CSE 3rd/ Lib

Roll No. ..... Total Pages : 03

BT-3/D-23 43138

PRINCIPLES OF PROGRAMMING LANGUAGES

ES-227/205A

Time : Three Hours] [Maximum Marks : 75

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

Unit I

1. (a) What are desirable characteristics of a good programming language ? Discuss. 5

   (b) What is meant by type checking ? Differentiate between static type checking and dynamic type checking. 5

   (c) Compare implicit and explicit type declarations with their merits and demerits. 5

2. (a) Explain in detail the design issues of Boolean types and enumeration types. 7

   (b) Define CFG. What does it mean for CFG to be ambiguous ? Give an example of left recursive rule of CFG. Also explain the significance of this rule. 8

Unit II

3. (a) Explain in detail arrays, indices, subscript bindings, and array categories. **8**

   (b) What do you understand by type equivalence ? Differentiate between name equivalence and structural equivalence along with their pros and cons. **7**

4. (a) Explain overloaded subprograms and generic subprograms with suitable examples. **5**

   (b) Differentiate between union and structure. **5**

   (c) Differentiate between procedural abstraction and data abstraction. **5**

Unit III

5. (a) What is the difference between "within statement" and "within expression" sequence control ? Explain using suitable examples. **8**

   (b) Explain different types of subprogram controls with suitable examples. **7**

6. (a) Explain about shared data dynamic and static scope with suitable examples. **8**

   (b) Explain different types of subprogram level concurrency control mechanisms. **7**

Unit IV

7. Explain about stack based and system controlled storage management. **15**

8. (a) Differentiate between procedural and non-procedural programming languages. **8**

   (b) Compare key features of C and C++ programming languages. **7**

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BT-3/D-23 43139

DATA STRUCTURE AND ALGORITHMS
PC-CS-201A

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. Differentiate between different Dynamic memory allocation methods used in C. Explain the problems associated with these methods and how to overcome those problems ? Also, implement a C Program to store and display record of an Employee dynamically and the record contains Name, age and ID. **15**

2. Answer the following questions related with sorting and searching :

   (a) Write down the pseudo code of Insertion sort and compute the time complexity of insertion sort in all the three cases i.e. worst case, average case and best case. **8**

(b) Explain step by step how to perform searching with Binary search if given data is : 15, 23, 45, 66, 78, 99, 125, 150, 266, 280 and searched item in the given array is 150. 7

Unit II

3. Consider the following arithmetic expression X, written in Infix notation. Translate X, into its equivalent Postfix expression with the help of Infix to Postfix expression algorithm.

X : K + L – M*N + (O^P) * W/U/V*T + Q

Also, discuss the advantages of Postfix and Prefix expressions over Infix expression. **15**

4. Discuss the difference between simple queue and circular queue. Also, consider any array and write the pseudo code for how elements are enqueued and dequeued from the circular queue along with their overflow and underflow conditions. **15**

Unit III

5. What is linked list ? Why do you add header node in the linked list? Also define circular linked list and write a function of how to add an element at the specified position and at the end of the circular linked list. **15**

6. (a) What is the difference between singly linked list and doubly linked list ? Also discuss pros and cons of these. **8**

(b) Write an algorithm to construct a simple linked list with 5 nodes and print the content of linked list starting from the given node. **7**

Unit IV

7. What is balanced multiway search tree ? Explain its construction and applications. Consider a graph with five vertices and six edges then explain how to find out Minimum Spanning Tree (MST). Also explain Warshal's algorithm. **15**

8. What is AVL tree ? Explain its need. With input data 125, 112, 117, 130, 15, 69, 115, 114, 137, 127, 140, 129, 128 depict step by step construction of an AVL Tree. Also, delete 140, 129, 128 from the AVL tree and draw the final one after deletion. **15**

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BT-3/D-23 **43140**

DIGITAL ELECTRONICS
ES-207A

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) Differentiate between the following : **5**

(i) Positive and negative logic

(ii) Positive and negative logic.

