Roll No. ..... Total Pages : 3

BT-3/D-21 **43001**

DATABASE MANAGEMENT SYSTEM

Paper–CSE-201 E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) What are the different views of data and briefly explain database language and environment.

(b) Who is Database Administrator (DBA)? Write the responsibilities of DBA.

(c) Draw and explain Client/Server architecture. (7+7+6=20)

2. (a) Differentiate between :

(i) Single-valued and multi-valued attribute.

(ii) Primary key and Foreign key.

(iii) Total participation and Partial participation constraint.

(b) What is network data model? Write the advantages of network data model. (10+10=20)

UNIT–II

3. (a) What is meant by index-sequential files and B-tree index files? Explain with example.

(b) Write a detailed note on well formed formula and specifications. (10+10=20)

4. (a) What is need of relational algebra? Explain select, join, union and Cartesian product with illustration.

(b) Differentiate between tuple and domain relational calculus. (10+10=20)

UNIT–III

5. (a) How basic retrievals and modifications are done in a database using QBE language?

(b) What is functional dependency? Differentiate between full and partial functional dependency. (10+10=20)

6. (a) State the need for normalization of a database and explain the various normal forms (i.e. 2nd, 3rd and BCNF) with suitable examples.

(b) Write a note on join and multi-valued dependencies. (14+6=20)

UNIT–IV

7. (a) What do you understand by object identity and object structure in object-oriented databases?

(b) What is data warehouse? Write its important properties. How you integrate data warehouse with data mining? (10+10=20)

8. (a) What is lost-update and incorrect summary problem of concurrency? Elaborate.

(b) What is database recovery? Differentiate between deferred and immediate recovery. (10+10=20)

Roll No. ..... Total Pages : 2

BT-3/D-21 **43002**

DATA STRUCTURE
Paper–CSE-203 E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting atleast *one* question from each unit.

UNIT–I

1. Write an algorithen to multiply A[i, j] and B[j, k] matrics. 20

2. Write an algorithm to convert infix to postfix expression and apply this algo on "A + (B*C–(D/E^F)*G)*H". 20

UNIT–II

3. What is Linear Queue and write an algorithm to implement Circular Queue (initialize, insert, serach and delete operation) using array. 20

4. What is advantage of link list structure over array data structure. Write an program to insert and search in Double linked list. 20

UNIT–III

5. Write an algorithm to traverse node in pre-order and post order in binary tree. 20

6. What is AVL trees and also explain factor and rotation in AVL tree using examples. 20

UNIT–IV

7. What is difference between directed graphs. Write an program to implement Adjacency Matrix and Adjacency List in a case graph example. 20

8. Write an algorithm of insertion sort and its complexity and also explain it with the help of example. 20

Roll No. ..... Total Pages : 2

BT-3/D-21 **43003**

DISCRETE STRUCTURES

Paper–CSE 205E

Opt. (II)

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) Explain the following terms :

Combination of sets, Duality, finite and infinite sets, power sets, multi sets. 15

(b) Describe principle of inclusion and exclusion. 5

2. (a) Explain function and its types. 10

(b) Discuss cardinality and inverse relations. 10

UNIT–II

3. (a) There are 60 disks of which 10 are defective. Determine :

(i) in how many ways can we select 10 disks ?

(ii) in how many ways can we select 10 non-defective disks?

(iii) in how many ways can we select 10 disks containing exactly 3 defective disks ? 15

(b) How many permutations can be made out of the letter of words "COMPUTER"? 5

4. (a) Explain homogeneous solution and particular solution with the help of a suitable example. 15

(b) Describe the total solution of a recurrence relation using generating functions. 5

UNIT–III

5. (a) What are the elementary properties of algebric structures? 10

(b) Discuss the examples of monoid, submonoid, semigroup, group and rings. 10

6. (a) Explain Lanrange's theorem. 10

(b) Describe homomorphism, isomorphism and automorphism with example. 10

UNIT–IV

7. (a) Explain the following terms :

directed, undirected graph, path, circuit, subgraph. 10

(b) Explain Euler's formula. 10

8. (a) What do you understand by spanning trees and cut-sets? 10

(b) Describe binary tree traversals with the help of a suitable. 10

Roll No. ..... Total Pages : 3

BT-3/D-21 **43004**

INTERNET FUNDAMENTALS

Paper–CSE-207E

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) How labels are used to identify the contents of Web page? Briefly discuss the concept of Scalability and Internet culture. 10

(b) Define Intranet and Extranet. How Internet works? What are the implications of World Wide Wait Problem and Freedom of Expression? 10

2. (a) Briefly discuss the following : 10

(i) Communication software.

(ii) Business culture.

(iii) Internet congestion.

(b) Explain the following :

(i) Block diagram of IPv6.

(ii) Speed and time continuum. 10

UNIT–II

3. (a) Write short notes on the following :

(i) Search strategies.

(ii) Directories. 10

(b) What are plug-ins? Provide the name of three plug-ins and describe the purpose of each. Also give the name of three helper applications and explain their use. 10

4. (a) Explain the working of a Search Engine and Meta Search Engine with their block diagrams. 10

(b) Briefly discuss the following :

(i) Mirror site.

(ii) Coast-to-coast surfing. 10

UNIT–III

5. (a) Explain the following :

(i) Newsgroup.

(ii) Chat rooms.

(iii) SMTP.

(iv) Different MIME Types. 12

(b) Write the HTML code by Nested frames and Targeted hyperlinks. 8

6. (a) Write short note on the following :

(i) Online Reference Works.

(ii) Library Card Catalogue. 10

(b) Write full description and work flow mechanism of e-mail management. Also discuss their cost effective design paradigm. 10

UNIT–IV

7. (a) Why Hashing algorithms are useful for verifying message integrity? Why is there some controversy over Pretty Good Privacy (PGP)? 12

(b) What do you mean by IDS and Proxy server? Explain why IDS is preferred over Firewalls. 8

8. (a) What are web servers? How we start and stop IIS web server? Explain the certain directives used for IIS configuration. 10

(b) Write short notes on Encryption schemes and Risk analysis. 10

Roll No. ..... Total Pages : 2

BT-3/D-21 **43006**

ANALOG COMMUNICATION

Paper–ECE-203E

Opt. I

Time : Three Hours] [Maximum Marks : 100

Note : There is total *eight* questions. Each question carries equal marks. The candidate is required to attempt *five* questions selecting *one* question from each unit.

UNIT–I

1. (a) Define SNR and Noise Figure. Write note on the measurement and calculation of noise figure in a network. 10

(b) What are the various classification of noise? 10

2. (a) Determine noise bandwidth of parallel RLC filter having a 3-dB bandwidth B. 10

(b) Describe transmission of noise through linear system. 10

UNIT–II

3. (a) Define amplitude modulation, derive the expression for instantaneous value of an AM voltage and define the modulation index and sideband production in AM. 10

(b) With neat diagram explain the phase shift method for SSB generation. State the advantages and disadvantages of this method. 10

4. (a) Explain working of Envelope Detector with the help of waveform. The waveform $v(t) = (1 + m_a \cos w_m t) \cos w_c t$, with in a constant ($m_a \leq 1$), is applied to the diode detector. Show that, if the demodulator output is to follow the envelope of $v(t)$, it is required at any time to

$$\frac{1}{RC} = \frac{w_m . m_a}{\sqrt{1 - m_a^2}}$$

Where w_m = angular frequency of modulating signal
m_a = modulation index 12

(b) Explain with the help of wave forms modulation and demodulation of vestigial side band system. 8

UNIT–III

5. (a) An FM carrier is sinusoidal modulated. Determine those values of modulation index for which all the power will lie in the sidebands. 10

(b) Explain the direct method for generation of FM signal. State the limitations of direct method of FM generation. 10

6. (a) Draw the circuit diagram of a ratio detector and explain its operation. How is amplitude limiting obtained in this detector? 10

(b) Explain the comparison between the following :

(i) AM & FM Signals.

(ii) AM &NBFM Signals. 10

UNIT–IV

7. (a) Give block diagram of AM transmitter and explain the functions of its constituents. 10

(b) What are the main requirements of an ideal privacy device? Explain the principle of displaced speech-band privacy device used in radio communication. 10

8. Explain the following :

(a) Image signal rejection.

(b) AFC.

(c) AGC.

(d) Tracking and alignment of receivers. 20

Roll No. ..... Total Pages : 2

BT-3/D-21 **43080**

DISCRETE STRUCTURES
Paper–CSE-201N/IT-209N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) Prove that there are 2^n elements in the class of all subsets of a set of n elements. 5

(b) Determine whether or not $[(p \vee q) \wedge (\sim q)] \rightarrow p$ is a tautology or contradiction. 5

(c) Give a counter example to disprove following propositions :

$A \cup (B - C) = (A \cup B) - (A \cup C)$. 5

2. (a) State and prove Inclusion-Exclusion Principle. 8

(b) State and prove principal of mathematical induction. 7

UNIT–II

3. (a) If R is an equivalence relation on a set A, show that R^{-1} is also an equivalence relation on A. 8

(b) What is poset ? Find a compatible total ordering for the poset $(\{1, 2, 4, 5, 12, 20\}, |)$. 7

4. (a) Prove that $(D_{40}, \leq)$ is a lattice, where $\leq$ denotes divisibility relation. Also draw a hasse diagram of D_{40}. 8

(b) How relations and diagraphs can be represented on computers ? Explain. 7

UNIT–III

5. Solve the following recurrence relation using generating functions: $S(n) - 2S(n-1) - 3S(n-2) = 0$, $n \geq 2$ with $S(0) = 3$ and $S(1) = 1$. 15

6. (a) Determine if each function $f : A \to B$ is surjective

(i) $f(x) = -\sqrt{x}$, $A = \mathbb{R}^+$, $B = \mathbb{R}^-$.

