(3 Hours)

Max. Marks: 100

N.B. : (1) Question No. 1 is compulsory.
      (2) Answer any four questions out of the remaining six questions.
      (3) All questions carry equal marks

Q.1) (a) Define a Structure? What is nested structure? Explain the nested structure with example. **[10]**

    (b) What are preprocessor directives? Provide the differences between macros and functions. **[10]**

Q.2) (a) What is a file? Compare binary and text file. Give examples to open and close the files. **[10]**

    (b) Write a complete C program to print a Pascal triangle of ten lines. **[10]**

Q.3) (a) What are storage classes? Explain with suitable example. **[10]**

    (b) Explain the advantages of using functions. Explain the concept of recursion with an example. **[10]**

Q.4) (a) Write a program to print the following pattern of asterisks up to n lines where n is taken from the user. **[10]**
```
*
**
***
****
*****
```
    (b) What is a pointer? How is a pointer variable declared? What is the purpose of the data type included in the declaration? Give example. **[10]**

Q.5) (a) Explain different types of operators available in C with suitable examples. **[10]**

    (b) Write a complete C program to check a number for palindrome. **[10]**

Q.6) (a) What is symbolic constant? How is a symbolic constant defined? Explain with example. **[10]**

    (b) Write a program to accept an unsorted list of names and sort them? **[10]**

Q.7) Write short notes on (any four): **[20]**

    (a) Type casting
    (b) Actual parameters and Formal parameters
    (c) Multi dimensional Array
    (d) Function pointers

MCA (SEM- I)
System Analysis Design
(Paper – II)
MAY: - 2016

QP Code : 26554

(3 Hours) [Total Marks : 100

N. B. : (1) Question No. 1 is compulsory.
(2) Answer any **four** questions out of remaining **six** questions.
(3) All questions carry **equal** marks.
(4) Answer to the questions should be grouped and written together.

Q1 (a): Built a Railway Reservation System, draw CLD, DFD up to two level and ER Diagram. (10)

Q1 (b): Explain Data dictionary and Structure English with suitable example (10)

Q2 (a): What is difference b/w System Analysis and System design? What are the considerations in Feasibility study and what are the contents of Feasibility Report? (10)

Q2 (b): What is the Criteria for Software and Hardware selection? How to evaluate the performance of Software and Hardware? (10)

Q3 (a): Explain RAD and Spiral model with suitable diagram (10)

Q3 (b): What are structured Walkthroughs and how they are carried out? Describe composition of a Walkthrough Team? (10)

Q4 (a): Why Documentation is necessary for Analysts and Designers? Explain Types and importance of Documentation? (10)

Q4 (b): Compare and contrast conventional testing and object oriented testing. (10)

Q5 (a): What do you mean by Normalization of the data? What are the types of Normalization? Illustrate with a simple example, what is removed when a relation is converted to the first normal form? (10)

Q5 (b): What are the information gathering tools? Is interview an art? Justify it. (10)

Q6 (a): What is deliverable? What is the design book and what is it purpose? Explain in detail. (10)

Q6 (b): What are the threats of System Security and what are control measures? (10)

Q7: Write short notes on- (20)

(a) Debugging

(b) Cost –Benefit Categories

(c) Cc

(d) C

MCA (SEM- I)
Computer Organization and Architecture
(Paper – III)
MAY: - 2016

QP Code : 26557

[Total Marks : 100

N.B. :   1) Question **No.1** is **compulsory.**
   2) Attempt any **four** from the remaining **six** questions.

1. (a) Simplify the following expression using Karnaugh Map. Also   (06)
         draw the Logic Circuits of the simplified expression.
         $F(A,B,C,D) = \sum(0,1,2,5,7,8,10,13) + d(3, 9)$
    (b) What are Half Adders. Explain with its logic diagram and truth   (04)
         table.
    (c) Explain why are NAND and NOR gates are called as Universal   (10)
         Building Blocks.

2. (a) What is an I/O module. Discuss with the help of a diagram, the   (10)
         functioning of an I/O module
    (b) Explain different Bus arbitration schemes with suitable diagrams.   (10)

3. (a) List and explain different addressing modes with examples.   (10)
    (b) What are Clusters? Explain various cluster organisations in detail.   (10)

4. (a) List and explain the use of various general purpose registers in a   (10)
         CPU.
    (b) What is a Cache Memory? Explain the Associative cache   (10)
         organisation in detail.

5. (a) Explain Micro programmed control implementation of a Control   (10)
         Unit.
    (b) Compare and contrast Interrupt Driven I/O, DMA and   (10)
         Programmed I/O.

