



**2021/TDC/CBCS/ODD/
CSCDSE-501T (A/B)/092**

**TDC (CBCS) Odd Semester Exam., 2021
held in March, 2022**

COMPUTER SCIENCE

(5th Semester)

Course No. : CSCDSE-501T

Full Marks : 50

Pass Marks : 20

Time : 3 hours

*The figures in the margin indicate full marks
for the questions*

Honours students should answer from Option—A
and Pass students will answer from Option—B

OPTION—A

(For Honours Students)

Course No. : CSCDSE-501T (A)

(Numerical Methods)

SECTION—A

Answer any *fifteen* of the following as directed :

1×15=15

1. What is round-off error?



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2. What do you mean by significant digit?
3. What is the difference between absolute error and relative error?
4. What do you mean by convergence criteria of an iterative method?
5. Write the fundamental formula of Newton-Raphson method.
6. What is the main difference between Newton-Raphson method and Secant method?
7. Gauss elimination is a/an _____ method.
(a) direct
(b) iterative
(Choose the correct answer)
8. If the real root of a function $f(x)$ lies between a and b , then $f(a)f(b) > 0$.
(Write True or False)
9. What is the difference between Newton's interpolation and Lagrange's interpolation?
10. What is interpolation?

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11. Jacobi method is an iterative method.
(Write True or False)
12. What do you mean by first-forward difference?
13. Write the formula of Simpson's $\frac{1}{3}$ rd rule.
14. Mention two extrapolation methods.
15. What is numerical differentiation?
16. Simpson's rule of integration is more accurate than trapezoidal rule.
(Write True or False)
17. The Runge-Kutta method is less efficient than Euler method.
(Write True or False)
18. What is mid-point method?
19. What is the order of Ralston's method?
20. What is the basic purpose of Heun method?



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SECTION—B

Answer any five of the following questions : $2 \times 5 = 10$

21. Discuss the types of truncation error in brief.
22. What is order of a method? What are the orders of Euler's method and modified Euler's method?
23. Write two advantages and disadvantages of Newton-Raphson method.
24. Discuss Regula-Falsi method in brief.
25. If $f(2) = 5$, $f(3) = 7$ and $f(5) = 12$, then what is the value of $f(4)$ using Lagrange's interpolation formula?
26. Differentiate between Newton forward and backward interpolation.
27. Derive trapezoidal rule.
28. Explain Euler's method in brief.
29. Write about modified Euler's method.
30. Describe Ralston's method in brief.

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SECTION—C

Answer any five of the following questions : $5 \times 5 = 25$

31. Discuss the concepts of convergence and efficiency of numerical methods.

32. The approximate value of π is given by

$$X_1 = \frac{22}{7} = 3.1428571$$

and its true value is $X = 3.1415926$. Find the absolute and relative error. Also find the error when X is round-off to 5 significant digits.

33. Find a real root of the equation $x^3 - 3x - 4 = 0$ using Secant method.

34. Using Newton-Raphson method, find the root of $x^3 - x^2 - x + 1 = 0$.

35. Find the values of y at $x = 8$ and $x = 17$ with the following table :

x	:	0	5	10	15	20
y	:	1	3	17	73	225

36. Obtain the value of $f(20)$ from the following table :

x	:	10	15	24	32
$f(x)$:	45	63	99	125

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37. Using Euler's method, solve

$$\frac{dy}{dx} = 1 + y^2, y(0) = 0$$

38. Integrate

$$\int_1^2 \frac{1}{1+x^2} dx$$

using (a) trapezoidal rule and (b) Simpson's $\frac{3}{8}$ th rule. Assume $h = 0.2$.

39. Given

$$\frac{dy}{dx} = 1 + y^2$$

where $y = 0$. When $x = 0$, find $y(0.2)$ and $y(0.4)$ using Runge-Kutta fourth-order method. Assume $h = 0.2$.

40. Using modified Euler's method, determine the value of y when $x = 0.1$. Given that

$$y(0) = 1 \text{ and } \frac{dy}{dx} = x^2 + y$$

Assume $h = 0.05$.

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OPTION—B

(For Pass Students)

Course No. : CSCDSE-501T (B)

(Internet Technology)

SECTION—A

Answer any fifteen of the following questions :

1×15=15

1. What is class in Java?
2. What is add() method?
3. How is an array declared?
4. What is Java array class?
5. What is JavaScript function?
6. How is variable declared in JavaScript?
7. What is event handler?
8. What is the use of alert() in JavaScript?

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9. What is the purpose of JDBC?
10. What is the return type of class.forName()?
11. Which interface is responsible for transaction management in JDBC?
12. What is SQL exception class?
13. What is JSP?
14. What is JSTL?
15. How to disable session in JSP?
16. Which direction is used in JSP custom tag?
17. What is JavaBean?
18. Mention one property of JavaBean.
19. Mention one disadvantage of JavaBean.
20. What are action tags in JavaBean?

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SECTION—B

Answer any five of the following questions : 2×5=10

21. How can you access an element in the ArrayList?
22. Write the syntax for creating an ArrayList object called 'cars' that will store some strings.
23. What are events? Give example.
24. What are the non-primitive data types in JavaScript?
25. What is the difference between ResultSet and RowSet?
26. What are the functions of the JDBC connection interface?
27. How is JSP used in the MVC model?
28. What are the JSP implicit objects?
29. Write down the purpose of JavaBean class in Java.
30. Write down the purposes of setter and getter methods in JavaBean.

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SECTION—C

Answer any five of the following questions : 5×5=25

31. Describe different ways to create object of a class in Java.
32. Explain ArrayList class in Java with an example.
33. Write a JavaScript code to find the factorial of a given number.
34. Explain with example different operators used in JavaScript.
35. What is JDBC? Explain the components of JDBC for interacting with a database.
36. Explain the steps to connect Java application with the database using JDBC.
37. Explain the difference between Servlet and JSP.
38. Explain the steps to run a JSP page.

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39. Write down the steps to develop a simple Bean.
40. Explain Enterprise JavaBean architecture.

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