(ii) $f(x) = 2^x$, $A = \mathbb{R}$, $B = R^+$ 8

(b) Find the number of different arrangements of the letters of the word REFERENCE. 7

UNIT–IV

7. (a) Let H be the subgroup and let K be a normal subgroup of group G. Prove that HK is a subgroup of G. 8

(b) Prove that every subgroup of a cyclic group is cyclic. 7

8. Write short notes on :

(a) Isomorphism.

(b) Homomorphism.

(c) Automorphism.

(d) Monoid.

(e) Group. 15

Roll No. ..... Total Pages : 2

BT-3/D-21 **43081**

DATA STRUCTURES

Paper-CSE-203N/IT-203N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) Explain the built-in and user defined data structures. (8)

(b) What do you understand by sparse matrices? Explain. (7)

2. (a) Write binary search algorithm. (8)

(b) Describe bubble, sort algorithm with the help of an example. (7)

UNIT–II

3. Explain the PUSH and POP operations of stack and write the algorithms for PUSH and POP operations. (15)

4. (a) Explain the circular queue and its applications. (10)

(b) What are the linear queue limitations? Explain. (5)

UNIT–III

5. (a) Explain the need of dynamic data structures. (8)

(b) Explain the basic operations on single linked list. (7)

6. (a) Write a short note on dynamic implementation of stacks. (8)

(b) Discuss primitive operations on doubly linked list. (7)

UNIT–IV

7. Explain the binary tree traversals with the help of a suitable example. (15)

8. Describe graph traversals with the help of an example. (15)

Roll No. ..... Total Pages : 2

BT-3/D-21 **43082**

DATA BASE MANAGEMENT SYSTEM

Paper : CSE-205N/IT-201N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt any *five* questions by selecting at least *one* question from each unit.

UNIT–I

1. Explain DBMS architecture in detail. (15)

2. (i) Who is DBA. Discuss the responsibilities of DBA.(7)

(ii) With example explain various mapping cardinalities, total and partial participation constraint in ER Model. (8)

UNIT–II

3. (i) What arte Aggregate functions in SQL. List any three aggregates functions. (8)

(ii) What are triggers? Write the syntax to create a trigger for each row. (7)

4. Write short notes on : DDL, DML, DCL. (15)

UNIT–III

5. What is normalization? Discuss the role of normalization. Explain 3NF, 4NF, 5NF with suitable example. (15)

6. (i) Discuss the main heuristic that are applied during query optimization to improve the processing of the query. (7)

(ii) Consider Schedule S with transaction T1 and T2. T1 transfer Rs. 150 from account A to C and T2 adds Rs. 50 into A. Prepare concurrent schedule with 2 phases locking protocol. (8)

UNIT–IV

7. (i) Write short note on Undo and Redo Logging. (7)

(ii) What is deadlock and how is it different from standard block situation. (8)

8. (i) Differentiate recoverability and serailizabilty. (7)

(ii) Write a detailed note on concurrency control by timestamps. (8)

Roll No. ..... Total Pages : 2

BT-3/D-21 **43083**

DIGITAL ELECTRONICS
Paper–ECE-207N / CSE-207N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. Convert the following numbers from decimal to binary : (15)

(a) $(194)_{10}$ to (_____)$_2$.

(b) $(192.25)_{10}$ (_____)$_2$.

(c) $(11010101)_2$ to (_____)$_{10}$.

(d) $(11000101.0101)_2$ to (_____)$_{10}$.

(e) $(1101110110100001)_2$ to (_____)$_{16}$.

2. Draw the minimized circuit using only NAND Gates for $Y(A, B, C, D) = \Sigma (1, 5, 6, 7, 11, 12, 13, 15)$ given in SOP form using K-map. (15)

UNIT–II

3. Design 16 : 1 Multiplexer using 2 : 1 Multiplexer. (15)

4. Explain CMOS invertor with its circuit and operation. Discuss its advantages over TT1. (15)

UNIT–III

5. (a) Design D and T Flip-Flop using, J-K Flip-Flop.

(b) Discuss Excitation table of J-K Flip-Flop. (5)

6. Design Mod-10 synchronous counter using D-Flip-Flop. (15)

UNIT–IV

7. Discuss and differentiate different types of memories. (15)

8. Differentiate PLD and FPGA. How FPGA designing is different from ASIC flow. (15)

Roll No. ..... Total Pages : 2

BT-3/D-21 **43084**

PROGRAMMING LANGUAGES

Paper–CSE-209 N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) Comment on the need of studying the programming languages. 7½

(b) What is meant by declarations? Describe the purpose for declarations. 7½

2. (a) What do you mean by attribute grammar? Provide suitable examples. 7½

(b) What is meant by Enumerations and Booleans? Explain along with their specifications. 7½

UNIT–II

3. (a) What are the problems faced when type checking is done in data structures? 7½

(b) Describe the various types of files along with major operations that can be performed on them. 7½

4. (a) What is a subprogram? How a subprogram can be used as an abstract operation? Explain using suitable example. 10

(b) Write a short note on evolution of data types. 5

UNIT–III

5. How the sequence control is handled within statements? Explain using suitable examples. 15

6. (a) Describe the various parameter passing techniques using suitable examples. 7½

(b) Differentiate between static and dynamic scope of data. 7½

UNIT–IV

7. What is meant by heap storage management? Explain in detail. 15

8. Differentiate between following :

(a) C & C++.

(b) Procedural and Non-procedural.

(c) Functional and object-oriented language. 15

Roll No. ..... Total Pages : 2

BT-3/D-21 **43131**

PRINCIPLES OF PROGRAMING LANGUAGES

Paper : ES-227-A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) Describe various types of translators and their mechanism of translation. 8

(b) What are merits and demerits of static and dynamic type checking? Explain. 7

2. (a) Explain in detail the design issues of character string type and enumeration types. 8

(b) What is BNF? Explain BNF using suitable example. 7

UNIT–II

3. (a) Define name and structure type compatibility. Explain their relative merits. 8

(b) What are unions and sets? Explain with examples. 7

4. (a) Explain about abstraction, encapsulation and information hiding. 7

(b) What is an overloaded subprogram? Explain with an example. 8

UNIT–III

5. (a) What is the difference between implicit and explicit sequence control? Explain using suitable examples. 8

(b) How is the sequence control carried out within arithmetic expression? Explain. 7

6. (a) What is exception handling? Discuss design issues of exception handling. 8

(b) Explain subprogram level concurrency with an example. 7

UNIT–IV

7. What is Heap-storage management? How can it be done using variable and fixed size elements? Explain. 15

8. (a) Differentiate between functional and object oriented programming languages. 8

(b) Explain system controlled storage management. 7

Roll No. ..... Total Pages : 2

BT-3/D-21 **43132**

DATA STRUCTURE AND ALGORITHMS
Paper-PC-CS201A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt any *five* questions by selecting at least *one* question from each unit.

UNIT–I

1. (i) Differentiate between linear and non linear data structures with example. (8)

(ii) Differentiate Recursive and Non recursive binary Search. (7)

2. (i) Differentiate between linear and searching algorithm. (8)

(ii) Discuss various steps involved in Bubble sort with suitable example. (7)

UNIT–II

3. (i) Write algorithm to insert and delete elements in stack. (8)

(ii) Discuss various steps involved in Priority queue. (7)

4. (i) Write prefix and postfix expression for (A – B/C + E)/ (A + B). (8)

(ii) Discuss various applications of stack and queue. (7)

UNIT–III

5. (i) Write algorithm for insert and delete an element from a linked list. (8)

(ii) How stack and queue are dynamically implemented. (7)

6. (i) Write algorithm insert and delete elements in doubly link list. (8)

(ii) Differentiate Static and dynamic implementation of link list. (7)

UNIT–IV

7. (i) Write properties of AVL tree. Make an AVL tree having elements 5, 10, 20, 30, 40, 45, 50, 60 and 70. (8)

(ii) Write algorithm to traversal in a binary tree with example. (7)

8. (i) Compare Prim's and Kruskal's algorithm with suitable example. (8)

(ii) Write algorithm for balanced multi way search trees. (7)

Roll No. ..... Total Pages : 3

BT-3/D-21 **43133**

DIGITAL ELECTRONICS

Paper–ES-207A/ES-205A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) Prove the following using boolan algebric theorems :

$$\bar{A}BC + A\bar{B}C + AB\bar{C} + ABC = AB + BC + CA$$

$$(A+B)(C+D) = \overline{\overline{(A+B)} + \overline{(C+D)}} \quad 5$$

(b) Reduce the following expressions using K-Map:

(i) $F = \Pi\, M(1, 2, 5, 6, 8, 9, 10)$

(ii) $f = \Sigma(0, 1, 4, 5, 7, 13, 14, 15)$.