(b) List various logic operations. Mention gates corresponding to them. Explain, how NAND gate can be used to perform OR operation. **5**

(c) Convert decimal numbers into BCD (i) 46, (ii) 327.89, (iii) 20.30. **5**

2. (a) State and prove (i) Duality Theorem (ii) De-Morgan's theorem. **5**

(b) Write the rules of minimization using K-Map. Minimize the given expression using K-Map : $F(A, B, C, D) = \Sigma(1, 2, 4, 5, 7, 8, 9, 11, 13, 14)$. Realise the obtained expression using logic gates. **10**

Unit II

3. (a) Draw logic diagram of full adder. Explain its working. **8**

(b) Design an octal to binary encoder. **7**

4. (a) What is a multiplexer ? Explain working of an n : 1 multiplexer. **8**

(b) Design a 4 bit comparator. **7**

Unit III

5. (a) Differentiate between the following : **5**

(i) Latch and flip-flop

(ii) Level triggering and edge triggering.

(b) Explain working of JK flip-flop. Discuss race around problem of JK flip-flop. Also describe how Master-Slave flip-flop overcomes this problem. **10**

6. (a) Explain application of shift register as ring counter. **5**

(b) Design a synchronous mode 5 counter. Use JK flip-flops for designing the counter. **10**

Unit IV

7. Explain working of the following : **15**

   (i) R-2R ladder type DAC

   (ii) Successive Approximation type ADC.

8. (a) Draw diagram of a memory cell. Explain either read OR write operation with timing waveforms in memory cell. **10**

   (b) Write a note on ROM. **5**

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BT-3/D-23 43141

OBJECT ORIENTED PROGRAMMING
PC-CS-203A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions in all, selecting *one* question from each Unit I to Unit IV. All questions carry equal marks.

Unit I

1. What do you mean by Namespaces ? Explain containers, iterators and algorithms as important part of C++ standard library. Discuss the uses of C++ in GUI based applications. **15**

2. (a) What are abstract classes ? Discuss the use of public, private and protected access specifiers and their visibility in the class.

   (b) Reusability of classes is one of the major properties of OOP. How is it implemented in C++ ? **8+7=15**

Unit II

3. (a) Write a C++ program to calculate sum of distance and display the result using friend function.

(b) How is constructor different from the member function ? Discuss default constructor and parameterized constructor with the help of an example in C++. **8+7=15**

4. (a) Discuss the role of access specifiers in inheritance and show their visibility when they are inherited as public, private and protected.

(b) What is the need of inheritance ? Discuss Multiple inheritance in context of Object Oriented Programming. How do you override base class members in derived class ? **8+7=15**

Unit III

5. (a) State any *four* points of differentiation between compile time polymorphism and run time polymorphism.

(b) Differentiate between static and dynamic binding.

(c) State rules for virtual function. Explain the reason for making a class virtual with the help of example. **5+5+5=15**

6. (a) What is the need of overloading operators and functions ? Discuss rules for operator overloading.

(b) Write a C++ program to demonstrate the overloading of a unary operator. **8+7=15**

Unit IV

7. What is a stream ? Draw a neat and clean sketch to show the different streams available in C++. Give syntax of and explain various functions related to ifstream and ofstream classes: seekp(), getline(),hide(),tail(). **15**

8. (a) When do we need multiple catch blocks for a single try block ? Give an example. Also write down the scenario where we require user defined exceptions ?

