B.Tech. (CSE) 5th Semester

(G-Scheme) Examination, December-2024

MICROPROCESSOR

Paper –ESC-CSE-301-G

Time allowed : 3 hours]   [Maximum marks : 75

Note : *Attempt five questions in all, selecting one question from each unit. Question No. 1 is compulsory.*

1. Write short notes on the following:

   (a) Interrupt

   (b) EU

   (c) S0, S1 pins of 8085

   (d) HLT instruction

   (e) 8259

   (f) Directives

Unit-I

2. Draw and explain functional block diagram of 8085.

   15

3. (a) Write an Assembly Language Program to find the largest number between two 8 bit numbers. 7.5

   (b) Compare microprocessor and MPU with the help of diagram. 7.5

3227-P-2-Q-9 (24)   [P.T.O.

Unit-II

4. Explain the Architecture of 8086 microprocessor. 15

5. (a) Explain the concept of physical address computations with the help of suitable example.

7.5

(b) Discuss various branch related addressing modes of 8086.   7.5

Unit-III

6. (a) Describe various data transfer Instructions of 8086.   7.5

(b) Explain various shift and rotate Instruction of 8086.   7.5

7. Explain the following Instruction: 15

(a) AAA

(b) SBB

(c) IMUL

(d) TEST

(e) SAHF

Unit-IV

8. Explain Direct Memory Access and 8237 DMA controller.   15

9. (a) Explain the working of 8255 clip.   7.5

(b) Describe 8253 clip in detail.   7.5

3228

Time allowed : 3 hours] [*Maximum marks : 75*

Note : **Question No.1 is compulsory.** *Attempt* **five** *questions in total, the* **first being compulsory** *and select* **one** *from each unit.*

1. (i) What is distributed Processing? How does it relate to Computer Networks?   2.5

    (ii) What is Multiplexing?   2.5

    (iii) Difference between Physical Addressing and Logical Addressing.   2.5

    (iv) What is a repeater?

    (v) What is Domain Name space?   2.5

    (vi) Describe Ciphers.   2.5

Unit-I

2. What is the OSI Reference Model? Differentiate between OSI and TCP/IP Reference Model.   15

3. Differentiate between : 3×5=15

    (a) Half-duplex and full-duplex Transmission

    (b) Modulation and Multiplexing

    (c) Connectionless and Connection-Oriented Services

Unit-II

4. Explain Network layer functions and services in detail.

    15

5. Explain the following : 3×5=15

    (a) IPv4 classful and classless addressing

    (b) Routers and Gateways

    (c) ARP and RARP

Unit-III

6. What is Routing? Explain various routing algorithms in detail. 15

7. Write short note on the following : 2×7.5=15

    (a) Transport Layer Functions and Services

    (b) Application Layer Functions and Services

Unit-IV

8. Write short note on the following : 3×5=15

    (a) ATM

    (b) MAN Architecture

    (c) QoS Improving Techniques

9. (a) Differentiate between Symmetric key ciphers and Asymmetric key ciphers. 7.5

    (b) What is Firewall? Explain the various types of attacks in detail. 7.5

B.Tech. 5th Semester (CSE) Examination,

December–2024

FORMAL LANGUAGES & AUTOMATA

Paper–PCC-CSE-305-G

Time allowed : 3 hours]　　　　[Maximum marks : 75

Note : **Question No. 1 is compulsory.** Attempt **five** questions in total, selecting **one** question from each section.

1. (a) Suppose you convert a Mealy machine into Moore machine and after conversion the first output of Moore machine (output of start state) becomes 1. Is it acceptable ? If yes, justify how it is correct. If no, then what you will do to correct the corresponding Moore machine ?

   (b) Design a finite automata to accept the language L = {aa, aaab, aabaa, aabb, ...}, here aa is taken as a substring.

   (c) Draw the FA for regular expression $(a^* + b^*)^*$.

   (d) Write the left most and right most derivation for given CFG and generate the string abbbb.