Realise the obtained expressions using NAND/NOR logic. 10

2. (a) Explain the working of TTL NAND gate. Also explain Tristate logic. 9

(b) Explain how CMOS logic gates can be interfaced with TTL logic gates. 6

UNIT–II

3. (a) Design a full subtractor. 5

(b) State and explain the working of four bit BCD adder with its logic diagram. 10

4. (a) What is multiplexer? Explain working of 8 : 1 Multiplexer. How can 16:1 MUX be designed using 8 : 1 Mux and OR gate? 8

(b) Design an even parity checker. 4

(c) Design a two bit comparator. 3

UNIT–III

5. (a) Differentiate between : 3

(i) Sequential circuits and Combinational circuits.

(ii) Level Trigerring and Edge Triggering.

(b) What are flip-flops? Explain race around condition of JK flip-flop. Also describe how is it removed by master slave flipflop? 6

(c) Convert J-K flip-flop to D Flip-Flop. 6

6. (a) Design a decade synchronous counter. 9

(b) Design a bidirectional shift register. Explain its working. 6

UNIT–IV

7. (a) Write down the characteristics of D/A converters. Explain them. 6

(b) Explain the working of dual slope ADC. 9

8. (a) Write note on ROM. Explain with the help of timing diagrams the read and write operation occurring in semiconductor memory. 10

(b) Differentiate between PAL and PLA. 5

Roll No. ..... Total Pages : 2

BT-3/D-21 **43134**

OBJECT ORIENTED PROGRAMMING
Paper–PC-CS-203

Time : Three Hours] [Maximum Marks : 75

Note : All questions carry equal marks. Attempt any *five* questions in all.

1. (a) What is an inline substitution?

(b) What is meant by break statement ? How it is involved in constructing a multiway switch-case structure ?

2. (a) What are destructors. When they are called and what is their utility?

(b) In what way destructor is different from delete operator?

3. (a) How can private members be accessed using pointers ?

(b) What is the difference between array of pointers and pointer to the array?

4. (a) Why is the "assignment" operator function not inherited. Explain.

(b) Under what circumstances overloading using friend function becomes necessary ?

5. (a) Write an object oriented program in C++ to read set of lines and find out the number of characters, words and lines in a given text.

(b) What is the difference between early binding and late binding in C++?

6. (a) What are the differences between static and dynamic memory ?

(b) What is inheritance ? How does inheritance influence the size and functionality of derived class objects ?

7. (a) Explain the concept of Virtual and Pure Virtual Functions with the help of examples.

(b) What is exception handling ? What will happen if an exception is thrown for which no matching catch() block is defined ?

8. (a) Explain how array of class objects can be stored and retreived from a file ?

(b) What is a Template? What is the difference between template and macros. Create a template for displaying the reverse of string function.

Roll No..... **Total No. of Page(s): 2**

BT-3/ D-21: 43135

BS-205 A : Mathematics-III

Time: 3 Hours] **[Max. Marks: 75**

Note: Attempt any five questions.

1 (a) Test the convergence of $\sum_{n=1}^{\infty}\left(\frac{(n+1)(n+2)}{n^2\sqrt{n}}\right)$

(b) Discuss the convergence or divergence of the series

$$\frac{x}{1.2}+\frac{x^2}{2.3}+\frac{x^3}{3.4}+\cdots \qquad x>0$$

2 (a) Expand $f(x)=x\sin x$ as a Fourier series in $(0,2\pi)$.

(b) Find the half -range sine series for $f(x)=x(\pi-x)$ in the interval $(0,\pi)$ and deduce that

$$\frac{1}{1^3}-\frac{1}{3^3}+\frac{1}{5^3}-\frac{1}{7^3}+--=\frac{\pi}{32}$$

3 (a) Solve $(x^2y-2xy^2)\,dx-(x^3-3x^2y)\,dy=0$ using exact differential equation.

(b) Solve the differential equation

$$x^2\left(\frac{dy}{dx}\right)^2+xy\frac{dy}{dx}-6y^2=0$$

4 (a) Solve $\frac{d^3y}{dx^3}-6\frac{d^2y}{dx^2}+11\frac{dy}{dx}-6y=e^{2x}$

(b) Solve by the method of variation of parameters:

$$\frac{d^2y}{dx^2}-2\frac{dy}{dx}=e^x\sin x$$

5 (a) Change the order of integration in the interval:

$$\int_0^{4a}\int_{\frac{x^2}{4a}}^{2(ax)^{\frac{1}{2}}}dy\,dx$$

(b) Show that area between the parabolas $y^2=4ax$ and $x^2=4ay$ is

$$\frac{16}{3}a^2$$

6 (a) Evaluate

$$\int_{1}^{e}\int_{1}^{\log y}\int_{1}^{e^x} \log z \, dz \, dx \, dy$$

(b) Find the volume of the ellipsoid $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$

7 (a) If $\vec{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$, show that $\Delta r^n = nr^{n-2}\vec{r}$

(b) Prove that $\nabla^2 f(r) = f''(r) + \frac{2}{r}f'(r)$

8 (a) Evaluate the line integral $\int_C (x^2 + xy)\,dx + (x^2 + y^2)\,dy$,

where C is the square formed by the lines $x = \pm 1, y = \pm 1$

(b) Verify Green's Theorem for $\oint_c [(xy + y^2)\,dx + x^2\,dy]$,

where c is bounded by $y = x$ and $y = x^2$.

Roll No. ..... Total Pages : 2

BT-3/D-21 **43136**

BUSINESS INTELLIGENCE AND ENTREPRENEURSHIP

Paper–HM-902 A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions, selecting minimum *one* question from each unit.

UNIT–I

1. Which economic and non-economic factors affect entrepreneurship and its competencies in India?

2. Which important qualities and pre-requisites are required to become a victorious entrepreneur in present competitive and turbulent business environment?

UNIT–II

3. How project planning and scheduling can be done through networking techniques?

4. What are the pertinent features of an appropriate business idea? Why feasibility study is necessary to conduct?

UNIT–III

5. What is the role of small-scale industries in economic development of India?

6. Which MSME schemes are available in India and which challenges are faced by entrepreneurs while availing such schemes?

UNIT–IV

7. What is the role of State financial corporation and venture capital in supporting entrepreneurs/small business in India?

8. What are the requirements for formation of private/public limited company? How can an engineering graduate start any business entity?

Roll No. ..... Total Page : 2

BT–5/D–21 **45001**

DESIGN & ANALYSIS OF ALGORITHMS

Paper–CSE–301

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) What is Hashing Data structure and how the hash table is generated? 8,7

   (b) What are the advantages of Linked list Data structure over array Data structure? 5

2. Write a Quick sort Algorithm for sorting in increasing order and explain it with example. 15,5

UNIT–II

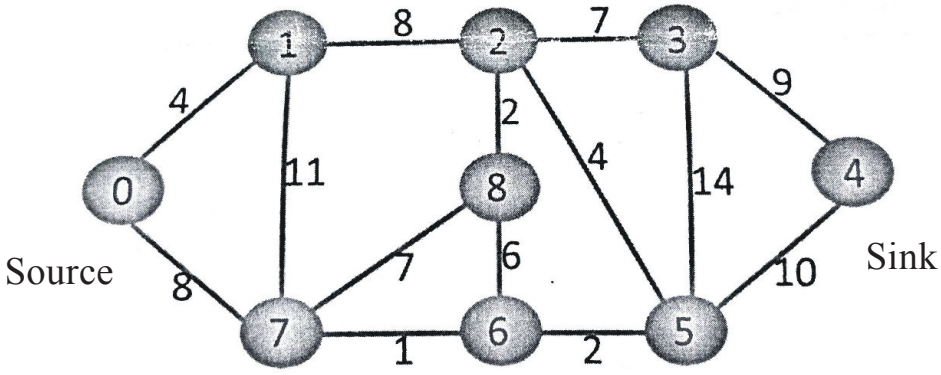
3. Write an algorithm to find Longest common subsequeance of any two numbers and try to analyse this algo. 15,5

4. What is Binomial Heap and explain the Union operation in Binomial Heap with the help of example. 15,5

UNIT–III

5. Write Johnson's algorithm for All-pairs shortest paths and explain it with example. 15,5

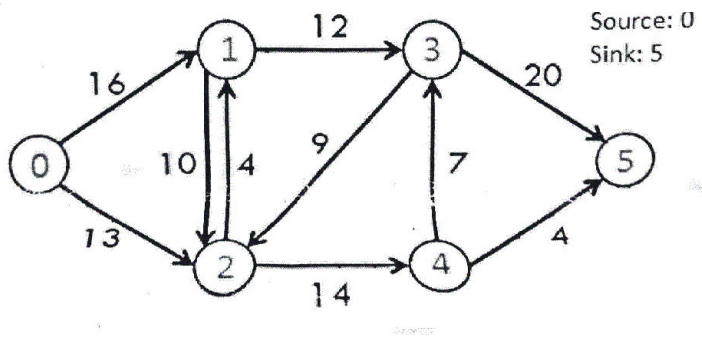
6. What is prim's MST Algorithm and solve the below problem with the help of prim's MST Algorithm. 15,5



UNIT–IV

7. What is a Comparator and writs its function. Also write the different properites of comparision networks. 20

8. What is Ford-Fulkerson Algorithm for Maximum Flow and find the maximum possible flow from 0 to 5th node. 20



Roll No. ..... Total Page : 2

BT–5/D–21 **45002**

COMPUTER NETWORKS

Paper–CSE–303

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Describe along with a sketch various network topologies and mention the type of Networks for which they are suitable.