   (b) Write a C++ program using function template to find the product of two integer or floating point type of data. **8+7=15**

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BT-3/D-23 43142

MATHEMATICS-III

BS-205A

Time : Three Hours] [Maximum Marks : 75

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

Section A

1. Examine the convergence of the series :

(i) $\frac{1}{2\sqrt{1}}+\frac{x^2}{3\sqrt{2}}+\frac{x^4}{4\sqrt{3}}+\frac{x^6}{5\sqrt{4}}+....\infty$

(ii) $\frac{1}{2}+\frac{2}{3}x+\left(\frac{3}{4}\right)^2 x^2+\left(\frac{4}{5}\right)^3 x^3+....\infty$

2. Prove that $x^2=\frac{\pi^2}{3}+4\sum_{n=1}^{\infty}(-1)^n\frac{\cos nx}{n^2}$, $-\pi < x < \pi$.

Hence show that :

$$\sum\frac{1}{n^2}=\frac{\pi^2}{6}.$$

Section B

3. Solve :

$$\frac{2x}{y^3}dx+\frac{\left(y^2-3x^2\right)}{y^4}dy=0.$$

4. Solve $x^2\frac{d^2y}{dx^2}-x\frac{dy}{dx}+y=\log x$ using the method variation of parameter for finding the particular integral.

Section C

5. Change the order of integration in $I=\int_0^{4a}\int_{x^2/4a}^{2\sqrt{ax}}dy\,dx$.

6. Evaluate $\iint_D (x+2y)dx\,dy$, where D is the region bounded by the parabolas $y = 2x^2$ and $y = 1 + x^2$.

Section D

7. For the function $\phi(x,y)=\frac{x}{x^2+y^2}$, find the magnitude of the directional derivative along a line making an angle 30 with the positive x-axis at (0, 2).

8. State Green's Theorem for a plane and verify the same for $\int_C \left(3x^2-8y^2\right)dx+(4y-6xy)dy$, where C is the boundary of the region bounded by $x \geq 0$, $y \leq 0$ and $2x - 3y = 6$.

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BT-3/D-23 43143

BUSINESS INTELLIGENCE AND ENTREPRENEURSHIP

HM-902A

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. Which traits/qualities are needed to become a successful entrepreneur ? Which are different entrepreneurial competencies ? Write some examples.
2. Which economic and non-economic factors affect the entrepreneurial growth and economic growth of a nation ?

Unit II

3. Which points are considered while preparing the project report ? Write on the methods of project appraisal.
4. What in steps the process of business idea development and implementation ? How an entrepreneur can overcome the challenges while implementing idea ?

Unit III

5. What is the role and contribution of MSMEs to the economic development of the developing nation like- India ?

6. 'Despite different schemes meant for SSI, the number of challenges being faced by SSIs are high.' Comment on the statement.

Unit IV

7. What is the role of SIDC and SIDBI towards promotion of Small scale business in India ?

8. For successful entrepreneurship, there is a need to respect Intellectual Property Rights. Why ? Justify with examples.

CSE5th/Lib

Roll No. ..... Total Pages : 03

BT-5/D-23 45168

MICROPROCESSOR AND INTERFACING

ES-301A

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). Describe the internal architecture of 8086 microprocessor with neat block diagram. **10**

   (b) Express how the physical address generated in 8086. **5**

2. (a) Examine all the signals available in the 8086 processor. **8**

   (b) How is the clock signal generated for 8086 ? Explain in detail. **7**

Unit II

3. (a) Describe the maximum mode configuration of 8086 with a neat diagram. Mention the functions of various signals. **7**

(b) For the given clock, draw the timing diagram for Read and write cycle in minimum mode operation and explain. **8**

4. (a) Interface the 8086 microprocessor with two 8K × 8 EPROM chips and two 8K × 8 RAM chips. Draw the necessary block diagram showing the interfacing of the memory with 8086. **10**

(b) Give the cell structures of PROM and E^2PROM memories. **5**

Unit III

5. (a) Define addressing mode. Describe in detail about each addressing mode with an example. **7**

(b) Mention an example for the 8086 instructions : **8**
AAA, CWD, JNBE, LAHF, MOVS, RCL, ROL, SAHF

6. (a) Generate the HEX codes for the following instructions : **8**

(i) Mov AX, BX

(ii) Mov AX, [BX] [SI].

