_Admission).

b. Insert a new attribute (Domicile_District) into Student table.

c. Insert at least 10 data into the Student table.

d. Display the District wise Student numbers.

e. Update the Domicile_District to 'Khordha' if any stdudent entered 'Khurdha' or 'BBSR'

f. Delete all the student records that are having Year _of_Admission = '2020'.

OR

State and explain all the operations of Relational Algebra with suitable examples.

7. Distingish between Conflict serializability and view serializability.

OR

Explain two-phase Locking Protocol with all its variants and compare them.

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2024

Time :As in Programme

Full Marks : 60

The figures in the right-hand margin indicate marks.

*Answer **all** questions.*

PART-I

1. Answer all questions: (1x8=8)

    a.   EER stands for _____?

    b.   _____ is an entity that can only exist when owned by another one?

    c.   FD stands for_____?

    d.   _____ is a constraint that is similar to functional dependency or multi-valued dependency?

    e.   DDL stands for_____?

    f.   _____ is the full form of DCL?

    g.   _____ command makes the transaction permanent in the database?

    h.   ACID stands for_____?

PART-II

2. Answer any eight of the following within two to three sentences each. (1.5x8=12)

    a)   What do you mean by schema?

    b)   Define multivalued attribute with an example?

(Turn Over)

c) What is database?

d) What do you mean by BC NF?

e) Define super key with an example?

f) What is DML? Give one example?

g) What is the role of retrieval queries in dbms?

h) Define lock?

i) What is the use of abort command in transaction?

j) Define time stamp?

PART-III

3. Answer any eight of the following within 75 words each.

(2x8=16)

a) What are data models?

b) What is the difference between physical data independence and logical data independence?

c) Elaborate database users briefly?

d) What is a primary key? Give an example?

e) What is 3rd NF?

f) What is TCL? What are the commands used in TCL?

g) Define DIVISION with example?

h) What are SQL data types?

i) Define serializability?

j) What is recoverability?

PART-IV

Answer all the following within 500 words each.   (6x4=24)

4. What is database system? Describe the architecture of database system with a suitable diagram?

OR

Define ER model? Draw an ER model for hospital management system?

5. What do you mean by normalization? Explain different types of normalization with a suitable example?

OR

Define Join? Explain different types of joins with suitable examples?

6. Define SQL? Explain INSERT, DELETE and UPDATE with syntax and suitable examples?

OR

Explain relational algebra along with relational calculus through examples?

7. What is a transaction? Explain various states with a suitable diagram and properties of transaction?

OR

Define concurrency control? Explain in detail locking techniques for concurrency control ?

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(4)

2024

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

1.   Answer all the questions :   [1 x 8 = 8

   (a)   What do you mean by instance ?

   (b)   What is reference key ?

   (c)   What is Subschema ?

   (d)   What is the need of normalization ?

   (e)   What do you mean by abort state ?

   (f)   Write down the notation for weak entity.

   (g)   What is the use of checkpoint ?

   (h)   What do you mean by degree in a relation ?

2.   Answer any EIGHT of the following questions :

                                                 [1.5 x 8 = 12

   (a)   Write the use of DML.

   (b)   Define functional dependency.

                                                 [*Cont...*

[2]

(c) Explain different types of database users.

(d) Write down the difference between simple and composite attributes.

(e) Write down the syntax for rename.

(f) What is concurrency control ?

(g) How to explain division operation ?

(h) What is timestamp ordering ?

(i) Write down the characteristics of primary key.

(j) Define projection operation.

3. Write short notes :   [2 x 8 = 16

(a) What is the criteria for 2NF ?

(b) Write the need of client-server architecture.

(c) Write a query to add a new columns job of varchar (12) to the employee table.

(d) How to write a SQL program to print the student details that stored in student database.

(e) Define specialization.

(f) How do you explain relational calculus ?

(g) Explain DCL.

(h) What is the necessity to use Recoverability ?

(i) What is EER diagram ?