   (b) What is the difference between Switching and Multiplexing? Describe one technique each for switching and multiplexing.

2. List the layers of OSI reference model and describe the functions of each layer. Also bring out a distinction between OSI reference model and TCP/IP protocol suite.

UNIT–II

3. Give a brief description of the following protocols :

   (a) HDLC (b) PPP

   (c) ARQ.

4. Distinguish between :

   (a) Slotted ALOHA and CSMA/CD protocols.

   (b) FDMA, TDMA and CDMA.

UNIT–III

5. (a) Bring out a distinction between Datagram and Virtual Circuit switching

   (b) Explain the Link State routing algorithm and describe the role of following in the algorithm.

6. What is the difference between Quality of Service and Congestion Control? Describe one technique for each.

UNIT–IV

7. What is the Frame format and addressing hierarchy followed by the IP protocol? What is subnet addressing and subnet mask? How is CIDR related to class C addressing?

8. Bring out a distinctive description of the following Internet protocols :

   (a) ARP and RARP

   (b) TCP and UDP

   (c) ICMP and DHCP.

Roll No. ..... Total Pages : 1

BT-5/D-21 **45003**

AUTOMATA THEORY

Paper–CSE-305

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. (a) Explain Non-deterministic finite Automata (NDFA). 10

   (b) Describe regular expression. 10

2. (a) Explain Regular expression conversion and vice-versa. 10

   (b) Discuss the equivalence of finite automata and expression. 10

UNIT-II

3. (a) Describe properties and limitations of FSM. 10

   (b) Explain conversion of NFA and DFA by Arden's method. 10

4. (a) Write a short note on closure properties of regular sets. 10

   (b) Write the applications of the pumping Lemma. 10

UNIT-III

5. (a) Explain Chomsky Normal Form (CNF). 10

   (b) Explain context free and context sensitive Grammar with the help of suitable examples. 10

6. Describe Push-down machines and its applications. 20

UNIT-IV

7. (a) Explain deterministic and non-deterministic Turing machines. 10

   (b) Write a short note on Halting problem of T. M. 10

8. (a) Explain Primitive Recursive functions. 10

   (b) Write a short note on PCP problem. 10

Roll No. ..... Total Page : 1

BT–5/D–21 **45004**

OPERATING SYSTEM

Option–II

Paper–CSE–307

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Explain the characteristics of Operating systems. 8

   (b) Write a short note on threading. 7

2. (a) Discuss directory and file protection mechanisms. 8

   (b) Explain round robin CPU scheduling with the help of a suitable example. 7

UNIT–II

3. (a) Differentiate between segmentation and fragmentation. 8

   (b) Explain the concept of demand paging. 7

4. (a) Write a short note on device management. 8

   (b) Explain the Thrashing. 7

UNIT–III

5. (a) Explain the four necessary conditions for a deadlock to occur. 8

   (b) Discuss the deadlock prevention. 7

6. (a) What is meant by critical section problem? 8

   (b) Write a short note on inter-process communications. 7

UNIT–IV

7. Explain the file system and interrupt mechanism of DOS. 15

8. Explain the Storage management and file system of UNIX. 15

Roll No. ..... Total Pages : 2

BT-5/D-21 **45043**

FUNDAMENTAL OF MANAGEMENT

Paper–HUT-302 E

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. Explain/Answer the following questions in up to 200 words each: 20

   (a) Various functions of financial executives

   (b) Any two tools of financial planning

   (c) Need of holding working capital and types of working capital.

   (d) Factors affecting requirement of working capital.

2. What do you mean by the term 'capital structure'? What are features of an optimum capital structure? Also describe factors affecting choice of capital structure. 20

UNIT-II

3. What do you mean by human resource management? Differentiate between HRD and HRM. Explain operative functions of human resource manager. 20

4. Explain the objectives and process of job analysis. Differentiate job description and job specification. 20

UNIT-III

5. What are functions of production management? Explain the meaning and various stages of Production Planning and Control. 20

6. Elaborate various techniques of work measurement. What are the steps involved in work measurement? Explain briefly giving example. 20

UNIT-IV

7. "The 7 Ps of marketing give the marketer a framework to use in his/her markets planning and essential strategy to effectively promote to his/her target market." Comment on this statement by elaborating concept, need and essential elements of marketing mix. 20

8. Describe the following: 20

   (a) Societal concept of marketing

   (b) Need and elements of marketing information system.

   (c) Any three modes of entry in to international markets.

Roll No. ..... Total Page : 1

BT–5/D–21 **45113**

AUTOMATA THEORY

Paper–CSE–301N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Explain the Applications of finite Automata. 5

   (b) Describe the DFA and FNA. 10

2. (a) Explain the closure properties of Regular Languages. 8

   (b) Discuss the Applications of Regular Expressions. 7

UNIT–II

3. Discuss the Pumping lemma for context free languages. 15

4. (a) Write a short note on Parse Trees. 7

   (b) Describe Chomsky Theorem. 8

UNIT–III

5. Explain the Mealey and Moore Machine. 15

6. Describe the Deterministic push down automata. 15

UNIT–IV

7. (a) Explain the Restricted Turing Machines. 7

   (b) Write a short note on designing of Turing machines. 8

8. Describe the Post's Correspondence Problem (PCP). 15

Roll No. ..... Total Page : 1

BT–5/D–21 **45114**

COMPUTER NETWORKS

Paper–CSE–303N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. What is Multiplexing? Discuss about Frequency Division, time Division and Wavelength Division Multiplexing. 15

2. What is Switching? Describe various types of Switching – Circuit Switching, Message Switching and Packet Switching. 15

UNIT–II

3. Explain sliding Window protocol. What is the difference between pure ALOHA and slotted ALOHA. 15

4. What are the differences between switches, bridges, router and gateway. Explain FDDI. 15

UNIT–III

5. Discuss about distance vector routing and link state routing. What is flooding? 15

6. What is IPV6 ? Differentiate between unicast and multicast routing protocols. 15

UNIT–IV

7. Explain Leaky bucket algorithm and Token bucket algoriothm. 15

8. What are Firewalls? Discuss about Public key encryption alogrithm and digital signatures. 15

Roll No. ..... Total Pages : 2

BT-5/D-21 **45115**

DESIGN AND ANALYSIS OF ALGORITHMS

Paper–CSE-305N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Discuss about the properties of Red-black trees. Suppose that a node x is inserted into a red-black tree with RB-insert and then is immediately deleted with RB-delete. Is the resulting red-black tree the same as the initial red-black tree ? Justify your answer. 15

2. What is Recurrence ? How is recursion-tree method solve the Recurrences ? 15

UNIT–II

3. How is Dynamic programming solve the problems by combining the solutions to subproblems ? Also state the matrix-chain multiplication problem to lower the cost. 15

4. How is a greedy approach applied to produce an optimal best solution to solve a problem of scheduling unit-time tasks with deadlines and penalties ? 15

UNIT–III

5. How is Bellman-Ford algorithm solve the single-source shortest-paths problem in which edge weights may be negative ? Explain. 15

6. How is Floyd-Warshall algorithm used as different dynamic programming formulation to solve the all-pairs shortest-paths problem on a directed graph ? Discuss with an example. 15

UNIT–IV

7. Describe the classical method of Ford and Fulkerson for finding maximum flow to compute the greatest rate to ship material from the source to the sink without violating any capacity constraints. 15

8. How are combinatorial problems solved with multiple-source and Multiple-sink maximum flow by maximum-bipartite-matching approach. Explain in detail. 15

Roll No. ..... Total Page : 1

BT–5/D–21 **45116**

COMPUTER ORGANIZATION AND ARCHITECTURE

Paper–CSE–307N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Explain Digital arithmetic operations using Booth's algorithm for addition and subtraction. 15

2. What do you understand by Floating point representation of numbers? Describe the various arithmetic operations performed using Floating point representation. 15

UNIT–II

3. What is Program interrupt? Discuss about the way the interrupt is handled by the Computer by describing the interrupt cycle by mean of flowchart. 15

4. What is Instruction cycle? Discuss about memory reference instructions and register reference instructions. 15

UNIT–III

5. What is Stack organization in the CPU? How is stack organization used for evaluating the arithmetic expressions written in postfix/reverse polish notation. Explain with example. 15

6. How are the operands chosen during program execution based on the addressing modes of the instruction? Explain with example. 15

UNIT–IV

7. What is Asynchronous Data transfer between two independent units? Discuss the various modes of Data transfer–Programmed I/O, Interrupt-initiated I/O and Direct Memory Access. 15

8. What is the difference between isolated I/O and Memory-mapped I/O? What are the advantages and disadvantages of each? 15

Roll No. ..... Total Pages : 1

BT-5/D-21 **45117**

SIMULATION & MODELING

Paper–CSE-309N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. What do you mean by system modelling in simulation. And explain the different methods to validate the simulation models. 15

2. What do you mean by Simulation. What are the advantages and limitations of Simulation. Why simulation is required for any system? 15

UNIT-II

3. Explain the model of chemical reactor system and its applications. 15

4. (a) What is difference between Monte Carlo and stochastic model of simulation with the help of example.