(b) Write an assembly language program to search data in an array using 8086 instruction set. **7**

Unit IV

7. (a) Draw the complete interfacing diagram for interfacing an 8-bit channel A/D Converter like ADC 0808/0809 to an 8086 CPU. Test a sample, one at a time from each channel of analog inputs and display it at a special display port & wait for 2 seconds for each channel. **8**

   (b) Describe the 8255 programmable peripheral interface and its operating modes. What is the purpose of control word used in 8255 ? **7**

8. (a) Interface a typical 12-bit DAC with 8255 and write a program to generate a triangular waveform of period 12 ms. The CPU runs at 4 MHz clock frequency. **8**

   (b) Describe the internal architectural diagram of the 8237 and explain how it functions as a DMA controller. **7**

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BT-5/D-23 45169

DATABASE MANAGEMENT SYSTEMS

PC-CS-301A

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 do you mean by Data Models ? Explain Network, Hierarchical and Relational Model with the help of example. **5,10**

2. (a) What is Data independence and also explain why it is required ? **7**

   (b) Explain the following attributes : **8**

   (i) Strong Entity
   (ii) Weak Entity
   (iii) Derived attribute
   (iv) m : n relation with the help of an example.

Unit II

3. What do you mean by Relational Algebra ? Explain select operation, union operation and cartesian product operation with the help of example. **15**

4. (a) What is stored procedure ? Write a procedure to display record of all the students whose marks are greater than 70. **8**

   (b) Write a trigger that will be invoked automatically to insert the working_hours = 0 if someone tries to insert working – hours < 3. **7**

Unit III

5. What do you mean by normalization . Explain BCNF and 3NF and check whether any table data is in BCNF and 3NF with the help of example. **5,10**

6. What do you mean by concurrency control and recovery management ? Explain lock based protocol and two phase locking in detail. **5,10**

Unit IV

7. (a) What are different types of failures ? Explain different techniques of recovery. **5**

(b) Explain timestamp based concurrency control with the help of an example. **10**

8. (a) What do you mean by serializibility ? Explain view serialiazability in detail. **10**

(b) What do you mean by dead lock and explain commit and lock in detail with the help of an example. **5**

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BT-5/D-23 **45170**

FORMAL LANGUAGE & AUTOMATA THEORY
PC-CS-303A

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 concept of the 'epsilon' (ε) transition in an NFA and its significance.

(b) Provide an example of a regular grammar that generates the language of valid identifiers in a programming language. Explain, how the grammar enforces the rules for identifiers.

2. (a) Discuss the process of converting an NFA into an equivalent DFA (NFA to DFA conversion).

(b) Provide an example of a regular expression for a language that recognizes valid email addresses.

Unit II

3. (a) What is the Chomsky hierarchy ? Where do context-free languages fit within it ?

   (b) What is the Pumping Lemma for Regular Languages, and how is it used to prove that a language is not regular ?

4. (a) Explain, how CFGs are used in the syntax analysis phase of compilers. How can you convert a CFG into a parse tree or an abstract syntax tree ? Discuss.

   (b) What is the Greibach Normal Form (GNF) for a context-free grammar ? How does it differ from other normal forms like Chomsky Normal Form (CNF) ? Discuss.

Unit III

5. (a) Can you convert a Moore machine into an equivalent Mealy machine ? Provide an example of this conversion.

   (b) Describe the closure properties of context-free languages.

6. (a) Explain the differences between deterministic and non-deterministic PDAs in terms of language recognition and computational complexity.

(b) Describe the role of PDAs in parsing and interpreting programming languages. How do they help in syntax analysis and error checking ?

Unit IV

7. (a) How does Rice's Theorem relate to the Halting Problem and the decidability of specific properties of Turing machines ? Discuss.

   (b) How does the concept of non-deterministic polynomial time (NP) relate to Turing machines, and what is the significance of the P *vs.* NP problem ?

8. (a) Explain the reduction of the Halting Problem to the Post Correspondence Problem. How does this reduction demonstrate the undecidability of the Post Correspondence Problem ?