(j) Define transaction processing.

[3]

4. Answer the following questions :   [6 x 4 = 24

(a) Explain 3-schema architecture with suitable diagram.

OR

Explain various problems with concurrent execution of transaction in DBMS.

(b) What is ER-diagram ? Write down all the notations used in ER diagram and draw an ER diagram for Hospital Management System.

OR

Explain different types of normalizations with examples.

(c) What is relational algebra ? Explain different relational operations with examples.

OR

Discuss database languages with examples.

(d) Define Serializability. Explain the concept of serializability with a suitable example.

OR

What is Transaction ? Define different states and ACID properties of transaction.

III - S - B.Sc. - (ITM) - Core - 06 - (Database System) - (R & B)

2024

Full Marks - 60

Time - As in the Programme

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    (f) Write down the notation for weak entity.

    (g) What is the use of checkpoint ?

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    [1.5 x 8 = 12

    (a) Write the use of DML.

    (b) Define functional dependency.

    [Cont...

(c) Explain different types of database users.

(d) Write down the difference between simple and composite attributes.

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(g) Explain DCL.

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(i) What is EER diagram ?

(j) Define transaction processing.

[Cont...

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Explain different types of normalizations with examples.

(c) What is relational algebra ? Explain different relational operations with examples.

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Discuss database languages with examples.

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What is Transaction ? Define different states and ACID properties of transaction.

III - S - B.Sc. - (ITM) - Core - 06 - (Database System) - (R & B)

3.(a) What is aggregation function ? What are the aggregate functions used in SQL ?

(b) Differentiate between Generalization and Specialization.

OR

(c) Explain DDL and DML statement in SQL . Explain all the commands belonging in that.

4.(a) What is Normalization ? Discuss different normal forms with example ?

OR

(b) Explain ACID property of DBMS.

5.(a) What is Indexing ? Differentiate between primary and secondary indexing.

(b) Write short note on :

(i) Schema

(ii) System Log

OR

(c) What you mean by attribute ? Explain its types.

(d) Discuss various phases of database design.

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**IV - S - BCA - CBCS - CC - IX -
(Database Systems) - (OC)**

2023

Full Marks - 70
Time - As in the Programme
The questions are of equal value.
Answer ALL questions.

1.(a) What you mean by Database Management System ? Describe briefly.

(b) Differentiate between Attribute and Entity.

OR

(c) Explain select and project operation with example.

(d) Draw an ER Diagram of University database having entities Student, Teacher, Department and Library.

2.(a) Differentiate between loss less join and lossy join.

(b) Explain INSERT operation using example.

OR

(c) What are the different concurrency techniques used in DBMS ?

(d) Define relational database constraints ? Explain with example.

[P.T.O.

2022

Full Marks - 70

Time - As in the Programme

The questions are of equal value.

Answer ALL questions.

1.(a) Explain E-R modelling symbol.

(b) Differentiate between Attribute and entity.

OR

(c) Define external level, conceptual level and internal level in architecture of database system.

(d) Give an example of the fallowing relationships :

(i) One to one

(ii) One to many

(iii) Many to many

2.(a) Explain selection and projection with example.

(b) Define different types of joins.

OR

(c) Write short note on :

(i) Relational Calculus.

(ii) Set Difference.

(d) Define relational database constraints ? Explain with example.

[P.T.O...

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[2]

3.(a) What is aggregation function ? What are the aggregate functions used in SQL ?

(b) Write short note on :

(i) Schema

(ii) View

OR

(c) Explain DDL and DML statement in SQL . Explain all the commands belonging in that.

4.(a) What is Normalization ? Discuss different normal forms with example ?

OR

(b) What is join dependencies ? Explain with an example.

5.(a) Discuss various phases of database design ?

(b) Discuss heap file organization.

OR

(c) What is relational algebra query tree ? Give an example.

(d) What is indexing ? Differentiate between primary and secondary indexing.