   (b) Write a method to generate random number. 15

UNIT-III

5. Explain the simulation of two server system and write algorithm to implement two server Queue system . 15

6. What is PERT. Write an algo to find the time duration of completion of any project with the help of activity network diagram. 15

UNIT-IV

7. (a) Write an algorithm to generate random number using poisson distribution. 8

   (b) What are the basic requirements of Inventory system. 7

8. Design a model of Inventory System by taking a suitable example. Also find reorder point, reorder Quantity equation by simulation. 15

Roll No. ..... Total Page : 2

BT–5/D–21 **45168**

MICROPROCESSOR & INTERFACING

Paper–ES–301A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) How 8086 CLK and RESET signals are generated using 8284 ? Explain in detail? 9

   (b) Discuss the working of EU and BIU of 8086 Microprocessor. 6

2. (a) Draw and explain the relevant pin diagram for 8086 in minimum mode. 9

   (b) Discuss the WAIT state generation in 8026 Microprocessor. 6

UNIT–II

3. Interface the 8086 Microprocessor with two 16K × 16 EPROM chips and two 16K × 16 RAM chips. Draw the necessary block diagram for the support of your calculation. 15

4. Draw and discuss the read and write cycle timing diagram of 8086 in minimum mode. 15

UNIT–III

5. (a) Write as assembly language program to find any power of any number. 7

   (b) Discuss the following assemble directives : 8

   (i) ASSUME.

   (ii) SEGMENT.

6. What do you mean by instruction format? Explain the following instruction with the help of suitable example : 15

(i) ADC (ii) LEA (iii) PUSH (iv) INC

(iv) JNZ.

UNIT–IV

7. (a) Design 16 bit I/O port using 8255 and interfaces it with 8086 using I/O addressing. 7

(b) Explain with a neat diagram the interfacing of stepper motor to 8086 using 8255 in detail. 8

8. (a) Explain the structure of 8086 interrupt vector table with neat diagram. 6

(b) Discuss DMA with the help of lock diagram. 9

Roll No. ..... Total Page : 2

BT–5/D–21 **45169**

DATA BASE MANAGEMENT SYSTEM

Paper–PC–CS–301A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. What do you mean by DBMS. Explain three schema architecture of DBMS in detail? 15

2. Explain the following terms : 15

   (a) Primary key

   (b) Foreign key

   (c) Weak Entity and Strong Entity.

   (d) Derived attribute

   (e) Unique key.

UNIT–II

3. What is Relational calculus. Create table customer, Branch, Account, Loan, Borrower and Depositor. Present the following query using relational calculus and its result. 15

   (a) Find the loan number, branch, amount of loans of greater than or equal to 10000 amount.

   (b) Find the names of all Customers having a loan at the "ABC" branch.

   (c) Find the names of all Customers who have a loan and an account at the bank.

4. (a) Write a command in SQL to create table having (Id, name, date_of_joining, bank_name) 4

   (b) Write a command in SQL to change name where name is staring with K letter. 4

   (c) Create procedure to copy date from one table to other. 7

UNIT–III

5. (i) What do you mean by Functional dependency. Explain transitive and multi valued dependency with the help of example. 7

   (ii) Explain 3NF and Boyce codd Normal form with the help of example. 8

6. What is Concurrency control and recovery management. Explain lock based protocol and two phase locking techniques. 15

UNIT–IV

7. What is conflict Serializability and Enforcing Serializibility? Explain with the help of example. 15

8. What is Distributed database and what are different methods to resolve deadlock and also explain different transaction states with the help of flow diagram. 15

Roll No. ..... Total Page : 2

BT–5/D–21 **45170**

FORMAL LANGUAGE AND AUTOMATA THEORY

Paper–PC–CS–303A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Prove that the Language $A = \{0^n 1^n \mid n \geq 0\}$ is not regular using pumping lemma.

   (b) Prove that every NFA can be converted to an equivalent DFA that has a single accepting state.

2. Give state diagrams of DFAs recognizing the following languages over the alphabet {0, 1}.

   (a) {W | W contains at least two 0s and at most one 1}.

   (b) {W | W starts with 0 and has odd length, or starts with 1 and has even length}.

UNIT–II

3. (a) Show that the given language $\{a^i b^{2i} a^i \mid i \geq 0\}$. is not a CFL using the pumping lemma.

   (b) Describe the language generated by the CFG with productions $S \to ST \mid \wedge\ T \to aS \mid bT \mid b.$

4. (a) Let L be the language generated by the CFG with productions $S \to aSb \mid ab \mid SS.$ Show that no string in L begins with abb.

   (b) Draw an NFA accepting the language generated by the grammar with productions $S \to abA \mid bB \mid aba \quad A \to b \mid aB \mid bA \quad B \to aB \mid aA.$

UNIT–III

5. (a) Give a transition table for PDA that accept the language $\{a^i\ b^j \mid i \le j \le 2i\}$.

   (b) Construct a Mealy machine which can generate strings having EVEN and ODD numbers of 1's or 0's.

6. (a) Draw a PDA that accept the language :

   $\{0^i\ 1^j\ 2^k \mid i, j, k \ge 0 \text{ and } j = i \text{ or } j = k\}$.

   (b) Give a transition table for a deterministic PDA that accepts the language $\{a^i\ b^{i+j} a^j \mid i, j \ge 0\}$.

UNIT–IV

7. (a) Write down an unrestricted grammar that generate the language $\{a^n\ b^n\ a^n\ b^n \mid n \ge 0\}$.

   (b) State and explain Cook-Levin theorem.

8. (a) Show that the set of languages L over {0, 1} such that neither L nor L′ is recursively enumerable is uncountable.

   (b) Prove that language satisfiable (or the decision problem sat) is NP-complete.

Roll No. ..... Total Pages : 2

BT-5/D-21 **45171**

ESSENTIALS OF INFORMATION TECHNOLOGY

Paper–PC-CS-305A

Option–I

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit.

UNIT–I

1. (a) What is Package ? How do we add a class or an interface to a package ? Discuss the various levels of access protection available for packages and their implementation. 2,3,5

   (b) What is JVM ? Explain various features of JAVA ? 5

2. What is an exception ? Explain how exception handling mechanism can be used for debugging a program. List some of the most common types of exceptions that might occur in Java. Give examples. 15

UNIT–II

3. (a) What is Swing ? What are the advantages of Swing on AWT ? How do we use containers and components through swing ? Illustrate all with a simple program ? 10

   (b) Explain in brief

   (i) Combo Box (ii) Panel

   (iii) Scroll Panes (iv) Tabbed Panes. 5

4. How Applets are different from Applications Programs ? Develop an applet that receive one numeric value as input from the user and display factorial of that number on the screen. Write an HTML page and test the applet ? 15

UNIT–III

5. (a) What is Servlet ? What are the advantages of Servlet ? Explain its life cycle. 7

   (b) Explain the following with example :

   (i) Cookies. (ii) Session Tracking. 2×4=8

6. Write the steps to create and run servlet program. Explain with example. 15

UNIT–IV

7. What is JDBC ? Why it is needed ? Write Java code for establishing connection interface using SQL. 15

8. (a) Explain the terms Result Set Object and Result Set Meta data. 8

   (b) What are the steps to connect to database in JAVA ? 7

Roll No. ..... Total Pages : 2

BT-5/D-21 **45172**

COMPUTER ORGANIZATION & ARCHITECTURE

Paper–PC-CS-307A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. (a) Write down the algorithm and draw the flowchart for non-restoring division in which dividend (A)=101110 and divisor (B)=010111. 5

   (b) What is the impact of the cache on overall performance of the computer system? 5

   (c) Discuss about the virtual memory? Discuss about the mapping of virtual address to memory table. 5

2. (a) Discuss the logic of Von Neumann Architecture. Explain it with the help of suitable working diagram. List their merits and demerits. 5

   (b) Explain the basis for Booth's multiplication algorithm along with its constituent steps. What type of numbers it will work? What are the limitations of the same? 5

