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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?
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BT-3/D-21**43195****MATHEMATICS FOR BIG DATA AND OPTIMIZATION****Paper : BS-CS-AIDS-201A**

Time : Three Hours]

[Maximum Marks : 75

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

UNIT-I

1. (a) Find the fourier series expansion of

$$f(x) = 2x - x^3 \text{ in } (0, 2\pi). \quad (7.5)$$

- (b) Express the function in Q1(a) as half range Sine series in the interval (0,3). (7.5)

2. (a) Using Parseval's identity for Fourier Transform, evaluate

$$\int_0^{\infty} \frac{dt}{(9+t^2)(25+t^2)}. \quad (7.5)$$

- (b) Find the Fourier sine transform of $\frac{e^{-ax}}{x}$. (7.5)

UNIT-II

3. (a) Solve the differential equation :

$$(3x^2 + 6xy^2) dx + (6x^2y + 4y^3) dy = 0. \quad (7.5)$$

(b) By variation of parameter, find the solution of

$$\frac{d^2y}{dx^2} - 3\frac{dy}{dx} + 2y = \sin x. \quad (7.5)$$

4. Solve the equation :

$$(D^2 + a^2)y = \cos ax + e^{-2x}. \quad (15)$$

UNIT-III

5. (a) Find the root of the equation $x \log_{10} x - 1$, correct to four decimal places, by Regula Falsi method. (7.5)

(b) Estimate the missing term from the following table :

x	0	1	2	3	4
$F(x)$	1	3	9	–	81

(7.5)

6. (a) Find the maximum and minimum value of $y(x)$ from the function tabulated below :

x	-2	-1	0	1	2	3	4
$y(x)$	2	-0.25	0	-0.25	2	15.75	56

(7.5)

(b) Given that $\frac{dy}{dx} = x^2 + y$, and $y = 1, x = 0$.

Find an approximate value of y at $x = 0.5$ by modified Euler's method. (7.5)

UNIT-IV

7. Using Kuhn Tucker method,

$$\text{Minimize } f = x_1^2 + x_2^2 + 60x_1,$$

$$\text{subject to } x_1 - 80 \geq 0, x_1 + x_2 - 120 \geq 0. \quad (15)$$

8. Determine the extreme points as well as evaluate the following function $f(x)$:

$$\text{where } f(x) = x_1^3 + x_2^3 + 2x_1^2 + 4x_2^2 + 6. \quad (15)$$



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OBJECT ORIENTED PROGRAMMING

Paper : PC-CS-AIDS-203A/PC-CS-AIML-205A

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) Give an introduction to C++ with an illustrative C++ program.
(b) List some popular application areas of object-oriented programming.

2. (a) What is the purpose of an abstract class and what are its properties? Give an example of an abstract class.
(b) Distinguish between :
 - (i) Classes and objects.
 - (ii) Inheritance and polymorphism.

UNIT-II

3. (a) Why do we need friend functions? What are the characteristics of friend function? Illustrate the use of friend function class using a suitable example.
(b) Define constructors and destructors as used in C++. What are the types of constructors?

4. What are the advantages of Inheritance? Explain different types of Inheritance in C++ with examples.

UNIT-III

5. What is a virtual function and a pure virtual function? How is dynamic binding implemented with virtual functions?
6. What is the advantage of operator overloading in C++? What is its syntax and rules? Describe operator overloading with the help of a suitable example.

UNIT-IV

7. What are the advantages of exception handling over traditional error handling? How is exception handling carried out in C++? List the standard exceptions which can be used in C++ programs.
 8. Answer the following question in brief :
 - (a) What are the types of streams in C++?
 - (b) Distinguish between sequential access and random access of files.
 - (c) What are Templates? How are templates used to define classes and functions?
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DATA STRUCTURES AND ALGORITHMS

Paper : PC-CS-AIDS-205A

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) Write the Binary Search Algorithm and discuss its time complexity.
(b) What do you understand by data structure? Differentiate between linear and non-linear data structures.

2. (a) What do you understand by time and space complexities? What are their applications? Discuss.
(b) Write the Bubble Sort algorithm and discuss its time complexity.