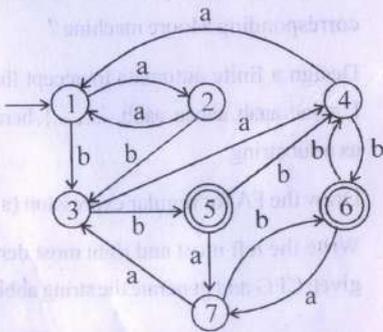$S \rightarrow aBC$

$B \rightarrow bCb$

$C \rightarrow B \mid \in$

(e) Design PDA (transition diagram only, no need to write explanation) to accept the language

    L = {aba, aabbbaa, aaabaaa, aaaabbaaaa, ...}

(f) Compare the heads of FA, PDA and Turing Machine (in tabular form only). Write atleast two comparisons.   6×2.5=15

Section–A

2. (a) Minimize the given Automata (by using equivalence method only i.e. π0, π1, π2 method).   8

(b) M = ({q_0, q_1, q_2}, {0, 1}, δ, q_0, {q_2}) is a NDFA. where δ is given by   7

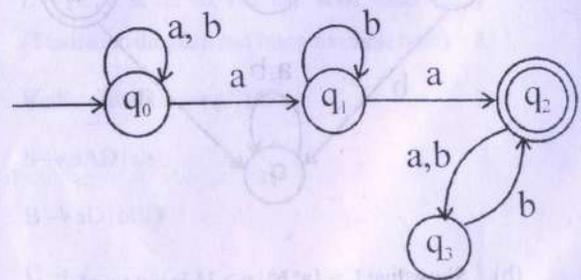$$\delta(q_0, 0) = \{q_1, q_2\}, \qquad \delta(q_0, 1) = \{q_1\}$$

$$\delta(q_1, 0) = \{q_0, q_1\}, \qquad \delta(q_1, 1) = \phi$$

$$\delta(q_2, 0) = \{q_1\}, \qquad \delta(q_2, 1) = \{q_0, q_1\}$$

Construct an equivalent DFA by converting the states into substates method only.

3. (a) Construct a DFA for given NFA (by converting the states into substates method only)   8
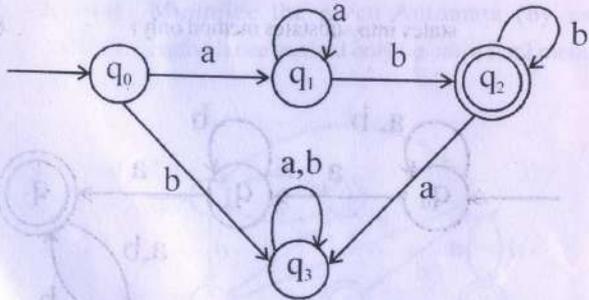
(b) Construct a DFA which accept strings containing two consecutive 0's followed by two consecutives 1's over the alphabets $\{0, 1\}$. [Note : 0 and 1 must appear as a substring and the string can either start with 0 or start with 1]. 7

Section–B

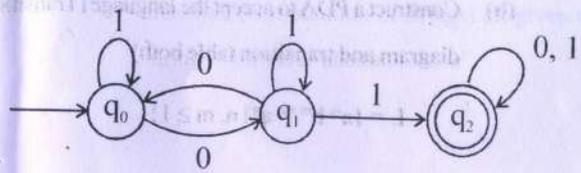4. (a) Find the regular expression for the given Finite Automata 7

(b) Show that $L = \{a^n b^n \mid n \geq 1\}$ is not regular. 8

5. (a) Construct a DFA for the regular expression. Also draw transition table of DFA. 7

$$0^* + (01 + 0)^*$$

(b) Find regular expression for the given diagram: 8

Section–C

6. (a) Construct a PDA to accept the language

$L = \{\in, a, b, aa, bb, aba, bab, abba, baab, ...\}$
(Transition diagram and transition table both) 8

