# D.B.R.A. University, Agra

## B.C.A. Second Semester Examination, May—2022

## Numerical Methods (C-205)

**Note :** Attempt any **five** questions. **All** questions carry equal marks. Calculator is allowed.

1. Find real cube root of 18 by Regula-Falsi method.
2. Use Newton-Raphson method to obtain a root of the equation $x^5 + 5x + 1 = 0$.
3. The area A of a circle of diameter $d$ is given for the following values :

| $d$ | 80 | 85 | 90 | 95 | 100 |
|---|---|---|---|---|---|
| A | 5026 | 5674 | 6362 | 7088 | 7854 |

Find approximate value for the area of circle of diameter 82.

4. Show that $\Delta^3_{b\,c\,d}\left(\frac{1}{a}\right) = \frac{-1}{abcd}$.
5. Find the value of $f(0.04)$ form the following table :

| $x$ | 0.01 | 0.02 | 0.03 | 0.04 | 0.05 | 0.06 |
|---|---|---|---|---|---|---|
| $f(x)$ | 0.1023 | 0.1047 | 0.1071 | 0.1096 | 0.1122 | 0.1148 |

6. Find $\int_0^1 \frac{dx}{1+x^2}$ by using Simpson's $\frac{1}{3}$ RULE.
7. Solve the following equations by Gauss-elimination method :

$$3x - y + 2z = 12$$
$$x + 2y + 3z = 11$$
$$2x - 2y - z = 2$$

8. Solve the following equations by Gauss-Seidel method :

$$10x + 2y + z = 9$$
$$2x + 20y - 2z = -44$$
$$-2x + 3y + 10z = 22$$

9. Given $\frac{dy}{dx} = \frac{y-x}{y+x}$, with $y = 1$ for $x = 0$.

Find approximately for $x = 0.1$ by Euler's method (five steps).

10. Apply the fourth order Runge-Kutta method to find an approximate values of $y$ when $x = 0.2$, given that $\frac{dy}{dx} = x + y$, $y(0) = 1$.

# D.B.R.A. University, Agra
## B.C.A. Fourth Semester Examination, May—2022
## JAVA Programming (C-401)

**Time : 3 Hours]** **[Maximum Marks : 50**

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

1. Explain the concept of inheritance in Java with an example. WAP to multiplication of matrix using inheritance.
2. Explain the lifecycle of an applet with an example.
3. (a) What is a package. explain it with example.
   (b) Explain about various AWT classes used in Java
4. What is multithreading programming? How to create and run Threads? Explain it with example.
5. Explain life cycle of thread with an example. Also define Naming Convention.
6. (a) What is an array? Explain its type write a program to sum of five-digit number using array.
   (b) Define Vector and wrapper class with example program.
7. (a) What is method overriding? Explain with example.
   (b) What is applet? Explain applet life cycle in detail.
8. (a) Difference between JDK, JRE and JVM.
   (b) What is constructor explain with example.
9. Explain Exception Handling and types of error using example program.
10. (a) Explain the following :
    (i) Applet tags
    (ii) Java Program Structure
    (b) Explain component of java in detail.

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# D.B.R.A. University, Agra

## B.C.A. Fourth Semester Examination, May—2022

## Web Technology with PHP & MYSQL (C-402)

**Time : 3 Hours]** **[Maximum Marks : 50**

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

1. (a) What do you understand by PHP? Explain it with it's features.
   (b) Explain the operators of PHP with example.
2. (a) Explain the term function in PHP. Explain various types of functions with example.
   (b) Write down the factorial program by using recursive function.
3. (a) How arrays are defined in PHP? Explain with examples.
   (b) Write a program to show 10 values in an array. Calculate .....
4. Write a program to create a HIMI and form using PHP after submission.
5. (a) What do you mean by file? Explain sends to file.
   (b) Explain the PHP read functions with
6. (a) Explain the PHP the upload and download with example.
   (b) Explain creating and deleting folder in PHP.
7. (a) Explain the cookies. How to set cookies in PHP?
   (b) Write down the example of cookie.
8. (a) Explain the Session. How to set Session in PHP?
   (b) Write down the example of Session.
9. Explain the given terms in brief :
   (a) RDBMS
   (b) DML
   (c) Inner join
   (d) Debugging
   (e) Database connection
10. Explain the term exception handling. Write down the example using try, catch and throw.