   (c) Differentiate between micro operation and macro operation with an example. 5

UNIT-II

3. (a) Explain the following with respect to logic micro operations: 8

   (i) selective set (ii) selective complement

   (iii) selective clear (iv) mask

   (b) What is the basic role of micro-program sequencer? Explain the working of micro-program sequencer. 7

4. (a) Mention the advantages and disadvantages of micro-programmed control unit and hardwired control unit. 8

(b) Explain the basic role of horizontal and vertical micro-programming. List various steps that are involved in these programming styles. 7

UNIT-III

5. (a) Identify the basic purpose of using Flynn's taxonomy. Examine all the taxonomies and models for Flynn's classification theory with reference to the computer architectures. 8

(b) What do you mean by addressing mode? Why addressing modes are used? Explain the following addressing modes with examples:

(i) Direct addressing mode

(ii) Immediate addressing mode

(iii) Register indirect addressing mode

(iv) Relative addressing mode. 7

6. (a) Describe the working architecture of a shared memory multiprocessor? 8

(b) Explain the fundamental differences among pipeline and vector processing with the help of their suitable working diagram. 7

UNIT-IV

7. (a) Identify the role of interrupts in computer organization and architecture. How can you justify Daisy chain priority is useful in priority interrupt. 5

(b) Discuss any five key differences between subroutine and interrupt service routines. 5

(c) Differentiate serial arbitration logic and parallel arbitration logic with neat sketches. 5

8. (a) What are handshaking signals? Explain the handshake control of data transfer during input and output operation. 8

(b) What is a parallel priority interrupt processing? Explain any parallel processing mechanism. 7

Roll No. ..... Total Pages : 2

BT-5/D-21 **45176**

ADVANCED ALGORITHMS

Paper–PE-CS-T 307A

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT-I

1. (a) Explain Big-oh, Big-omega and Big-theta notations of the complexity with suitable examples. 7

   (b) What is Binary search tree? Write down the insertion algorithm of Binary search tree and insert the following elements: 35, 29, 17, 44, 55, 67, 3, 2, 114, 55, 15, 28, 88, and 41. Also, explain the problem of skewness in BST. 8

2. (a) Solve the following recurrence relation using Master theorem: 7

   $T(n) = 2T(n/4) + \sqrt{\mathbf{n}}$

   (b) Using recursive tree method solve the following: 8

   $T(n) = T(n/10) + T(9n/10) + n$

UNIT-II

3. (a) What is Activity Selection problem? Solve following problem using greedy algorithm. Set of activity 8

   $S = \{a_1\ a_2, a_3, a_4, a_5, a_6, a_7, a_8, a_9, a_{10}, a_{11},\}$

l	1	2	3	4	5	6	7	8	9	10	11
s_i	1	3	0	5	3	5	6	8	8	2	12
f_i	4	5	6	7	8	9	10	11	12	13	14

   (b) Explain the fundamental steps of finding longest common subsequence using dynamic programming. Find LCS between two strings X=BACDB and Y=BDCB. 7

4. (a) Explain Strassen's algorithm to compute the matrix multiplication and analyze its complexity. Also multiply following matrix using Strassen's Algorithm. 8

$$X = \begin{bmatrix} 3 & 2 \\ 4 & 8 \end{bmatrix} \quad Y = \begin{bmatrix} 1 & 5 \\ 9 & 6 \end{bmatrix}$$

(b) Write Huffman code for following symbols 7

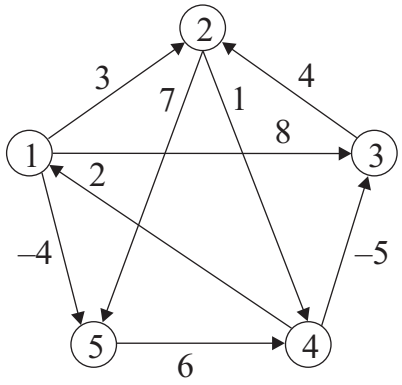
Symbol	A	B	C	D	E	F
Frequency	45	12	13	16	9	5

UNIT-III

5. (a) Define spanning tree. Write the pseudo code of the Kruskal algorithm for finding minimum spanning tree. Also analyze its complexity. 8

(b) What is topological sort? Explain with an example. 7

6. (a) Explain Floyd-Warshall Algorithm to find all pair shortest path. Find all pair shortest path of following problem also analyze its complexity. 8



(b) Write shortest path Dijkstra Algorithm and explain its steps. 7

UNIT-IV

7. (a) Write Naive string matching algorithm and explain its working with an example. 7

(b) Write Rabin-Karp string matching algorithm. 8

8. Explain different components of Knuth-Morris-Pratt algorithm and explain them by taking an example. 15

Roll No. ..... Total Pages : 3

BT-7/D-21 **47002**

WEB ENGINEERING

Paper–CSE-403

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) Identify the deign paradigms which are involved in organizing Web Sites and Intranets. 8

(b) Discuss various types of navigation systems. What are the ways by which the elegant navigation systems can be designed? 7

2. (a) How to determine that a website needs a search system? Also discuss the anatomy of search system. 8

(b) What do you mean by cohesive organization systems? How to create cohesive organization systems? 7

UNIT–II

3. (a) Describe the Cascading Style Sheet (CSS) with an Example use the Font Attributes and Text Attributes in the example. 5

(b) How frames and layer are used in HTML? Explain them using suitable examples of HTML script. 5

(c) Write a HTML program to print a paragraph with 4 sentences. Each sentence should made of different font. 5

4. (a) Write a program in HTML5 for the following :

(i) Canvas Element.

(ii) New input type attribute.

(iii) Add video and audio. 10

(b) Explain the concept of session storage object in HTML5? How to create and access? 5

UNIT–III

5. (a) Elaborate the concept of efficiency and optimization in CGI using PERL. What are the various architectural and coding guidelines made available for the CGI using PERL environment. Explain each of them. 8

(b) Thoroughly explain the architectural diagram and working of CGI. 7

6. (a) How to pass information using GET method, POST method, Checkbox data, Radio button data and Text Area Data to CGI Program using PERL? 10

(b) What are the various CGI Environment Variables? Briefly explain each of them. 5

UNIT–IV

7. (a) How to invoke JSP objects and components? Explain it with the help of real time example using JSP script. 8

(b) Write down the script to ensure the embedding of XML for data files in HTML file. 7

8. (a) How to establish the relationship between XML, HTML and SGML? Explain with the help of suitable example. 8

(b) Write down the technical differences among XSL and CSS in details with the help of scripting examples. 7

Roll No. ..... Total Pages : 3

BT-7/D-21 **47003**

STATISTICAL MODELS FOR COMPUTER SCIENCE

Paper : CSE-405

Time : Three Hours] [Maximum Marks : 100

Note : Attempt *five* questions in all selecting at least *one* question from each unit.

UNIT–I

1. (a) Define probability axioms. Prove the following relations.

$$P(A \cup B \cup C) = P(A) + P(B) + P(C) - P(A \cap B) - P(A \cap C) - P(B \cap C) + P(A \cap B \cap C) .$$ (10)

(b) Derive the expression for generalized Bernoulli trials. (10)

2. (a) Explain Baye's rule and derive an expression. (10)

(b) Suppose that a laboratory test to detect certain disease has the following statistics :

A = Tested person has the disease

B = Test result is positive.

$$P\left(\frac{B}{A}\right) = 0.99 \text{ and } P\left(\frac{B}{A}\right) = 0.005$$

and 0.1 percent of the population has the disease. What is the probability that a person has the disease given that the test result is positive? (10)

UNIT–II

3. (a) Derive the expression of Poisson distribution for the following parameters :

(i) PMF.

(ii) CDF.

(iii) First Moment.

(iv) Second Moment.

(v) Generating function representation. (10)

(b) Find the value of the constant K so that

$$f(x) = \{kx^2(1-x^2)\}, \quad 0 < x < 1$$

$$f(x) = 0, \quad \text{otherwise.}$$

is a proper density function of a continuous random variable. (10)

4. (a) Prove that there exists relationship between Poisson and exponential distribution. (10)

(b) For a continuous random variables X having exponential density function find :

(i) Expectation.

(ii) Variance.

(iii) Standard deviation. (10)

UNIT–III

5. (a) Explain the Bernoulli process in detail. (10)

(b) Prove that in $M|G|\infty$ Queuing system, number of jobs in the system, at time t has Poisson distribution. (10)

6. State and prove renewal theorem. (20)

UNIT–IV

7. Explain discrete parameter birth death process. (20)

8. (a) Explain Machine repairman model. (10)

(b) Derive all parameters of M|M|1 queuing system. (10)

Roll No. ..... Total Pages : 2

BT-7/D-21 **47147**

UNIX AND LINUX PROGRAMMING

Paper : CSE-401N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. What are the various shells in Unix system. Compare the various Unix commands like zip, unzip, pack, unpack, compress, uncompress. 15

2. Explain File-related system Calls like opening, creating, reading, writing, closing, accessing files. 15

UNIT–II

3. Discuss in detail about the actions with Stream Editor sed. How is awk and perl used for programming ? 15

4. What is files compression and how is X delta utility used for files compression. 15

UNIT–III

5. Describe about use of 'makefile' utility for managing large projects with suitable example. 15

6. How are the C compiler options used to compile the Unix based C programming projects. Illustrate with an example. 15

UNIT–IV

7. What is Backup and Restore utility in Unix/Linux Systems? Discuss in detail about signal handlers used in Linux processes. 15

8. Explain about Unix System Administration and Networking Tools like ping, telnet, ftp and firewalls. 15

Roll No. ..... Total Pages : 2

BT-7/D-21 **47148**

COMPUTER GRAPHICS AND ANIMATION

Paper-CSE-403N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (a) What is computer graphics? Discuss its major applications. (7)

(b) List & explain the operating characteristics for the following display devices :

(i) Light Pen.