(b) Reduce he following CFG 7

$S \rightarrow aAD \mid ab$

$B \rightarrow aD \mid bBD$

$C \rightarrow d$

$D \rightarrow b$

7. (a) Convert the following grammar into G.N.F.   8

$S \rightarrow bCS \mid b$

$C \rightarrow SdC \mid SS \mid db$

(b) Construct a PDA to accept the language (Transition diagram and transition table both)

$L = \{a^m b^{m+n} a^n \mid n, m \geq 1\}$ 7

Section–D

8. (a) Explain the different variants of Turing machines.   7

(b) Design a T.M. to accept the language $L = \{011, 001111, 00011111, \dots\dots\dots$ and so on$\}$ 5

(c) Why Turing machine is much powerful than other types of machines ?   3

9. (a) Write a detailed note on undecidable problems in automata.   4

(b) Design a Turing machine (transition diagram and table both) to increment decimal integer by 1.   3

(c) Design a Turing machine and perform the trace of machine (computation of strings) on given two strings which are "abba and ababa".   8

B.Tech. (CSE) 5ᵗʰ Semester G-Scheme

Examination, December–2024

DESIGN & ANALYSIS OF ALGORITHMS

Paper-PCC-CSE-307-G

Time allowed : 3 hours]   *[Maximum marks : 75*

Note : *Attempt* **five** *questions selecting* **one** *question from each section and* **Question No. 1 is compulsory.**

1. (a) Explain Space and Time complexity briefly.

    (b) Explain Bubble sort with example.

    (c) Briefly explain Stack and its operations.

    (d) Discuss the Queue and its operations.

    (e) Sets and Disjoint Set Union

    (f) Write the algorithm for linear search tree with the help of example.

                                       15

Section-A

2. Explain the Asymptotic Notation (Big OH, Omega and Theta) and best, average and worst-case behavior in detail.

                                       15

3. (a) Discuss Strassen's Matrix Multiplication algorithm with the help of example.   8

3230-P-3-Q-9(24)   **[P.T.O.**

(b) Discuss the merge sort algorithm and Compare its time complexity with selection sort. 7

Section-B

4. (a) Solve the below problem of Job Sequencing with Deadlines: n=4, (p1,p2,p3,p4) = (100,10,15,27) and (d1,d2,d3,d4) = (2,1,2,1) 8

(b) What is minimum spanning tree? Explain Prim's and Kruskal's Algorithm in details. 7

5. (a) Define 0/1 Knapsack problem and solve using Dynamic programming method. 8

(b) Explain Travelling Salesperson problem using dynamic programming with the help of example. 7

Section-C

6. (a) Give an algorithm for graph coloring problem using Backtracking with example. 8

(b) Explain the 0/1 knapsack problem using branch & bound method taking suitable example. 7

7. (a) Explain Branch & Bound strategy to solve travelling salesperson problem for any graph. 8

(b) Write a short note on following : 7

(i) Hamiltonian Cycles

(ii) 8 Queen's problem

Section-D

8. (a) What is NP Hard and NP Complete Problems? Briefly explain. 8

(b) State and explain cook's theorem. 7

9. (a) Define the classes problem P, NP and NP Complete. How are they related to each other? Explain. 8

(b) What is NP hard graph and NP scheduling problems? Explain briefly. 7

B.Tech. 5ᵗʰ Semester (CSE) G-Scheme

Examination, December–2024

PROGRAMMING IN JAVA

Paper-PCC-CSE-309-G

Time allowed : 3 hours]   [Maximum marks : 75

Note : *Attempt five questions selecting one question from each unit and question no.1 is compulsory.*

1.   Write a short note on :

(a)   What is an Abstraction? Explain with example. 2.5

(b)   How we can define a class in Java? How we can access class members?   2.5

(c)   What do you mean by Java Virtual Machine? Explain.   2.5

(d)   What is method overloading?   2.5

(e)   What are wrapper classes? Explain.   2.5

(f)   What are abstract classes and methods?   2.5

Unit-I

2.   What is Java Virtual Machine? Explain the relation between JVM, JRE and JDK in detail.   15

3. Explain the Object-Oriented programming structure of Java. What are the major characteristics of JAVA? Explain in detail.   15