❖

2022

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

Group - A

1. Answer all questions :   [8 x 1

 (a) _____ is collection of interrelated data.

 (b) _____ identifies entity within an entity set in relational database.

 (c) _____ is enforced with the help of foreign key.

 (d) _____ automatically takes care of backup and recovery.

 (e) _____ ensures that the database properly changes states upon a successfully committed transaction.

 (f) Data about data is normally termed as _____.

 (g) The index table has _____ columns.

 (h) Record is also called as a _____.

Group – B

2. Answer any EIGHT within TWO to THREE sentences :   [8 x 1.5

 (a) Explain primary key with an example.

[P.T.O...

(b) Explain different types of relation in DBMS.

(c) Explain first normal form.

(d) What are different type of database users.

(e) Define DDL statement.

(f) Explain candidate key in DBMS.

(g) What is division operation in binary relation.

(h) Define foreign key.

(i) Explain GRANT operation.

(j) What is UPDATE command ?

Group – C

3. Answer any EIGHT from the following within 75 words : [8 x 2

(a) State the usability of strong entity in ER Diagram.

(b) What is difference between database integrity and database security.

(c) Explain two schema architecture of data abstraction mode.

(d) Explain Partial dependency in DBMS.

(e) Explain second normal form.

(f) Explain EER in DBMS.

(g) Explain fourth normal form in DBMS.

(h) Define SCHEMA with examples.

(i) Distinguish between Tuple and domain in a Table.

(j) State the name of four properties of transaction.

Group – D

Answer all questions : [4 x 6

4. Explain the function of DBMS.

OR

Explain Entity Relationship (ER) Model with example.

5. What is Normalization ? Explain different normalization method.

OR

What is join dependency ? Explain with an example.

6. What is Unary Relational Operation? Explain SELECT and PROJECT operation.

OR

Explain insert, delete and update statement with example.

7. Explain various concurrency control techniques.

OR

What is Properties of Transactions and Recoverability ?

✦

IV - S - BCA - CC - 10 - (DATABASE SYSTEMS)

2024

Time :As in Programme

Full Marks : 60

The figures in the right-hand margin indicate marks.

*Answer **all** questions.*

PART-I

1. Answer all Questions.   1x8

    a.   Operating System is a _____ software.

    b.   Which program locates the kernel and loads into the main memory.

    c.   _____ is the heart of UNIX operating system.

    d.   Virtual Memory uses _____ Memory.

    e.   SJF algorithm is stands for _____.

    f.   If a process does not get the processor time for a long duration. This condition is _____.

    g.   _____ system call is used to create a separate and duplicate process.

    h.   _____ acts as a command interpreter in UNIX operating system.

PART-II

2. Answer any eight within two to three sentences   1.5x8

    a.   What is operating system ?

    b.   What is masking ?

c. What is SPOOLing ?

d. What is Be-Lady's anomaly ?

e. what is deadlock ?

f. Define thrashing.

g. What is locality of reference ?

h. Define safe state.

i. Briefly describe sleeping - barber problem.

j. What is segmentation ?

k. Write the use of process control block.

l. What is fragmentation ?

PART-III

3. Answer any eight of the following (in maximum 75 words.)   2x8

   a. State the little formula and explain its usages.

   b. What is Semaphore ? Briefly explain its usage.

   c. State Bounded-Buffer problem.

   d. State the necessary conditions of deadlock.

   e. What is paging ? Explain the basic methods of paging implementation.

   f. Distinguish between internal and external fragmentation.

   g. Why are segmentation and paging sometimes combined into one scheme.

   h. What is demand paging ? Explain the role of virtual memory and demand paging.

   i. Define shared lock and exclusive lock and explain file-locking mechanism.

   j. What is Hash table ? How collision creates problem in directory implementation ?

PART-IV

Answer within 500 words each.   6x4

4. Differentiate between multiprogramming and multi-tasking operating system.

OR

What is System call ? Describe various system calls with suitable example.