UNIT-II

3. What is a circular queue? Write the algorithm to insert and delete the elements in circular queue. What are the advantages of circular queue over simple queue.

4. (a) What is stack data structure? Discuss its application in recursion.
- (b) Write the algorithm to perform PUSH and POP operation in linked list implementation.

UNIT-III

5. (a) What is a singly linked list? Write the algorithm to insert a node in a sorted singly linked list.
 - (b) What is a circular linked list? Discuss its applications.
6. (a) What is doubly linked list? Write the algorithm to delete a node the address of which is 'X'.
 - (b) What are the merits and demerits of linked list implementation of stack/queues over array implementation.

UNIT-IV

7. (a) Define and differentiate tree and graph data structure.
 - (b) What is binary search tree? What is height balanced tree? What is the need of balancing the tree.
8. (a) Discuss the breadth first traversal of graph data structure,
 - (b) Write the note on threaded binary tree.
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INTRODUCTION TO ARTIFICIAL INTELLIGENCE

Paper : C-CS-AIDS-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) Write the branch and bound algorithm. Discuss the types of problem for which branch and Bound is advisable.
(b) What is production system? What are its different components? Discuss.
2. (a) Write the algorithm of Hill climbing search. What are the limitations of this search algorithm?
(b) Write the breadth first search and discuss its space complexity.

UNIT-II

3. (a) Differentiate between :
 - (i) Alpha and beta pruning,
 - (ii) Modus ponens and modus tollens.
(b) Convert the statement "Smoking can kill you" into conceptual dependency structure.

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4. (a) What are the desirable characteristics of a knowledge representation scheme? What is the difference between declarative and procedural knowledge? Explain.
- (b) What is horizon effect? What is the solution to this problem? Discuss.

UNIT-III

5. (a) What is Most General Unifier (MGU)? Write the unification algorithm to find the MGU.
 - (b) What is propositional logic? What are its limitations? Explain the implication and biconditional operator using suitable examples.
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6. (a) What is Robinson's resolution principle? Explain the linear input form resolution using suitable example.
 - (b) Differentiate between forward and backward chaining. When is it advisable to use forward chaining over backward chaining and vice-versa? Discuss.

UNIT-IV

7. (a) What is Expert System? Discuss in brief the rule-based architecture of Expert System.
 - (b) What is Genetic Algorithm? What are its advantages over conventional search algorithms.
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8. (a) What is learning by induction? What are its different rules? Discuss.
 - (b) Write a brief note on Artificial Neural Network.

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43199

PROGRAMMING LANGUAGES

Paper-PC-CS-AIDS-209 A/PC-CS-AIML-209A

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) Discuss the technical role of orthogonality and abstraction in programming languages with the help of suitable examples. 08
- (b) What are the basic purposes for declarations in elementary data types? 07
2. (a) Identify the main role of attribute grammars in formal translation models with the help of suitable examples. 08
- (b) Design and discuss the syntax charts for extended BNF for six simple assignment statements. 07

UNIT-II

3. (a) What is the basic usage of structured data objects? How to implement encapsulation by subprograms? 08

- (b) Discuss the specification and implementation of vector and multidimensional slices. 07
4. (a) How the type definition is used as a template to construct data objects during program execution? 08
- (b) Write short notes on the following :
- (i) Overloaded subprograms.
- (ii) Generic subprograms. 07

UNIT-III

5. (a) What is basic role of referencing environment? Explain the concepts of call by value result and call by name for transmitting parameters. 08
- (b) Discuss the role of short-circuit Boolean expressions in sequencing with the help of suitable examples. 07
6. (a) What are the various problems associated in structured sequence control? Briefly discuss the concept of structure theorem in sequence control. 08
- (b) Briefly discuss the role of mutual exclusion in sequence control. 07

UNIT-IV

7. (a) Define garbage and dangling references in storage management. 08
- (b) Discuss the four basic concepts that are used in the heap storage management for variable size elements. 07

8. (a) Discuss the following concepts in relation to Ada and Smalltalk :
- (i) Sequence control.
 - (ii) Subprograms and storage management.
 - (iii) Abstraction and encapsulation. 08
- (b) Differentiate between functional and logical languages. 07
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