Unit-II

4. Explain the following :   15

   (a) Static vs Dynamic class loading

   (b) Argument passing mechanism

5. (a) Describe polymorphism with the help of a program in JAVA.   7.5

   (b) What is Interface? Why multiple inheritance is not possible in JAVA? Explain interface with writing a program in JAVA.   7.5

Unit-III

6. What are Packages? What is the need of packages in JAVA? Also explain some associating classes to Packages.   15

7. (a) How we declare a thread class in java? Explain with example program.   7.5

   (b) Differentiate between AWT and Swing programming with example program.   7.5

Unit-IV

8. Write a short note on following :   15

   (a) Comparable and Comparator Interfaces

   (b) Types of JDBC drivers

9. What is Callable Statement? Write a program in JAVA for creating callable statements. Also explain the difference between stored procedures and functions.   15

B.Tech. 5th Semester (CSE) (Elective-I) G-Scheme

Examination, December–2024

SOFTWARE ENGINEERING

Paper-PEC-CSE-311-G

Time allowed : 3 hours]   [Maximum marks : 75

Note : **Question No. 1 is compulsory.** *Attempt* **five** *questions in total,* **first being compulsory** *and selecing* **one** *from each unit.*

1.   Explain the following :

    (a)   Software Process and Software Product   2.5

    (b)   Risk Analysis and management   2.5

    (c)   Abstraction and Refinement   2.5

    (d)   Role of Functional Independence in System Design
        2.5

    (e)   Software Debugging   2.5

    (f)   Cost impact of software defects   2.5

Unit-I

2.   What is Software Life Cycle? Describe any two software life cycle models in detail.   15

3232-P-3-Q-9(24)   [P.T.O.

3. (a) What is Software project management? Also explain project size estimation metrics. 7.5

   (b) Describe COCOMO model in brief. 7.5

Unit-II

4. Requirement's analysis is unquestionably the most communication intensive step in the software engineering process. Why the communication path does frequently break down? Explain. 15

5. (a) Differentiate between Cohesion and Coupling. 7.5

   (b) Explain the software requirements specifications in detail by taking a relative case study. 7.5

Unit-III

6. (a) Describe Software Debugging Process. What is the difference between Software re-engineering and reverse engineering? 7.5

   (b) What is Software Architectural Designs? Explain architectural complexity for a software design. 7.5

7. What is Testing? Explain various Software Testing Techniques in detail. 15

Unit-IV

8. Describe the Software Quality concepts and various Software Quality Assurance activities in detail. 15

9. Explain the following in detail:

   (a) The ISO 9000 Quality Standards 7.5

   (b) Software Configuration Management 7.5

B.Tech (CSE) 5th Semester (G-Scheme)
Examination, November-2023
MICROPROCESSOR
Paper-ESC-CSE-301-G

Time allowed : 3 hours]   *[Maximum marks : 75*

Note : ***Question no. 1 is compulsory.*** *Attempt any* **one**
question from each unit.

1. Explain the following :

   (a) Flag Register   2.5

   (b) Data Bus   2.5

   (c) MOV, MVI, LXI   2.5

   (d) PIC   2.5

   (e) Memory Segmentation   2.5

   (f) Rotate instructions   2.5

Unit-I

2. What do you mean by microprocessor ? Draw and
   explain the architecture of 8085 microprocessor in
   detail.   15

3. Name the different types of Interrupts used by the 8085
   microprocessor along with their priority. How
   Instruction Set Works ? Explain.   15

3227-P-2-Q-9 (23)   [P. T. O.