5. Define critical section. What are the requirements to solve critical - section problem ?

OR

Differentiate between process and thread. Explain different thread implementation mechanism.

6. Consider the following page reference string 1, 2, 3, 4, 1, 2, 5, 1, 2, 3, 4, 5 for a memory with three frames. How many page fault would occur for following replacement algorithm and find the optimized one.

   a. LRU replacement

   b. FIFO replacement

OR

Differentiate between physical and logical address. How multilevel paging is useful in logical address space ?

7. What is virtual memory ? How virtual memory is useful in demand paging ?

OR

Explain optimal page replacement algorithm and justify this algorithm is not suffered from Belady's anomaly.

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2023

Time :As in Programme

Full Marks : 60

The figures in the right-hand margin indicate marks.

*Answer **all** questions.*

PART-I

1. Fill in the blanks.   1x8
    a.   An operating system is a ____ .
    b.   SPOOL is an acronym for ____ .
    c.   ____ is a logical extension of multiprogramming.
    d.   FORK is ____ .
    e.   ____ threads are supported directly by the operating system.
    f.   A process utilizes a resource in the sequence ____ .
    g.   The solution of internal fragmentation is ____ .
    h.   Disk scheduling involves deciding ____ .

PART-II

2. Answer any eight within two to three sentences.   1.5x8
    a.   Explain real time operating system ?
    b.   Write the advantages of batch processing system over serial processing system.
    c.   Why a thread is called a light-weight process ?
    d.   What is interprocess communication ?
    e.   Explain deadlock.
    f.   Distinguish between logical and physical addressing.
    g.   Write some uses of relocation register.
    h.   Explain associative memory ?

                                            (Turn Over)

i.   What is DMA ?

j.   Explain file attributes.

PART-III

3.   Answer any eight of the following (in maximum 75 words.)   2x8

a.   Explain distributed operating system ?

b.   Write four functions of operating system.

c.   Explain Be-Lady's anomaly ?

d.   Compare the concurrency and parallelism.

e.   What is locality of reference ?

f.   Write the basic use of process control block.

g.   Define thrashing.

h.   Distinguish between paging and segmentation.

i.   Explain fragmentation ?

j.   Distinguish between blocking and non-blocking I/0.

PART-IV

Answer within 500 words each.   6x4

4.   "Operating System can be considered as resource allocator."
     Explain

OR

Describe multiprogramming and multi-tasking operating system.

5.   What is process management ? Explain Inter-process
     communication.

OR

Explain different deadlock detection techniques.

6.   What is virtual memory ? How virtual memory is useful in
     demand paging.

OR

Explain Memory Management Stratergies like Swapping and
Paging.

7.   Describe file system concept and file system mounting.

OR

Explain File Sharing and File Protection.

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(2)

2023

Time :As in Programme

Full Marks : 60

The figures in the right-hand margin indicate marks.

*Answer **all** questions.*

PART-I

1. Answer the following questions.   1x8
   a. Bitmap is a collection of ____ that describes an image.
   b. ____ and ____ are examples of any 2 input devices.
   c. DDA stands for ____.
   d. What is aspect ratio ?
   e. ____ plane is used of 2D transformation.
   f. ____ types of translation are present in computer graphics.
   g. Clipping is used for ____ in computer graphics.
   h. The Cohen Sutherland algorithm divides 2D area into ____ regions.

PART-II

2. Answer any eight within two to three sentences.   1.5x8
   a. What is resolution ?
   b. List any 3 display devices.
   c. Discuss any 3 applications of computer graphics.
   d. Give the matrix representation for 2D rotation.
   e. What is shear transformation ?
   f. Write down any 2 line attributes ?
   g. What is B-spline curve ?

(Turn Over)

h. Discuss the concept of Vanishing Points.

i. What is view plane ?

j. What is point clipping ?