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# D.B.R.A. University, Agra
## B.C.A. Fourth Semester Examination, May—2022
## Optimization Techniques (C-405)

**Time : 3 Hours]** **[Maximum Marks : 50**

1. What is Operations Research? Define the techniques used in Operations Research.
2. Solve Max. To : $Z = 5x_1 + 7x_2$
   Subject to :
   $$3x_1 + 2x_2 \le 12$$
   $$2x_1 + 3x_2 \le 13$$
   $x_1, x_2 \ge 0$, by graphical method.
3. Express the following linear programming problem in standard form :
   Maximize : $Z = 3x_1 + 4x_2 + 7x_3$
   Subject to :
   $$2x_1 + 3x_2 - 2x_3 \le 30$$
   $$4x_1 - 2x_2 + x_3 \le 22$$
   $$x_1 = 5x_2 - 6x_3 \ge 4$$
   $x_1 \ge 0$, $x_2, x_3$ unrestricted
4. Solve the following linear programming problem by simplex method :
   Maximize : $Z = 3x_1 + 2x_2$
   Subject to : $x_1 + x_2 \le 4$; $x_1 - x_2 \le 2$ and $x_1, x_2 \ge 0$
5. Determine an initial B.F.S. to the following transportation table using Vogel's approximation method :

| | | Destination | | | | |
|---|---|---|---|---|---|---|
| | | $D_1$ | $D_2$ | $D_3$ | $D_4$ | Supply |
| | $O_1$ | 1 | 2 | 1 | 4 | 30 |
| Origin | $O_2$ | 3 | 3 | 2 | 1 | 50 |
| | $O_3$ | 4 | 2 | 5 | 9 | 20 |
| | Demand | 20 | 40 | 30 | 10 | 100 |

6. Consider the problem of assigning five jobs to five persons. The assignment cost are given as follows :

| | Job | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| A | 8 | 4 | 2 | 6 | 1 |
| B | 0 | 9 | 5 | 5 | 4 |

| Person | | | | | | |
|---|---|---|---|---|---|---|
| | C | 3 | 8 | 9 | 2 | 6 |
| | D | 4 | 3 | 1 | 0 | 3 |
| | E | 9 | 5 | 8 | 9 | 5 |

Determine the optimum assignment schedule and minimum cost of assignment.

7. A company has 3 jobs on hand. Each of these must be processed through two departments, the sequential order for which is :
Department A : **Press Shop** Department B : **Finishing**
The Table below lists the number of days required each job in each Department.

| | Job I | Job II | Job III |
|---|---|---|---|
| Department A | 8 | 6 | 5 |
| Department B | 8 | 3 | 4 |

Find the sequence in which the three jobs should be processed so as to take minimum time to finish all the 3 jobs.

8. Six jobs go first over machine I and then over II. The order of the completion of jobs has no significance. The following table gives the machine times in hours for six jobs on the two machines :

| Job | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| Time on Machine I : $(A_1)$ | 5 | 9 | 4 | 7 | 8 | 6 |
| Time on Machine II : $(B_1)$ | 7 | 4 | 8 | 3 | 9 | 5 |

Find the sequence of jobs that minimizes the total elapsed time to complete the jobs.
Find the minimum time using Gantt's chart or by other method.

9. Solve the game whose pay-off matrix is given by :

| | | B | | | |
|---|---|---|---|---|---|
| | | I | II | III | IV |
| A | I | 3 | 2 | 4 | 0 |
| | II | 2 | 4 | 2 | 4 |
| | III | 4 | 2 | 4 | 0 |
| | IV | 0 | 4 | 0 | |

10. Solve the game whose pay-off matrix is :

| | | B | | |
|---|---|---|---|---|
| | | I | II | III |
| A | I | − 1 | − 2 | 8 |
| | II | 7 | 5 | − 1 |
| | III | 6 | 0 | 12 |

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# D.B.R.A. University, Agra

## B.C.A. Fourth Semester Examination, May—2022

## Artificial Intelligence (C-403)

**Time : 3 Hours]** **[Maximum Marks : 50**

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

1. (a) What a Turing Test and how does it exhibit the intelligence of a system?
   (b) Discuss the characteristics of Al problems.
2. What is Expert System? What are the different components of Expert System.
3. What do you understand by informed search and how does it differ from the blind search? Discuss the brute-force search method.
4. Describe A* search with illustrations.
5. Write short notes on the following :
   (a) Best First Search
   (b) Ao* Search
6. How do languages for Artificial Intelligence (Al) differ from other programming languages?
7. What are semantic nets, briefly discuss the utility of semantic nets in Knowledge Management. Give suitable example in support of you answer.
8. Write short notes on the following :
   (a) Robotics
   (b) Natural Language Processing.
9. Discuss the concepts of probabilistic language processing and probabilistic language models.
10. (a) Discuss the Mron-End analysis and illustrate it with example.
    (b) Elaborate the following in brief :
        (i) Knowledge
        (ii) Intelligence

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