Unit-II

4. Explain the following in detail :

   (a) Addressing Modes of 8086   10

   (b) Program Relocation   5

5. What do you mean by EU ? Explain. Describe the pin diagram of 8086 microprocessor in detail.   15

Unit-III

6. Discuss the following :

   (a) NOP *vs* HLT instructions   8

   (b) Looping Instructions with examples.   7

7. How will you describe the assembler instruction format ? Discuss. Also describe the directive and operators used in 8086 microprocessor.   15

Unit-IV

8. What do you mean by DMA ? Explain the architecture of 8237 DMA controller in detail.   15

9. What do you mean by programmable interval timer ? Explain using suitable architecture along with its applications.   15

B.Tech (CSE) 5th Semester (G-Scheme)
Examination, November-2023

COMPUTER NETWORKS

Paper-PCC-CSE-303-G

Time allowed : 3 hours]   [Maximum marks : 75

Note : Attempt **five** questions in all; selecting **one**
question from each section and **Question no. 1** is
compulsory.

1.   Write a short note on the following :   15

(a)   Mesh Topologies

(b)   Network Address Translation

(c)   Dynamic Host Control Protocol (DHCP)

(d)   Fast Ethernet & Gigabit Ethernet

(e)   Email

(f)   Congestion Control

Section-A

2.   (a)   What is computer network ? Explain its historical
          development in detail.   8

(b)   Explain Data Link Layer functions in detail.   7

3228-P-3-Q-9 (23)   [P. T. O.

3. (a) Explain TCP/IP model in detail. 10

   (b) Describe various Transmission media used in Computer Networks. 5

Section-B

4. Write a short note on : 15

   (a) ARP

   (b) IPv4

   (c) MAC Layer Functions

5. Briefly Explain : 15

   (a) RARP

   (b) BOOTP

   (c) Difference between Router and Switch.

   (d) Network Layer functions and services.

Section-C

6. What is Routing ?Explain various types of routing in detail. 15

7. Write a short note on : 15

   (a) Transport layer functions and services

   (b) Application layer functions and services

   (c) FTP and HTTP

Section-D

8. (a) Discuss WAN architecture in detail. 15

   (b) QoS improving techniques.

   (c) Explain LAN architecture with ethernet in detail.

9. Write a short note on : 15

   (a) Frame Relay

   (b) Symmetric and asymmetric key ciphers

   (c) SONET/SDH

B.Tech (CSE) 5th Semester (G-Scheme)
Examination, November-2023
FORMAL LANGUAGES & AUTOMATA
Paper-PCC-CSE-305-G

Time allowed : 3 hours]   [Maximum marks : 75

Note : *Question no.* **1** *is compulsory. Attempt* **five** *questions in total, selecting* **one** *question from each section.*

1. (a) Draw a diagram of Mealy and a Moore machine containing input alphabets 0 and 1. Also process the string 111011 on given diagrams.

   (b) Design a finite automata (transition diagram only, no explanation needed) to accept the language $L = \{\in, b, bb, aaab, abaa, \ldots\ldots\}$.

   (c) Can we use pumping lemma to show that the language is regular ? Justify your answer.

   (d) Which machine has more computing power Pushdown automata or Turing Machine. Justify your answer.

   (e) What does a move states in Turing Machine ? Explain with the help of example.

   (f) Compare the heads (associated with tapes) of FA, PDA and TM and write the comparisons in tabular form only. $6\times2.5=15$

Section-A

2. (a) Minimize the given Automata (by using equivalence method only i.e. $\pi 0, \pi 1, \pi 2$ method). 8
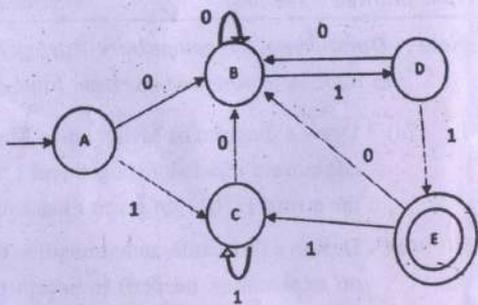
(b) M= $(\{q_1, q_2, q_3\}, \{a, b\}, \delta, q_1, \{q_3\})$ is a NDFA, where δ is given by :