PART-III

3. Answer any eight of the following (in maximum 75 words.)   2x8

a. Explain random scan system.

b. What is reflection transformation ?

c. List hidden edge surface removal techniques ?

d. What is aliasing and antialiasing ?

e. What is scan line algorithm ?

f. Discuss boundary fill algorithm ?

g. Discuss some important properties of Bezier curve.

h. What is 3D rotation ?

i. What is 2D viewing transformation ?

j. Differentiate between view port and window ?

PART-IV

Answer within 500 words each.   6x4

4. Describe computer graphics and its applications.

OR

Discuss about raster scan system ?

5. Explain any 2 line drawing algorithms briefly.

OR

Explain any one area filling technique.

6. Explain 2D scaling with an example.

OR

What do you mean by 3D transformation ?

7. Explain about 2D viewing ?

OR

Explain, in brief, about line clipping algorithm.

———— ❀ ————

[4]

6. Explain Bankers algorithm with an example.

OR

Calculate hit and miss using page replacement policies LRU and FIFO :

0, 4, 3, 2, 1, 4, 6, 3, 0, 8, 9, 3, 5.

7.(a) What are the typical operations that can be performed on a file. Discuss each one them.

OR

(b) List and briefly explain file allocation method.

✦

IV - S - BCA - CC - 8 - (OPERATING SYSTEMS)

2022

Full Marks - 60

Time - As in the Programme

The figure in the right hand margin indicate marks.

Answer ALL questions.

Group - A

1. Answer all questions : [8 x 1

(a) DMA stands for _____.

(b) Open() system call is used for _____.

(c) FCFS stands for _____.

(d) IPC stands for _____.

(e) _____ is used for OS to store the information about process.

(f) Paging is a _____ memory allocation method.

(g) File can be organized in _____ & _____.

(h) A stack is a Data structure which works on _____ property.

Group – B

2. Answer any EIGHT : [8 x 1.5

(a) What is the difference between process and program ?

[P.T.O...

(b) Define system software with examples.

(c) State the necessary conditions behind the deadlock.

(d) What is a Thread ?

(e) Discuss advantages of fragmentation.

(f) What is the use of paging in operating system ?

(g) Differentiate between logical address space and physical address space.

(h) What is Kernel ?

(i) Define Semaphore.

(j) What are the merits and demerits of round robin algorithm.

Group – C

3. Answer any EIGHT :   [8 x 2

(a) Write the structure of an operating system.

(b) Differentiate between batch processing and multi programming.

(c) Define real time operating system.

(d) Differentiate between long term scheduler and short term scheduler.

(e) What is Thrashing ?

(f) Mention the methods used to handle deadlock.

(g) Explain resource allocation graph with diagram.

(h) What is demand paging ?

(i) Discuss advantages of sequential access method over random access method.

(j) List different types of file ?

Group – D

Answer all questions :   [4 x 6

4. Explain in detail the functions of an operating system.

OR

Explain how the process is created when program is an execution.

5.
Process	Burst time	Arrival time
P1	5	0
P2	3	1
P3	7	3
P4	1	4

Implement the SJF (Preemptive) scheduling. Draw the Gantt chart. Also calculate the average waiting time.

OR

What is Process Management ? Explain various states of process with neat diagram.

2023

Full Marks - 60

Time - As in the Programme

The figures in the right hand margin indicate marks.
Answer ALL questions.

1. Answer all the questions : [1 x 8 = 8

   (a) What do you mean by multitasking ?

   (b) Define scheduler and dispatcher.

   (c) How to differentiate between a process and a program in Operating System ?

   (d) What is program counter ?

   (e) Define Swapping.

   (f) What is Semaphore ?

   (g) Define demand paging.

   (h) What do you mean by fragmentation ?

2. Answer any EIGHT of the following questions :
   [1.5 x 8 = 12

   (a) What is convoy effect ?

   (b) Give the definition of segmentation.

   (c) Which attributes are considered while designing the file structure ?

[Cont...

(d) When deadlock occur ?

(e) What is demand paging ?