   (b) Describe the concept of a universal Turing machine, and how can it simulate the execution of any other Turing machine.

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BT-5/D-23 45171

ESSENTIAL OF INFORMATION TECHNOLOGY

PC-CS-305A

Time : Three Hours] [Maximum Marks : 75

Note : Attempt *Five* questions by selecting at least one question from each Unit.

Unit I

1. (a) Why multiple inheritance is not supported in Java ? How multiple inheritance is achieved in JAVA ? Explain with example. 8

   (b) Why are String objects immutable ? Write a program to create an immutable class ? Explain four methods of String and StringBuffer class. 7

2. (a) What are Constructors ? Explain various types of Constructors used in JAVA. 7

   (b) How do you deal with different exceptions in Java ? How do you create your own exception ? Explain with example. 8

Unit II

3. (a) What is Swing ? What are the advantages of swing on AWT ? **8**

   (b) How do we use containers and components through swing ? Illustrate all with a simple program. **7**

4. (a) Explain in brief : **10**

   (i) CheckBox

   (ii) Trees

   (iii) Scroll Panes

   (iv) Tabbed Panes

   (v) Tables

   (b) How applets are different from applications programs ? Draw a flow chart for life-cycle of Applet. **5**

Unit III

5. Explain Servlet life-cycle. Write the steps to create and run servlet program. Explain with example. **15**

6. (a) Explain GET and POST method for servlets with suitable example. **5**

   (b) Explain the following with example : **10**

   (i) Cookies

   (ii) Session Tracking

Unit IV

7. Define JDBC and mention the steps involved in JDBC connectivity. Explain various types of connection interface with example for data connectivity in JDBC. **15**

8. Explain the following : **5×3=15**
   (a) ArrayList
   (b) Hashmap
   (c) Set

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BT-5/D-23 **45172**

COMPUTER ORGANIZATION & ARCHITECTURE

PC-CS-307 A

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 are the key principles of Von Neumann architecture, and how do they influence the design of modern computers ? **8**

(b) Describe the Booth's algorithm for binary multiplication ? **7**

2. (a) Compare restoring and non-restoring algorithms for binary division. What are their advantages and disadvantages ? **10**

(b) What is memory hierarchy, and why is it important in computer systems ? **5**

Unit II

3. What do you mean by instruction cycle ? Differentiate between register reference instructions and memory reference instructions. Provide examples of each. **15**

4. (a) What is Interrupt ? Explain interrupt cycle with the help of flow chart. **8**

   (b) Explain the concept of a microprogrammed control organization. **7**

Unit III

5. Discuss various addressing modes commonly used in CPU instruction sets. How do different addressing modes impact program efficiency ? **15**

6. (a) Explain the fundamental features of CISC and RISC architectures. Compare the two architectures. **10**

   (b) Describe the concept of pipeline processing in CPU design. **5**

Unit IV

7. What is Direct Memory Access (DMA), and how does it offload data transfer tasks from the CPU ? Describe the role of a DMA controller in this process. **15**

8. (a) Compare programmed I/O and interrupt-driven I/O. What are the advantages and disadvantages of each method ? 8

(b) Differentiate between the I/O bus and the memory bus. What are the key distinctions in their functions and usage ? 7

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BT-5/D-23 45176

ADVANCED ALGORITHMS

PE-CS-T307A

Time : Three Hours] [Maximum Marks : 75

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

Unit I

1. (a) Write algorithm for binary search tree. Write the time complexity of binary search (all cases). 8

   (b) Discuss the various methods for solving Recurrence. 7

2. (a) Explain Master Theorem with suitable example. 7

   (b) Discuss the role of various notations used in algorithm analysis with example. 8