$\delta(q_1, a) = \{ q_1 \}$, $\delta(q_1, b) = \{q_2, q_3\}$

$\delta(q_2, a) = \{ q_1, q_2\}$, $\delta(q_2, b) = q_2$

$\delta(q_1, a) = \{ q_2 \}$, $\delta(q_3, b) = \{q_1, q_2\}$

Construct an equivalent DFA by converting the states into substates method only. 7

3. (a) Explain the properties and limitations of finite automata. 7

(b) Construct a DFA (transition diagram only) which accept the language/strings 4

   L = {01, 101, 001, 1001, 1101, 0001,.....}

(c) Construct a DFA (transition diagram only) which accept the language/strings. 4

   L= {1, 1111, 111111, 11111111,......}

Section-B

4. (a) Pumping lemma for regular languages. 7

(b) Construct a DFA for the regular expression

   $(a + bb)^* (a^* + \Lambda)$ 8

5. (a) Find regular expression for the given diagram : 8
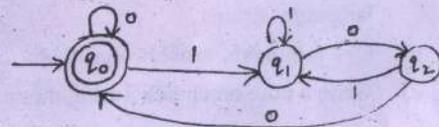
(b) Show that L = $\{a^n b^n \mid n \geq 1\}$ is not regular. 7

Section-C

6. (a) Construct a PDA (Transition table only) and show the processing of following language / strings on the designed PDA, the strings are L={abba, ababa, babab and baab, ...} 11

(b) Write the relation between different types of grammar. 4

7. (a) Convert the following CFG in CNF : 7

S → aA | bB

A → aAA | bS | a

B → aB | aS | a

(b) Construct a PDA (transition table and diagram both) to accept the language

L={aba, aabbbaa, aaabbaaaa, aaaabbaaaaa, aaaaabbbbaaaaa, ...} 8

Section-D

8. (a) Design a Turing machine to accept the language/strings

L = {ε, aa, bb, abab, aabb, baab, ...} 5

(b) Design a Turing Machine to accept the language/ strings

L = {ab, aabb, aaabbb, aaaabbbb, ...} 5

(c) Write a note on church Turing thesis. 5

9. (a) Design a Turing Machine to accept the language/strings L = {01, 0101, 010101,......} 3

(b) Design a Turing Machine to accept the language/strings

L = {abba, ababa, baab, abaaaba, babbbab, ...} 7

(c) Write a note on Universal Turing Machine. 5

B.Tech (CSE) 5th Semester (G-Scheme)

Examination, November-2023

DESIGN AND ANALYSIS OF ALGORITHMS

Paper-PCC-CSE-307-G

Time allowed : 3 hours]   *[Maximum marks : 75*

Note :   ***Question no. 1 is compulsory.** Attempt five questions in total, **first being compulsory** and selecting **one** from each unit.*

1.   (a)   Define Algorithm. What are its important characteristics ?   2.5

     (b)   Differentiate between Stack and Queue Data Structure.   2.5

     (c)   Differentiate between Greedy and Dynamic Programming.   2.5

     (d)   What is Branch and Bound Strategy ? How it is different from Backtracking ?   2.5

     (e)   What are P and NP classes ?   2.5

     (f)   Why NP Hard problems are difficult ?   2.5

Unit-I

2. Define the term Algorithm. How we determine the performance (time and space complexity) of an algorithm ? Explain by taking suitable example. 15

3. (a) What is Divide and Conquer Strategy ? How we sort a number series using Quick Sort by consideration of Divide and Conquer Strategy ? 10

   (b) Explain Strassen's Matrix Multiplication using Divide and Conquer Strategy. 5