(ii) Digitizers. (8)

2. (a) Write and explain the Bresenham's algorithm for line drawing. (7)

(b) Write and explain boundary filled algorithm. (8)

UNIT–II

3. Prove that the multiplication of transformation matrices for each of the following sequence of operations is commutative:

(i) Two successive rotations.

(ii) Two successive translations.

(iii) Two successive scalings. (15)

4. How can you perform.

(i) Scaling.

(ii) Translation.

(iii) Rotation.

(iv) Reflection, in three-dimensional transformation? (15)

UNIT–III

5. Explain following in detail :

(i) Parallel Projection.

(ii) Perspective Projection.

(iii) Depth cueing. (15)

6. Write and explain the Sutherland-Hodgeman algorithm for polygon clipping. (15)

UNIT–IV

7. What is Spline representation? Explain various type of Spline representations in detail. (15)

8. (a) Write and explain the depth-buffer algorithm for detecting visible surface. (7.5)

(b) Explain the working of scan line coherence algorithm using suitable example. (7.5)

Roll No. ..... Total Pages : 2

BT-7/D-21 **47151**

CRYPTOGRAPHY AND INFORMATION SECURITY

Paper–CSE-419N

Time : Three Hours] [Maximum Marks : 75

Note : Attempt any *five* questions out of *eight* questions, selecting at least *one* question from each unit.

UNIT–I

1. (a) Differentiate between Active Attacks and Passive Attacks. 7

(b) Compare stream cipher with block cipher with an example. 8

2. What is Cryptography. What are different types of cryptography and also explain in detail ? 15

UNIT–II

3. (a) Using RSA algorithm, Find n, d if $p = 11$, $q = 3$, $e = 3$. Encrypt "HelloWorld" Message. 6

(b) What is difference between discretionary and mandatory access control and also explain CPA-secure encryption with example ? 9

4. (a) Describe Triple DES and its applications. 7

(b) Explain Tiger Hash and Gear Hash Functions in detail with example. 8

UNIT–III

5. (a) Write about the usage of session keys, Public and Private keys in PGP. 8

(b) Give the structure of PGP message generation. Explain with a diagram. 7

6. (a) Briefly explain the Diffie Hellman Key Exchange algorithm. 7

(b) Analyze the Cryptographic algorithms used in S/MIME and Explain S/MIME certification processing. 8

UNIT–IV

7. Explain the process of deriving eighty 64-bitwords from 1024 bits for processing of a single blocks and also discuss single round function in SHA-512 algorithm. Show the values of W16, W17, W18 and W19. 15

8. Write short notes on :

(a) Signature based IDS.

(b) Profile based IDS.

(c) Rule based Intrusion Detection. 15

Roll No. ..... Total Pages : 2

BT-7/D-21 **47154**

SYSTEMS

Paper : CSE-425N/PE-CS-D-415A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all, selecting at least *one* question from each unit.

UNIT–I

1. (a) What are heuristics search techniques? Explain AO* algorithm with an example. (8)

(b) What is Min-Max search? Discuss its algorithm. (7)

2. Explain following knowledge representation techniques along with relative merits and demerits :

(a) Semantic Nets. (5)

(b) Frames. (5)

(c) Production Rules. (5)

UNIT–II

3. What is expert system? What are characteristics of an expert system? Discuss different types of problems handled by an expert system. (15)

4. What are different types of expert system building tools? Compare their features. (15)

UNIT–III

5. Discuss expert system development process. Discuss the criteria for selection of tools for building an expert system. (15)

6. Explain the process of acquiring, structuring and organizing knowledge for an expert system. (15)

UNIT–IV

7. (a) What are common pitfalls in planning? Discuss. (7)

(b) What do you mean by linear and non-linear planning? Explain Goa stack planning. (8)

8. What is domain expert? How can you deal with domain expert? Also, discuss difficulties faced while developing an expert system. (15)

Roll No..... Total No. of page(s): 1

BT-7/D-21: 47242
PE-CS-D403A:Software Verification and Validation and Testing

Time: 3 hrs] **[Max. Marks: 75**

Note: Attempt *five* questions in all, selecting at least *one* question from each unit. All questions carry equal marks.

UNIT-I

1. (a)	What are different phases in software development life cycle? Explain in brief.	07
(b)	What are verification and validation in software testing?	08
2. (a)	Elaborate the terms error, fault and failure in the context of software testing.	07
(b)	Explain the limitations of software testing with the help of real time examples.	08

UNIT-II

3. (a)	What is mutation testing? Elaborate in with the help of suitable test case.	07
(b)	Discuss boundary value analysis technique in detail.	08
4.	What is cyclomatic complexity? What is its importance? What are the properties of cyclomatic complexity? How would you calculate cyclomatic complexity?	15

UNIT-III

5. (a)	What is risk analysis in software testing and how to perform it?	07
(b)	Explain Regression testing in detail.	08
6. (a)	What is Integration testing and how do you write test cases for integration testing?	07
(b)	Elaborate the term debugging in brief. What are various steps involved in debugging?	08

UNIT-IV

7.	Discuss in detail different software quality models. What are their advantages?	15
8.	Explain the following: (i) Exploratory testing (ii) Stress testing (iii) Agile testing	15

Roll No. ..... Total Pages : 2

BT-7/D-21 **47246**

NEURAL NETWORK AND DEEP LEARNING

Paper : PE-CS-D411A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt any *five* questions selecting at least *one* from each unit.

UNIT–I

1. (a) Explain the basic working of a neuron. Are there any differences between ANN and biological neural, network? Discuss. (9)

(b) Describe supervised, unsupervised and reinforcement learning. (6)

2. (a) Explain single layer and multilayer feed forward neural networks. (8)

(b) What is learning rate? Describe different applications of neural networks. (7)

UNIT–II

3. (a) Describe the gradient descent behavior of back propagation network. Is it a supervised learning? Give supporting equations here. (9)

(b) Describe the XOR problem that Hopfield network is able to solve. Explain Hopfield architecture. (6)

4. (a) Explain associative memory network architecture and show its supervised learning. (9)

(b) What are counter propagation networks? Give its phases and basic design. (6)

UNIT–III

5. (a) Explain the working of Kohonan self organizing maps with the help of diagram and necessary equations and algorithm. (8)

(b) Discuss optical and holographic neural networks. How these neural networks work? (7)

6. (a) What is boltzman machine? What are its characteristics? How are these machines useful? (8)

(b) What is vector quantization architecture? What are its uses? Discuss. (7)

UNIT–IV

7. (a) How to calculate MSE in linear regression? What are underfitting & overfitting problems? (8)

(b) Explain the operation of recurrent neural networks. What are deep recurrent networks? (7)

8. (a) What are different applications of deep learning? Explain different available algorithms. (8)

(b) Describe how support vector machine can be used for both classification and regression. (7)

Roll No. ..... Total Pages : 2

BT-7/D-21 **47249**

CYBER LAW AND ETHICS

Paper-OE-CS-401A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *five* questions in all selecting at least *one* question from each unit. All questions carry equal marks.

UNIT–I

1. (i) Differentiate doctrinal approach and consensual approach with example. (8)

(ii) Discuss the significance of domain name in controlling cyber crime. (7)

2. (i) Discuss the working of courts with help of court hierarchy. (7)

(ii) Differentiate criminal jurisdiction and cyber jurisdiction with example. (8)

UNIT–II

3. (i) What is IT act 2000? What is the need of IT Act? What are its limitations? (8)

(ii) Explain the working digital signature in detail. (7)

4. (i) Write and explain various steps involved in Cryptographic algorithm. (8)

(ii) Discuss the role of Electronic governance in cyberspace. (7)

UNIT–III

5. (i) Differentiate copyright and patent with example. (8)

(ii) Discuss various methods to protect electronics database. (7)

6. Write short notes on:

(i) Indian Panel code.