(f) What is the difference between logical and physical address ?

(g) When does thrashing occur ?

(h) Differentiate between scheduler and dispatcher.

(i) What is virtual memory ?

(j) What is context switching ?

3. Answer any EIGHT of the following questions :

[2 x 8 = 16

(a) What is preemptive and non-preemptive scheduling.

(b) Explain RAG.

(c) What is process synchronization ?

(d) Explain producer-consumer problem.

(e) What is critical-section problem ?

(f) Explain the concept of compaction.

(g) What is PCB ?

(h) Define throughput, turnaround time and waiting time.

(i) What do you mean by system call ?

(j) Discuss the concept of first fit, best fit and worst fit.

4. Answer any FOUR of the following questions :

[6 x 4 = 24

(a) Briefly explain the services and function of Operating System.

[Cont...

OR

What is Operating System ? Explain different types of Operating Systems.

(b) Find the average waiting time and Turnaround time of the following process p_0, p_1, p_2, p_3, p_4 with arrival time 0, 2, 3, 6, 8 and burst time 3, 6, 4, 5, 2 using SJF.

OR

What do you mean by process ? Explain the process state diagram.

(c) Briefly explain the concept of paging.

OR

Solve the following using LRU with frame size -4. Find the percentage of page hit and page miss.

7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1.

(d) What is File ? Explain the file system concept.

OR

What is the layered structure of file. Briefly explain various operations on file.

✦

IV - S - B.Sc. (ITM) - Core - 10 - (Operating System) - (NC)

a. 0,400

b. 1,10

c. 2,100

d. 3,420

e. 4,95

Also calculate the physical address if no trap is produced.

7. Discuss different file protection methods.

OR

Explain the following :

a. File system mounting

b. Direct Access method

———— ✿ ————

2025

Time :As in Programme

Full Marks : 60

The figures in the right-hand margin indicate marks.

Answer all questions.

PART-I

1. Answer all Questions.   1x8

   a. What is a system call in operating system ?

   b. What are open-source system ?

   c. Define IO bound process.

   d. Define Thread.

   e. What is IPC? Give examples.

   f. Give 2 examples of non-preemptable resource.

   g. SJF is a _____ algorithm.

   h. _____ graph is used in deadlock detection if all the resources have only single instance.

PART-II

2. Answer any eight within two to three sentences   1.5x8

   a. Define monitor in operating System.

   b. Give examples of system calls used for different file operation.

   c. What is contiguous memory allocation?

d. Define page replacement algorithm.

e. State the different types of schedulers used by a operating system.

f. Define virtual machine.

g. An application program can directly access computer hardware, True or False. Justify your answer.

h. Define MMU.

i. What is a file system. Give example

j. What is segmentation ?

PART-III

3. Answer any eight of the following (in maximum 75 words.) 2x8

a. Differentiate between physical and logical address space.

b. State the contents of a PCB.

c. State the types of queue used in process management?

d. What criteria are used for CPU scheduling?

e. Discuss context switching.

f. Differentiate between program and process.

g. Define Thrashing.

h. Discuss sequential file access methods.

i. What is a file system? Give example.

j. What is swapping ? Which OS program performs swapping ?

PART-IV

Answer within 500 words each.   6x4

4. What are the functionalities of Operating System ?

OR

State and explain the structures of operating system ?

5. Consider the set of 6 processes whose arrival time and burst time are given below -

Process ID	Arrival time	Burst time
P1	0	7
P2	1	5
P3	2	3
P4	3	1
P5	4	2
P6	5	1

If the CPU scheduling policy is SJF, then calculate the average waiting time and average turn around time. Also draw the Gantt Chart.

OR

Define IPC. Give examples of IPC systems.

6. What is paging. Differentiate between paging and segmentation.

OR

Consider the following segment table -

Segment No.	Base	Length
0	1000	700
1	1300	14
2	90	100
3	1303	680
4	2206	90

Which of the following logical address will produce trap addressing error ?