Unit II

3. (a) Write short note on activity selection problem. 7

   (b) What is knapsack problem ? How can it be resolved ? 8

4. (a) Write and discuss algorithm for matrix chain multiplication. 7

   (b) Define Hiring Problem. Discuss its probabilistic analysis. 8

Unit III

5. (a) Write and explain all pair shortest path-Floyd Warshall Algorithm. **7**

   (b) Differentiate DFS and BFS with suitable example. **8**

6. (a) Write and discuss the significance of Dijkstra's Algorithm **7**

   (b) Differentiate Kruskal and Prim algorithms with example. **8**

Unit IV

7. Which string is accepted by the finite automata and which string is not accepted by the finite automata ? Explain with suitable example. Discuss, how can we use a finite automaton to search a string ? **15**

8. Write and explain the following : **2×7.5=5**

   (i) Knuth-Morris-Pratt Algorithm.

   (ii) Rabin-Karp Algorithm.

CSE 7th/ Lib

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

BT-7/D-23 **47244**

SOFTWARE VERIFICATION & VALIDATION AND TESTING

Paper–PE-CS-D-403A

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) What is software testing, and why is it important in the software development process? Discuss.

   (b) Explain the difference between verification and validation in software testing.

2. (a) What is the difference between error, fault and failure? Discuss.

   (b) What is a fault of omission, and how does it differ from a fault of commission? Provide examples of situations where a fault of omission might have significant consequences.

UNIT–II

3. (a) What is boundary value analysis, and why is it important in software testing? How does boundary value analysis contribute to the overall test coverage of a software application? Discuss.

(b) What is mutation testing, and why is it considered a powerful technique for assessing the quality of test suites? Describe the difference between strong mutation and weak mutation testing strategies.

4. (a) Provide an example of cyclomatic complexity and how it is related to structural testing.

(b) What is equivalence class partitioning? How does equivalence class partitioning help in reducing the number of test cases while maintaining thorough test coverage? Discuss.

UNIT–III

5. (a) What are the primary objectives of regression testing? How do you prioritize test cases for regression testing when time and resources are limited? Discuss.

(b) What is integration testing? What types of bugs are detected by t? Discuss.

6. (a) Explain the difference between alpha testing and beta testing in the context of acceptance testing.

(b) What is unit testing, and why is it considered the foundation of the testing pyramid? How does it differ from integration testing and system testing? Discuss.

UNIT–IV

7. (a) What are the primary goals and objectives of stress testing? Explain the difference between stress testing and load testing.

(b) What is the McCall Quality Model, and what is its significance in software engineering? Describe the three main categories of factors in the McCall Quality Model.

8. (a) What is CMM? How does an organization typically begin its journey towards CMM maturity levels, and what are the initial steps? Discuss,

(b) How does extreme testing contribute to ensuring the robustness and resilience of a software system?

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BT-7/D-23 **47246**

NEURAL NETWORKS AND DEEP LEARNING

Paper–PE–CS–D411A

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 different learning mechanisms used in Artificial Neural Networks with the help of necessary diagrams. Illustrate the different steps involved in the training algorithm of Perceptron. 7

   (b) How is the training algorithm performed in back-propagation neural networks? With graphical representations, explain the activation functions used in Artificial Neural Networks. 8

2. (a) With the help of an example, state the role of bias in determining the net output of an Artificial Neural Network. 7

(b) What are the Applications of Artificial Neural Networks? Where can we apply pattern classification method? Explain the Evaluation of Artificial Neural Networks. 8

UNIT–II

3. (a) What do you mean by Backpropagation network architecture and Training Algorithms ? Justify with Example and diagram. 7

   (b) How is different Adaptive resonance theory networks architecture from perceptron network architecture ? Justify with suitable example. 8

4. (a) What are the stages involved in training a neural net using Back propagation algorithm ? Explain. Compare auto associative net and Hopfield net. 7

   (b) Write Short notes on the following: 2×4=8

   (i) Hebb Network Theory

   (ii) Counter Propagation Network Architecture

   (iii) Training Algorithms

   (iv) Unsupervised Neural Network.