Unit-II

4. What is Fractional Knapsack Problem ? How it is different from 0/1 Knapsack problem (Dynamic Programming) ? 15

5. Explain Travelling Salesperson Problem using Dynamic Programming. 15

Unit-III

6. Describe 8 Queens Problem using Backtracking Method. 15

7. Explain 0/1 Knapsack Problem using Branch and Bound Strategy. 15

Unit-IV

8. Explain Cook's Theorem in detail. 15

9. Explain the following :

   (a) NP complete Problem 5

   (b) NP Hard Problem 5

   (c) Relation between P and NP 5

B.Tech (CSE) 5th Semester (G Scheme)
Examination, November-2023
PROGRAMMING IN JAVA
Paper-PCC-CSE-309-G

Time allowed : 3 hours]   *[Maximum marks : 75*

*Note : Attempt **five** questions in all, selecting at least **one** question from each unit. **Question no. 1 is compulsory**. All questions carry equal marks.*

1. (a) Array

    (b) Polymorphism

    (c) Class and Method

    (d) Transactions

    (e) Explain Standard data types in Java.

    (f) IO applets   6×2.5=15

Unit-I

2. (a) Define Inheritance. Explain type of inheritance in java. How we can implement Multiple inheritance in Java with example.   10

    (b) Define control statements. Write a program to show the use of FOR and WHILE loop.   5

3. (a) Explain the structure of JVM. 8

(b) Explain Static method, Static variable and Block in detail with example. 7

Unit-II

4. (a) Describe polymorphism with help of example. 8

(b) Compare features of java with C++. 7

5. (a) Create a program in java to implement method overriding. 10

(b) Define bitwise operator in java. 5

Unit-III

6. (a) What is applet ? Explain life cycle of applet. 8

(b) Create Class Package and then create an instance of your own class outside the package. 7

7. (a) Explain the concept of thread in java. Explain with suitable example. 8

(b) What is exception handling in java ? Explain with suitable example. 7

Unit-IV

8. (a) Describe and design JDBC. 7

(b) Explain concept the JDBC programming concept in detail. 8

9. Write notes on : 15

(a) Query execution

(b) Features of java 9

B.Tech (CSE) (Elective-I) 5th Semester

(G-Scheme) Examination,

November-2023

SOFTWARE ENGINEERING

Paper-CSE-311-G

Time allowed : 3 hours]   *[Maximum marks : 75*

*Note : Attempt **five** questions in all, selecting at least **one** question from each unit. **Question no. 1 is compulsory**.*

1.   (a)   Define Software Engineering. $6 \times 2.5 = 15$

     (b)   Discuss function point metric of size estimation.

     (c)   Write short note on Data Dictionary.

     (d)   Explain software Re-engineering.

     (e)   Differentiate between Alpha and Beta testing.

     (f)   Write short note on Reliability.

Unit-I

2.   (a)   State and explain the Prototyping method of software development along with its advantages and disadvantages.   10

     (b)   Discuss the emergence of software engineering. 5

3232-P-3-Q-9 (23)   [P. T. O.

3. (a) Explain the different team structures used for software teams.   5

    (b) Explain in detail the COCOMO - estimation model in detail.   10

Unit-II

4. (a) What do you understand by partitioning ? How it is useful in software development.   8

    (b) Define functional modeling. Draw a DFD for Library Management.   7

5. Write short note on the following :   15

    (a) Abstraction

    (b) Cohesion

    (c) Information hiding

Unit-III

6. (a) Differentiate between White-Box and Black-Box testing techniques of s/w testing.

    (b) What do you understand by equivalence class partitioning, software testing technique ? Explain with example.   15

7. Write short note on the following :   15

    (a) What do you understand by Architectural Design ? How it is done ?

    (b) Discuss transform flow and transaction flow used for mapping requirements in software architecture.

Unit-IV

8. What do you understand by formal Technical Review ? Explain in detail how review meeting, record keeping and review reporting is done ?   15

9. Write short note on the following :

    (a) CASE and its building blocks   8

    (b) ISO 9000 quality standard   7