6. (a) What are Multiplexers and De-Multiplexers. Construct a 4-to-1   (10)
         multiplexer using basic logic gates and its truth table.
    (b) Explain different RAID levels in detail.   (10)

7. Write Short Notes on **any four** :-   (20)
       a) Flip Flops
       b) Virtual Memory
       c) Instruction pipeline
       d) PCI Bus
       e) Synchronous Counters.

MCA (SEM- I)
Discrete Mathematics
(Paper – IV)
MAY: - 2016

QP Code : 26560

Total Marks : 100

N.B. 1) Q1 is Compulsory

2) Answer any four questions out of remaining six questions.

3) Figures to the right indicate marks.

Q1. A) (i) Obtain a conjunctive normal form of $\neg(P \lor Q) \leftrightarrow (P \land Q)$ [5]

(ii) Let S={1,2,3,4} and let A=S×S. Define the following relation R on A.

(a,b)R(a',b') if and only if ab'=a'b. Show that R is an equivalence relation. Compute A/R. [5]

B) (i) Show that a group (G,*) is abelian if and only if for a,b є G, $(a.b)^2 = a^2 b^2$ [5]

(ii) What is the solution of the recurrence relation $a_n = 6a_{n-1} - 9a_{n-2}$, with initial condition a_0=1, a_1=6. [5]

Q2. A) (i) Construct the truth table of : $(Q \land P) \lor (Q \land \neg P)$. Determine whether this is a tautology or contradiction or neither. [5]

(ii) What is functionally complete set of connectives. Explain with two examples. [5]

B) Let A={1,2,3,4}. For the relation R whose matrix is given, find the matrix of transitive closure by using Warshall's algorithm.

$$M_R = \begin{array}{|c|c|c|c|} \hline 1 & 0 & 0 & 1 \\ \hline 1 & 1 & 0 & 0 \\ \hline 0 & 0 & 1 & 0 \\ \hline 0 & 0 & 0 & 1 \\ \hline \end{array}$$

[10]

Q3. A) (i) Using mathematical induction prove that

2+4+6+.....................+2n = n(n+1) for all n ≥ 1 [5]

(ii) Check the validity of the following arguments.

If Ram has completed M.C.A or M.B.A, then he is assured a good job.

If Ram is assured a good job, he is happy.

Ram is not happy. So Ram has not completed M.C.A. [5]

B) (i) Let P(x): x is even; Q(x):x is a prime number; R(x,y): x+y is even variables x and y represent positive integers. Determine the truth values of the following:

1) $\forall x\, P(x)$ 2) $\exists x\, Q(x)$ 3) $\forall x \exists y\, R(x,y)$ 4) $\exists x \forall y\, R(x,y)$ 5) $\forall x\, (\neg Q(x))$

[5]

(ii) The solution of the recurrence relation [5]

$$C_0 a_n + C_1 a_{n-1} + C_2 a_{n-2} = f(n) \text{ is } 3^n + 4^n + 2$$

Given that f(n)=6 for all n. Determine C_0, C_1, C_2.

Q4. A) (i) Find the particular solution of $a_r - 3a_{r-1} + 3a_{r-2} + a_{r-3}$=4. [5]

(ii) Let $a_n = 2n^2$-3. Find $\nabla^k a_n$ where k equals to (1) 2 , (2) 3, (3) 4,   where ∇ denotes the backward difference. [5]

B) (i) State the "Tower of Hanoi" problem and obtain the corresponding recurrence relation indicating the initial conditions. Solve the recurrence relation. [10]

Q5. A) (i) Let G be a group and let a be a fixed element of g. Show that the function $f_a(x) = axa^{-1}$ for x∈G is an isomorphism.   [5]

(ii) Let S = {1,2,3}. Let G=S_3 be the group of all permutations of elements of S, under the operation of composition of permutations. Let H be the subgroup formed by the two

permutations $\begin{pmatrix} 1 & 2 & 3 \\ 1 & 2 & 3 \end{pmatrix}$ and $\begin{pmatrix} 1 & 2 & 3 \\ 2 & 1 & 3 \end{pmatrix}$ find the left cosets of h in G. Is H a normal

subgroup? Explain your notion of composition clearly.   [5]

B) Consider parity check matrix H given by H = $\begin{pmatrix} 1 & 1 & 0 \\ 0 & 1 & 1 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{pmatrix}$

Determine the group code $e_H: B^2 \rightarrow B^5$

Decode the following words relative to a maximum likelihood decoding function associated with e_H : 01110 ,11101, 00001, 11000.   [10]

