

2023

Time : 3 hours

Full Marks : 70

Candidates are required to give their answers in their own words as far as practicable.

The figures in the margin indicate full marks.

*Answer from **all** the Sections as directed.*

Section – A

1. Choose the correct answer from the given alternatives : 2×10 = 20

(a) Which type of programming does Python support ?

- (i) Object-oriented programming
- (ii) Structured programming
- (iii) Functional programming
- (iv) All of these

(b) Which of the following is correctly evaluated for the `pow(x, y, z)` function ?

- (i) $(x ** y) / z$
- (ii) $(x ** y) \% z$
- (iii) $(x / y) * z$
- (iv) $(x / y) / z$

(c) Which of these is not a core data type ?

- (i) Class
- (ii) Dictionary
- (iii) Tuples
- (iv) Lists

(d) Which keyword is used for function in Python language ?

- (i) void
- (ii) define
- (iii) def
- (iv) function

- (e) List, tuple and range are the _____ of Data Types.
- (i) Binary Types
 - (ii) Boolean Types
 - (iii) Sequence Types
 - (iv) None of these
- (f) How to access substring "DSPMU" from the following string declaration in Python :
`str = "My University name is DSPMU" ?`
- (i) `str([23 : 27])`
 - (ii) `str([22 : 26])`
 - (iii) `str([22] [27])`
 - (iv) None of these
- (g) What is used in Python functions, if you have no idea about the number of arguments to be passed ?
- (i) Default Arguments
 - (ii) Required Arguments

- (iii) Arbitrary Arguments
- (iv) Keyword Arguments
- (h) When will the else part of try-except-else be executed ?
 - (i) When no exception occurs
 - (ii) When an exception occurs
 - (iii) Always
 - (iv) When an exception occurs into except block
- (i) Which block lets you test a block of code for errors ?
 - (i) Finally
 - (ii) Except
 - (iii) Try
 - (iv) None of these
- (j) How to get the type of a variable in Python ?
 - (i) `print(typeof(a))`

(ii) `print(typeOf(a))`

(iii) `print(type(a))`

(iv) None of these

Section – B

Answer any **four** questions of the following :

$$5 \times 4 = 20$$

2. What is datetime module in Python ? Explain with example of `now()` and `today()` function.
3. Write a program input a number in Python and convert its Decimal, Binary, Octal and Hexadecimal.
4. Explain the following datatypes with suitable examples : list, string, tuple, set and dictionary in Python.
5. What is built-in function ? Explain with example any four built-in functions in Python.

6. Write a program input a number to check the number is prime or not prime.
7. Explain the following file handling methods with suitable examples : `open()`, `read()`, `readline()`, and `close()` in Python.

Section – C

Answer any **two** questions of the following :

$$15 \times 2 = 30$$

8. What is Python ? Explain the features and advantages of Python in detail.
9. What is user-defined function in Python ? Explain with example of various types of passing arguments to the function in Python.
10. What is Inheritance in Python ? Explain with example of all types of Inheritances supported in Python.

11. Write the syntax and example of the following block of exception handling in Python :

- (a) try block
- (b) try-except block
- (c) try-except-else block
- (d) try-except-else-finally block



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Section – A

1. Choose the correct answer of the following :

$2 \times 10 = 20$

- (a) A technique that was developed to determine whether a machine could or could not demonstrate the artificial intelligence known as the _____.

- (i) Boolean Algebra

- (ii) Algorithm
 - (iii) Logarithm
 - (iv) Turing Test
- (b) General algorithm applied on game tree for making decision of win / lose is _____.
- (i) DFS / BFS Search Algorithms
 - (ii) Minimax Algorithms
 - (iii) Greedy Search Algorithms
 - (iv) Heuristic Search Algorithms
- (c) Which of the following types does the Cryptarithmic problem belongs to ?
- (i) Encryption problem
 - (ii) Constraint satisfactory problem
 - (iii) Number problem
 - (iv) All of these
- (d) What is Perceptron ?
- (i) A single layer feed-forward neural network with pre-processing

- (ii) An auto-associative neural network
 - (iii) A double layer auto-associative neural network
 - (iv) A neural network that contains feedback
- (e) Which data structure conveniently used to implement Best First Search ?
- (i) Stacks
 - (ii) Queues
 - (iii) Priority queues
 - (iv) All of the mentioned
- (f) A fuzzy set 'A' in Z is characterized by a _____ that associates with element of Z, a real number in the interval [0, 1].
- (i) Grade of membership
 - (ii) Generic element
 - (iii) Membership function
 - (iv) None of the mentioned

(g) Which of the following is not a Capabilities of Expert Systems ?

- (i) Advising
- (ii) Demonstrating
- (iii) Explaining
- (iv) Expanding

(h) Which of the following strategies used by Inference Engine ?

- (i) Forward Chaining
- (ii) Block Chaining
- (iii) Stable Chaining
- (iv) Both (i) and (ii)

(i) Genetic algorithm is part of :

- (i) Evolutionary computing
- (ii) Inspired by Darwin's Theory about evolution
- (iii) Are adaptive Heuristic search algorithm based on the evolutionary ideas of natural selection and genetics
- (iv) All of these

(j) $p \leftrightarrow q$ is logically equivalent to

_____.

(i) $(p \rightarrow q) \rightarrow (q \rightarrow p)$

(ii) $(p \rightarrow q) \vee (q \rightarrow p)$

(iii) $(p \rightarrow q) \wedge (q \rightarrow p)$

(iv) $(p \wedge q) \rightarrow (q \wedge p)$

Section – B

Answer any **four** questions of the following :

5×4 = 20

2. Explain Water Jug problem.
3. Solve Block World problem by taking suitable Heuristic function.
4. What is Neural network ? Explain different types of Neural network.
5. Explain Alpha beta pruning with help of an example.
6. Explain the architecture of Expert System.

7. Write short notes on any **two** of the following :

- (a) Genetic Algorithm
- (b) Unification
- (c) A* (star) Algorithm

Section – C

Answer any **two** questions of the following :

$$15 \times 2 = 30$$

- 8. What do you understand by the term Artificial Intelligence ? Explain different application areas of AI.
- 9. What is Fuzzy Logic ? Explain different properties and operations of fuzzy set by taking suitable example.
- 10. What is Constraint Satisfaction Problem ? Solve following cryptarithmic problem :

SEND
+ MORE

MONEY

11. (a) Explain Steepest Ascent Hill climbing algorithm. Discuss its drawback with solution.

(b) Differentiate between DFS and BFS.

