B.Sc (HONS.) IN CSE SECOND YEAR, FOURTH SEMESTER EXAMINATION, 2020

DATABASE MANAGEMENT SYSTEM

[According to the New Syllabus]

Subject Code : 520221

Examination Code : 5614

Time—3 hours

Full marks—80

[N.B. The figures in the right margin indicate full marks. Answer any **four** questions.]

Marks

1. (a) Define DBMS. Write down the goals of DBMS.   4
   (b) Discuss the differences between a typical file processing system and DBMS.   4
   (c) Explain the differences between physical and logical data independence. Define instance and schema.   6
   (d) What do you mean by data model? Describe E-R model with an example.   6

2. (a) Differentiate between Hierarchical data model and Relational data model.   5
   (b) What is DBA stand for? Describe the responsibilities of DBA.   5
   (c) Describe mapping cardinalities with diagram.   5
   (d) What is key? Discuss different types of key with example.   5

3. (a) Explain the basic structure of an SQL expression.   4
   (b) What do you mean by aggregate functions? Describe briefly.   4
   (c) Consider the following relation schemas :   3×4=12

   Branch-schema=(branch name, branch-city, assets)

   Customer-schema=(customer-id, customer-name, customer-street, customer-city)

   Loan-schema=(loan-no, branch-name, amount)

   Borrower-schema=(customer-name, loan-no)

   Account-schema=(account-no, branch-name, balance)

   Depositor-schema=(customer-name, account-no)

   Write an SQL expression to express each of the following queries :

   (i) Find the names of all branches in the loan relation.
   (ii) Find all customers who have both a loan and an account at the bank.
   (iii) Delete all of Smith's account records.
   (iv) Increase all balances by 5 percent.

[Please turn over

4. (a) Why data Integrids rules are used?   5

   (b) What is normalization? How normalization can be accomplished?   5

   (c) Explain assertion with example.   5

   (d) What is database security? How can we protect a database?   5

5. (a) What do you mean by functional dependency? Describe with example.   4

   (b) What is Armstrong's Axioms rule? Write down the procedure to compute F^+ using Armstrong's axioms.   6

   (c) Let a schema R = (A, B, C, G, H, I) and the set F of functional dependencies   5

$$\{A \rightarrow B, A \rightarrow C, CG \rightarrow H, CG \rightarrow I, B \rightarrow H\}$$

   Find several members of F^+.

   (d) Describe 3NF with example.   5

6. (a) Explain basis notations used in E-R diagram.   4

   (b) What is a entity? Differentiate between weak entity and strong entity.   6

   (c) Explain concurrency control with example.   4

   (d) Differentiate between centralized and distributed database management system.   6

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B.Sc (HONS.) IN CSE, PART-II, FOURTH SEMESTER EXAMINATION, 2020

MICROPROCESSOR AND ASSEMBLY LANGUAGE

[According to the New Syllabus]

Subject Code: CSE-520223

Examination Code : 5614

Time—3 hours

Full marks—80

*[N.B. The figures in the right margin indicate full marks. Answer any **four** questions.]*

Marks

1. (a) Write down some important features of 8, 16, 32 bit microprocessor. — 6

   (b) Explain BIU and EU of 8086 microprocessor with block diagram. — 7

   (c) Distinguish between accumulator-based and register-based microprocessor. — 4

   (d) What are the advantages of assembly language in comparison with high level language? — 3

2. (a) Define physical address and logical address. Describe logical to physical address translation process of 8086 with example. — 2+4=6

   (b) Discuss the condition flags of 8086. — 5

   (c) What physical address is represented by— — 4
   (i) 3A23 : CD45H
   (ii) FB6A : 53D6H

   (d) What is macro? Write an assembly language program to display a message five times using macro. — 1+4=5

3. (a) Write down the key properties of semi conductor memory. — 4

   (b) How does SDRAM differ from ordinary DRAM? — 4

   (c) Design a memory 16K×8 using 4K×4chip. — 4

   (d) What do you mean by Error correcting lode? Explain with diagram of the Hamming Error correcting lode. — 2+6=8

[Please turn over

4. (a) What do you know about maskable and non-maskable interrupt? — 4

(b) Describe 8259A interrupt controller with block diagram. — 6

(c) Distinguish between hardware and software interrupt. — 4

(d) Write an assembly language program to display all English alphabets. — 6

5. (a) Define machine cycle and instruction cycle. — 4

(b) Describe the operation that on 8086 processor will perform when it executes each of the following instruction : — 6