UNIT–III

5. (a) Explain the architectures of popular self-organizing maps. Derive the training algorithm of Kohonen network. Also explain how SOMs can be used for data compression? 7

(b) Explain the Boltzman machine cognition network in Neural Network. Justify with example. 8

6. (a) What do you mean by Neocognitron network? Justify with Architecture and Algorithm. 7

(b) Write short notes on the following :

(i) Elctro-optical Multipliers

(ii) Holographic Correlators. 8

UNIT–IV

7. (a) Explain the working of Deep Learning forward Networks. Discuss the Components of CNN-Model. 7

(b) Explain Adaptive Learning rate related to Convolutional Neural Networks (CNN). Discuss the different steps involved in Natural Language Processing (NLP). 8

8. (a) Discuss any four regularization techniques in Deep Learning. 7

(b) What is the Goal of the Support Vector Machine (SVM)? How to compute the Margin ? 8

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BT–7/D-23 **47249**

CYBER LAW AND ETHICS

Paper–OE–CS–401A

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 the term Domain Name and explain its Legal & Technological significance. 15

2. Explain the following terms: 15

   (a) Hierarchy of Courts.

   (b) Consensual approach.

   (c) Internet as a tool for global access.

UNIT–II

3. Illustrate the concept of Digital Signature and explain the Legal recognition of Electronic records and Digital Signature. 15

4. What are the Limitations and Amendments of IT Act, 2000 ? 15

UNIT–III

5. What is the difference between Patent, Trademark and Copyright explain with the help of suitable examples ? 15

6. Explain the following terms: 15

   (a) Civil Procedure Code

   (b) Relevant sections of Reserve Bank of India Act

   (c) Relevant sections of Bankers book evidence Act.

UNIT–IV

7. Explain the term Cyber Ethics and write some ethics related to information society and Block Chain. 15

8. What is Cyber Law and explain its importance ? Also, Explain the need of Cyber Regulations. 15

CSE 8th/ Lib

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BT-8/D-23 **48245**

CLOUD COMPUTING

Paper–PE-CS-A402A

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) How do open standards play a crucial role in ensuring interoperability and flexibility in cloud computing? Provide one example of an open standard commonly used in the cloud computing industry. 08

(b) Name one popular cloud service provider that offers a range of cloud computing services and briefly describe one of their core services. 07

2. (a) By taking some real time practical examples, compare and contrast between cluster computing and grid computing. 08

(b) What are two benefits and two drawbacks of adopting cloud computing services for personal use or small businesses? 07

UNIT–II

3. (a) Briefly explain the differences between public, private, and hybrid cloud models, and provide one scenario where a business might prefer using a hybrid cloud? 08

   (b) What are the main differences between cloud computing architecture and traditional client-server computing architecture? Provide one advantage of each approach. 07

4. (a) Explain, in simple terms, how cloud computing works and why it is considered a scalable and cost-effective technology solution? 08

   (b) What are the essential characteristic of Platform as a Service (PasS) model and Infrastructure as a Service (IaaS)? 07

UNIT–III

5. (a) What is the purpose of a Service Level Agreement (SLA) in cloud computing, and why is it important for both cloud providers and cloud consumers? 08

   (b) How does cloud computing billing typically work, and why is accurate accounting important for organizations using cloud services? 07

6. (a) Could you provide a brief overview of a real-world use case or example where an organization successfully implemented Eucalyptus for their cloud computing needs? Highlight one key benefit they achieved. 08

(b) Define scalability. How does scalability play a key role in cloud services, and why is it beneficial for businesses using cloud computing? 07

UNIT–IV

7. (a) Identify the prime purpose of using data security and storage in cloud computing, and why is it important for cloud-based secure applications and data? 08

   (b) What is authentication in cloud security, and why is it a critical component for ensuring the security of cloud-based systems and data? 07

8. (a) What are some common data privacy and security concerns that organizations should address when adopting cloud computing services, and why is it important to mitigate these concerns? 08

   (b) Identify the major concerns that may arise due to division and replication of data in cloud computing for optimal performance and security. 07

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BT-8/D-23

CYBER SECURITY

Paper : OE-CS-402A

Time : Three Hours] [Maximum Marks : 75

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

UNIT–I

1. (a) What is the scope and nature of Cyber-Crimes? Explain different types of Cyber-Crimes.