(ii) Criminal Procedural Code. (2×7½=15)

UNIT–IV

7. (i) Discuss the significance of cyber ethics. (7)

(ii) Define Block chain. Discuss the role of chain in cyber ethics. (8)

8. (i) How Al can play an important role in Cyber ethics? (8)

(ii) Discuss various Ethics used for information society. (7)

Roll No. ..... Total Page : 2

BT–8/D–21 **48001**

NEURAL NETWORKS AND FUZZY LOGIC

Paper–CSE–402

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Draw the structure of a Biological Neuron and explain in detail. 10

   (b) What are the Applications of Neural Networks? 10

2. (a) Explain the concept of perceptron learning rule. 10

   (b) Differentiate between single layer and multi neural networks. 10

UNIT–II

3. (a) Define the Hopfield network. Discuss the architecture of Hopfield network in brief. 10

   (b) Explain the architecture of Kohonan networks in brief. 10

4. What is black propagation? Explain its training algorithm along with its applications. 20

UNIT–III

5. (a) What is Bidirectional associative memory? Elaborate its structure in brief. 10

   (b) Explain the Architecture of ART in brief. 10

6. (a) What are the advantages and limitations of ART. 10

   (b) How can an image be compressed using ART? Elaborate in brief. 10

UNIT–IV

7. Explain the following : 20

   (a) Cognitrons and Neocognitrons.

   (b) Volume holograms and vector matrix multipliers.

8. (a) Elaborate in brief the concept of genetic algorithm. 10

   (b) Define the term mutation and explain the necessity of using mutation. 10

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BT–8/D–21 **48002**

INTERACTIVE COMPUTER GRAPHICS

Paper–CSE–404

Time Allowed : 3 Hours] [Maximum Marks : 100

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. Write note on the following : 20

   (a) What is Frame Buffer? Explain. (b) Colour look-up tables.

   (c) Penetrating CRT Technique.

2. Explain the following : 20

   (a) Application of Computer Graphics.

   (b) Concept of Resolution and Aspect Ratio.

   (c) Plasma Panel.

UNIT–II

3. Draw Matrices for various 2D Transformation Operation : 20

   (a) Translation. (b) Scaling. (c) Rotation.

4. Discuss the DDA line drawing algorithm with suitable examples. 20

UNIT–III

5. What is Interactive Graphics? How it different from Non-Interactive Graphics? Discuss the different techniques for interact with graphics. 20

6. Difference between pointing and positioning devices. Discuss pointing and positioning techniques in Computer Graphics. 20

UNIT–IV

7. What is 3D transformation? Write various 3D Transformation with their matrix representation. 20

8. Explain the following : 20

   (a) Perspective Projection. (b) Parallel Projection.

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BT–8/D–21 **48006**

SOFTWARE VERIFICATION, VALIDATION AND TESTING

Paper–CSE–450

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Why is it impossible for a tester to find all the bugs in a system? Why might it not be necessary for a program to be completely free of defects before it is delivered to its customers? 8

   (b) With neat diagram, explain validation and Verification activities. 7

2. Develop a set of test cases for testing the program that determine the roots of a quadratic equation which read in three integers values range from [0,100] using cause effect graph. 15

UNIT–II

3. (a) What is the need of test case prioritization? Explain different types of prioritization techniques. 10

   (b) Discuss various Path testing techniques with example. 5

4. (a) What is meant by a program slice? Discuss about static and dynamic program slicing. 5

   (b) Explain the significance of control flow graph and cyclomatic complexity in white box testing technique with a pseudo code of sum and average of n numbers. 10

UNIT–III

5. (a) What are the objectives of Acceptance testing? Explain types of acceptance testing. 7

(b) What is Alpha and beta testing? What are few positive to having a beta test program for your software? 8

6. (a) What are the different strategies and tactics of testing the object oriented Software? 8

(b) Describe the purpose of confirmation and regression testing. 7

UNIT–IV

7. (a) What is the need of Automation? Discuss. 7

(b) Explain the characteristics of modern tools. 8

8. (a) Explain advantages and disadvantages of using tools. 7

(b) Discuss the Criterion for the selection of testing tools. 8

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BT–8/D–21 **48153**

NEURAL NETWORKS & FUZZY LOGIC

Paper–CSE–402N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. What are the Potential applications of Neural Networks? With the help of a neat diagram explain the analogy of a Biological neuron. 15

2. (a) Elaborate the fundamental aspects of Neural Network? Discuss single layer and Multi-layer neural networks. 8

   (b) Write a detailed note on perceptron learning and its representation. 7

UNIT–II

3. What is back propagation? With a schematic two-layer food forward neural network, derive its learning algorithm. Also discuss its learning difficulties and improvements. 15

4. (a) Explain the Architecture and the training algorithm used for Kohonen's SOMs. 8

   (b) State and prove bi-directional associative memory energy theorem. 7

UNIT–III

5. Discuss different classification of Adaptive Resonance Theory (ART). What are its advantages and limitations? How image is compressed using ART? 15

6. Explain the following :

(a) Holographic correlator. 8

(b) Cognitrons and Neocognitrons. 7

UNIT–IV

7. Design and develop pressure process control by fuzzy logic control model. Formulate necessary membership functions and required fuzzy rules for the application. 15

8. (a) Write a detailed note on Lattice of Fuzzy numbers and linguistic variables. 8

(b) Explain in detail the three steps involved in the genetic alogrithm with the help of an example. 7

Roll No..... **Total No. of Page(s): 1**

BT-8/ D-21: 48154

CSE 404N: Mobile Apps Development

Time: 3 Hours] **[Max. Marks: 75**

Note: Attempt five questions in all, selecting at least one question from each unit. Each question carry equal marks.

	UNIT -1	
Q1	Describe App User Interface Designing.	15
Q2	What are the steps for setting up the mobile app development environment along with an emulator? Explain.	15
	UNIT -2	
Q3	Explain the major building blocks of Android?	15
Q4	Describe the life cycle of an android activity with neat sketch.	15
	UNIT-3	
Q5	Write short note on the following terms: (a) Animation APIs (b) Location Awareness	15
Q6	(a)Describe Enterprise data access. (b)Write a short note on mobile database SQLite.	15
	UNIT- 4	
Q7	Describe debugging mobile apps with the help of suitable examples.	15
Q8	(a)Write a short note on test automation of Mobile apps.	8
	(b)Describe JUnit for Android.	7

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BT–8/D–21 **48155**

SOFTWARE TESTING (E–111)

Paper–CSE–412N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. What do you mean by verification and validation? Explain various activities involved in verification and validation in detail using suitable examples. 15

2. (a) What is Software testing? Design and explain a general model for Software testing. 7½

   (b) Explain the activities in SDLC in detail. 7½

UNIT–II

3. (a) A program calculates the total salary of an employee with the conditions that if the working hours are less than or equal to 48, then give normal salary. The hours over 48 on normal working days are calculated at the rate of 1.25 of the salary. However, on holidays or Sundays, the hours are calculated at the rate of 2.00 time of the salary. Design test cases using decision table testing. 5

   (b) A program has been designed to determine the nature of roots of a quadratic equation. The quadratic equation takes three input values from the range. [0, 100]. Design the test cases using cause-effect graphing technique. 10

4. What is control flow testing? Explain various types of control flow testing using suitable examples. 15

UNIT–III

5. What is meant by code coverage prioritization? Explain various techniques for code coverage prioritization in detail. 15

6. What is debugging? Explain the debugging process and various approaches to debugging in detail. 15

UNIT–IV

7. Explain the process of integration and system testing in case of object-oriented approach using suitable examples. 15

8. (a) What is post deployment testing? How are surveys helpful in post deployment testing? Explain the criteria that must be followed for deciding which suggested idea must be implemented. 7½

   (b) What is Database testing? Identify administrative and user operations of an online purchase of a Website. 7½

Roll No. ..... Total Page : 2

BT–8/D–21 **48159**

CLOUD COMPUTING

Paper–CSE–420N

Time Allowed : 3 Hours] [Maximum Marks : 75

Note : Attempt **five** questions in all, selecting at least **one** question from each Unit. All questions carry equal marks.

UNIT–I

1. (a) Elaborate the Historic evolution of cloud Computing. Discuss business drivers for adopting cloud Computing. 8

   (b) What is Utility Computing? Explain the Utility model for cloud Web service. 7

2. (a) What is meant by Clod Computing? Discuss the properties, characteristics and advantages of Cloud Computing. 8

   (b) Differentiate between cloud Computing, Grid Computing and Cluster Computing. 7

UNIT–II

3. (a) Explain briefly about various cloud services and their major providers at various levels. 8

   (b) Discuss the role of Networks and Protocols used in cloud computing. 7

4. (a) Design the Architecture of PaaS and SaaS in cloud computing? Also, explain the different categories of PaaS and SaaS with example. 8

   (b) Explain the Cloud deployment models, in detail. Outline their benefits and limitations while implementing and applications. 7

UNIT–III

5. (a) What kind of services are provided in cloud computing? Discuss about service level agreements. 8

(b) Write about Economics of scaling and cloud computing. Highlight the economic impact of cloud services. 7

6. (a) Write about Database and how Data is stored in cloud. 8

(b) Draw and explain Amazon cloud computing infrastructure. 7

UNIT–IV

7. (a) Discuss in detail the cloud security reference model and explain how cloud security is integrated into the design of application. 8

(b) Write note on Authentication in cloud computing. 7

8. (a) Write different types of internal security breaches in cloud computing. Also, explain the steps to reduce cloud security breaches. 8

(b) Briefly explain cloud contracting model. 7