(i) MOV BX, O3FFH

(ii) MOV AL, ODBOH

(iii) MOV DH, CL

(c) Explain the functional units of 80386 microprocessor with necessary diagram. — 6

(d) Discuss the main features of CISC processor. — 4

6. (a) What is register? Explain the register organization of Pentium processor. — 1+4=5

(b) Explain the major sections of an assembly program. — 5

(c) Write an assembly language program to calculate the factorial of a positive integer number. — 5

(d) Describe interrupt handling procedure. — 5

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B.SC (HONS) IN CSE, SECOND YEAR, FOURTH SEMESTER
EXAMINATIN, 2020

DESIGN AND ANALYSIS OF ALGORITHMS
**Subject Code : 520225**
Examination Code : 5614
[According to the New Syllabus]
Time—3 hours
Full marks—80
[N.B. The figures in the right margin indicate full marks. Answer any
***four*** *questions.]*

Marks

1. (a) Define an algorithm. What are the various properties of an algorithm. — 1+3 =4
   (b) What is asymptotic notation? Describe different types of asymptotic notation with example. — 6
   (c) Explain the time and space complexity of an algorithm. — 5
   (d) Prove that best case complexity of quick sort algorithm is $O(n \log_2 n)$. — 5

2. (a) State the control abstraction of divide conquer technique. What kinds of problems can be best solved using divide and conquer method. — 2+2 =4
   (b) Write down the complexity of a sorting algorithms. — 5
   (c) Simulate the binary search algorithm using the following set of numbers :
   20, 25, 27, 32, 40, 50, 72, 83, 91 to find 83 . — 5
   (d) Write down an algorithm to find the maximum and minimum number from a given set of numbers. — 6

3. (a) Draw the minimum cost spanning tree for the following graph (Using Kruskal's algorithm) : — 6
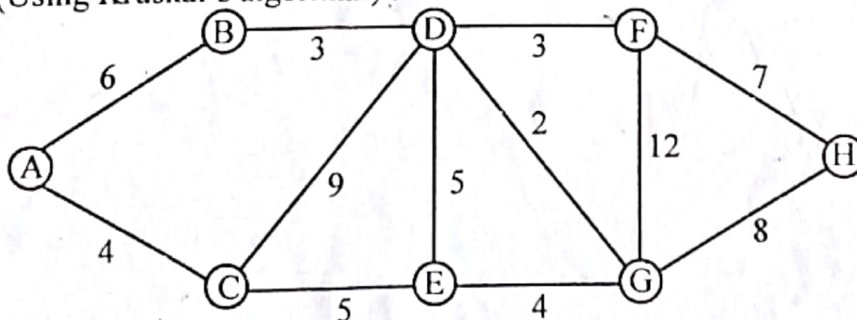
   (b) Find the optimal solution of Knapsack problem where $M = 15$, $(p_1, p_2, p_3, ..., p_7) = (10, 5, 15, 7, 6, 18, 3)$ and $(w_1, w_2, w_3, ..., w_7) = (2, 3, 5, 1, 4, 1, 2)$. — 6
   (c) Write down the difference between greedy method and dynamic programming. — 3
   (d) What is control abstraction? Describe the general approach of greedy method using control abstraction. — 5