(b) Define Cyber-Crimes. Discuss about cyber extortion and drug trafficking. 8+7=15

2. Discuss the following :

(a) Shannon's theory of confusion and diffusion.

(b) Differential and linear crypt analysis of DES. 8+7=15

UNIT-II

3. (a) Differentiate between MAC and Hash functions. Explain Secure Hash Algorithm (SHA_1).

(b) What are Digital Signature Standards (DSS)? Distinguish between direct and arbitrated digital signature. 8+7=15

4. (a) Define Kerberos. What 4 requirements were defined by Kerberos? In the content of Kerberos, what is realm?

(b) Explain the operation description of PGP. Why E-mail compatibility function in PGP needed? 8+7=15

UNIT-III

5. (a) Differentiate between active and passive attacks. Explain Cyber-Crimes prevention methods.

(b) Explore the mechanism for hardware protection and archival storage. 8+7=15

6. (a) Explain the technical details of firewall and describe any three types of firewall with neat diagram.

(b) Explain Secure Electronic transaction with neat diagram.

(c) Discuss three classes of intruder. Explain Intruder behaviour pattern. 5+5+5=15

UNIT–IV

7. (a) Discuss the historic background and need of digital forensic. Explain the challenges in digital forensic.

(b) Explain the different phases of digital forensic life cycle. Give a brief note on software support for digital forensic. 8+7=15

8. Why do we need cyber laws? Discuss cybercrimes scenario in Indian. Explain the provisions of Indian IT act against Cyber-Crimes. 15

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BT-8/D-23

WEB AND INTERNET TECHNOLOGY

Paper : OE-CS-410A

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 the Internet, and how does it differ from the World Wide Web (WWW)? Explain the concept of a "network of networks" in the context of the Internet.

(b) Define the following Internet-related terms: URL, IP address, DNS, ISP, HTTP, and Firewall.

2. Answer any *three* of the following in brief :

(a) Explain the concept of "online payment gateways" and their role in secure e-commerce transactions.

(b) Explain the difference between a web browser and a search engine. Provide examples of each.

(c) Explain the concept of Information Architecture (IA) in web design.

(d) List any two positive and any two negative societal impacts of the Internet.

UNIT–II

3. Give a brief description of any *three* of the following :

   (a) Software requirements for setting up an internet connection.

   (b) Steps involved in configuring a modem for a DSL internet connection,

   (c) Comparison between wired and wireless communication media.

   (d) Roles of servers, clients, and workstations in a network.

4. (a) Describe the structure of an HTML table, including the use of <table>, <tr>, <th>, and <td> elements. How do these elements work together to organize tabular data?

   (b) How does CSS enhance the presentation of HTML documents?

UNIT–III

5. (a) What is Python, and what are the key features that make it a popular programming language for beginners and experienced developers alike?

   (b) Define data types in Python and provide examples of different data types, including integers, floats, strings, and booleans.

6. (a) Explain the concept of arrays (lists) in Python and how they can be used to store and manipulate collections of data. Provide examples of list operations.

(b) Describe the characteristics and uses of strings, tuples, lists, and dictionaries in Python.

UNIT–IV

7. (a) Define inheritance in OOP and describe how it enables the creation of derived classes from base classes in Python.

(b) Explain the purpose of exception handling in Python and the role of try, except, and finally blocks in managing errors.

8. Answer any *three* of the following in brief :

(a) Explain the role of MySQLdb in Python for interacting with MySQL databases.

(b) Describe the process of creating a new table in a MySQL database using Python and MySQLdb.

(c) Define regular expressions and their significance in text processing.

(d) Discuss the importance of file checks in Python and the various methods available to check if a file exists.