Q6. A) (i) Consider the (2,6) encoding function e defined by

e(00) = 000000   e(01) = 011110

e(10) = 101011   e(11) = 111000

How many errors will e detect?   [5]

(ii) Consider (3,6) encoding function e as follows:

e(000) = 000000   e(001) = 000110   e(010) = 010010   e(011) = 010100

e(100) = 100101   e(101) = 100011   e(110) = 110111   e(111) = 110001

Show that the encoding function e is a group code.   [5]

B) (i) Let V={v_0 , w,a,b,c} S={a,b,c} and let $\rightarrow$ be the relation on V^* given by

1. $v_0 \rightarrow aw$ 2. $w \rightarrow bbw$ 3. $w \rightarrow c$

Consider the phase structure grammar G(V,S,v_0,$\rightarrow$). Derive the sentence ab^6c. Also draw the derivation tree.   [5]

(ii) Consider the state transition table shown below. Draw digraph of the machine.

	a	B
s_0	s_0	s_1
s_1	s_2	s_0
s_2	s_1	s_2

[5]

Q7. A) Determine whether the relation R on a set A is reflective, irreflective, symmetric, asymmetric, antisymmetric or transitive. Give necessary explanation to your answer.

A=set of integers, aRb if and only if |a-b|=4.   [10]

B) Perform the following operations

1) $(1001.0101)_2 = (?)_{10}$

2) $(11.125)_{10} = (?)_2$

3) $(0011010)_2 - (001100)_2 = (?)_2$

4) $(0011010)_2 * (001100)_2 = (?)_2$

5) $(101010)_2 \div (000110)_2 = (?)_2$ [10]

JI-Con. 6753-16.

(3 Hours)

[Total Marks : 100

N.B.:   1) Question No.1 is **compulsory.**
2) Attempt any **two** from Question **3 to 4.**
3) Attempt any **two** from Question **5 to 7.**

1. (a) Explain the law of demand. What are the important factors and   (10)
influences on the said law?
    (b) Explain Fayol's Principles of Management.   (10)

2. (a) What do you mean by monopoly and duopoly? What are the   (10)
significant features of these?
    (b) Does perfect competition exist? Explain in detail the concept.   (10)

3. (a) Describe in detail the internal and external economies of scale.   (10)
    (b) What is management by objective? Explain the steps involved in   (10)
MBO planning?

4. (a) Define economies of scale. How do you achieve the same in a   (10)
developing economy?
    (b) What is Price discrimination? Explain in detail the concept.   (10)

5. (a) What is the significance of Planning in management function   (10)
hierarchy? Explain the important steps in Planning.
    (b) What is meant by decentralization? Discuss the concept with   (10)
reference to the current Indian scenario.

6. (a) Define and explain the concept of 'Marketing Mix'.   (10)
    (b) What are the various leadership theories? Explain Theory X and   (10)
Theory Y.

7. Write Short Notes on *any four* :-   (20)
    a) Personnel Management
    b) Marketing research
    c) Cost of Quality
    d) Delegation of Authority
    e) Hawthorne Experiment

Duration : 3 hours   **Total Marks : 100**

N.B.   (1) **Question No.1 is compulsory**
         (2) **Answer any 4 of the remaining 6 questions**
         (3) **Figures to the right indicate full marks**

1. Attempt any FOUR questions
       a) Differentiate between GET and POST method.   (20)
       b) Explain how an ASP page is executed?
       c) String object in JavaScript
       d) Block level tags in HTML.
       e) Explain any four tags within <TABLE> tag.

2. (a) Explain types of lists in HTML. Write HTML code to demonstrate it.   (10)
    (b) Write a JavaScript to accept a number from user and check whether the number given is a
    Fibonacci number or not.   (10)

3. (a) What is Event and Event handlers in JavaScript? Write JavaScript to demonstrate event
       handling in JavaScript.   (10)
    (b) Explain Array as object in JavaScript with atleast four methods.   (10)

4. (a) How many types of dialog boxes can be created using JavaScript? Write how to create them
    and about their usage.   (10)
       (b) Explain Date object initialization in java script. Explain any two methods of Date object with
    example..   (10)

5. (a) Explain user defined objects and user defined functions in JavaScript along with example. (10)
       (b) What is CSS? Explain different types of CSS with example and advantages and disadvantages.
                                                                                    (10)

6. (a) Explain Request and Response object used in ASP.   (10)
       (b) What is the difference between Application and Session object? Explain with example.   (10)

7. (a) Explain linking between frames along with example. Explain the advantages and disadvantages
       of Frames.   (10)
       (b) What are Cookies? Explain along with example. What are the advantages of Cookies?   (10)

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