[Please turn over

4. (a) What is dynamic programming? Why it is important?   4

    (b) Differentiate between divide & conquer and dynamic programming.   4

    (c) What is multistage graph? Calculate the minimum cost path from S to T in the multistage graph below using forward and backward approach :   8
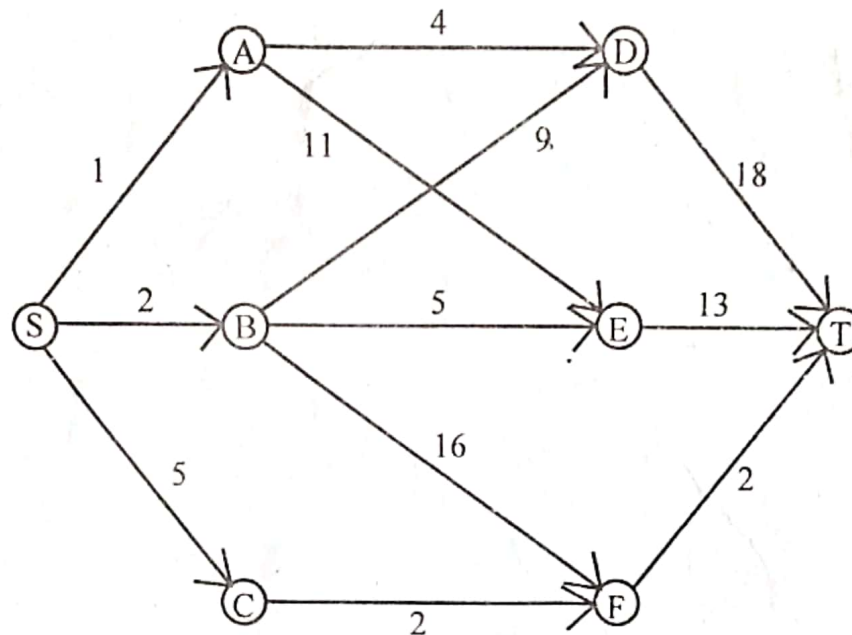
    (d) What do you mean birnary search tree and optimal binary search tree?   4

5. (a) Define binary tree. How can we traverse a binary tree?   4

    (b) Differentiate between BFS and DFS tree traversal techniques.   4

    (c) Define forward checking. Write down the solution steps of N queen problem.   6

    (d) Define sum of subset problem. Explain sum of subset problem with proper example.   6

6. (a) What is branch and bound algorithm? Write down the working principle of branch and bound algorithm with example.   6

    (b) Differentiate between 'Branch & Bound' and 'Backtracking' algorithm techniques.   4

    (c) Define travelling salesman problem (TSP). Explain TSP in the concepts of branch and bound technique with proper example.   6

    (d) Describe least cost search (LCS).   4

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B.Sc (HONS.) IN CSE PART-II FOURTH SEMESTER EXAMINATION, 2020
NUMERICAL ANALYSIS
[According to the New Syllabus]
Subject Code : 520227
Examination Code : 5614
Time—3 hours
Full marks—80

[N.B. The figures in the right margin indicate full marks. Answer any **four** *questions.]*

Marks

1. (a) Define algebraic and transcendental equation. 2
   (b) Establish the method of false position. Also discuss the geometrical interpretation of this method. 6+4=10
   (c) Find a root of the equation $x^3 - 3x - 5 = 0$ by the method of false position. 8

2. (a) Define interpolation and extrapolation. Derive Newton's general interpolation formula for unequal intervals for $y = f(x)$. 3+6=9
   (b) Find the relation between divided difference and simple difference. 4
   (c) Given the set of data points satisfying the relation $y = f(x)$: 7

x :	−1	0	3	6	7
y :	3	−6	39	822	1611

   Find the degree of $f(x)$ directly from the difference table. Also find the form of $f(x)$ and $f(2{\cdot}5)$.

3. (a) Define numerical integration. Derive Simpson's '$\frac{1}{3}$' and Simpson's '$\frac{3}{8}$' rules for numerical integration. 2+6=8

   (b) Find the value of $\int_{0}^{1}\dfrac{dx}{1+x^2}$ by using Simpson's '$\frac{1}{3}$' and '$\frac{3}{8}$' rules. Hence obtain the approximate value of π in each case. 6

   (c) Prove that, $C_K^n = C_{n-K}^n$. 6

4. (a) Define numerical differentiation. 2
   (b) Derive the derivatives obtained by Newton's forward difference interpolation formula. 8
   (c) Find the first and second derivatives of y at $x = 5$ from the following table : 10

x	50	60	70	80	90
y	19·96	36·65	58·81	77·21	94·61

[Please turn over

5. (a) Describe the method of factorization to solve the system of linear equation $AX = B$.   8

   (b) Solve the following system by factorization method :   6

$2x + 3y + z = 9$

$x + 2y + 3z = 6$

$3x + y + 2z = 8.$

   (c) Solve the following system of equations with the help of Gauss-elimination method :   6

$x - y + z = 1$

$-3x + 2y - 3z = -6$

$2x - 5y + 4z = 5.$

6. (a) Write in short about the different types of errors.   6

   (b) Establish the general error formula to calculate error.   6

   (c) Find the real root of the equation $x^2 + 4\sin x = 0$ correct up to four decimal places by using Newton-Raphson method.   8