



K23U 1132

Reg. No. :

Name :

**IV Semester B.Sc. Degree (CBCSS – OBE – Regular/Supplementary/
Improvement) Examination, April 2023
(2019 Admission Onwards)**

**COMPLEMENTARY ELECTIVE COURSE IN MATHEMATICS
4C04 MAT-BCA : Mathematics for BCA – IV**

Time : 3 Hours

Max. Marks : 40

PART – A

Answer **any four** questions. **Each** question carries **1** mark :

(4×1=4)

1. What is meant by an exhaustive event ?
2. Find 5P_3 .
3. What is meant by a linear programming problem ?
4. Define a path in a network.
5. What is meant by an initial value problem ?

PART – B

Answer **any 7** questions. **Each** question carries **2** marks :

(7×2=14)

6. What is the chance that a leap year selected at random will contain 53 Sundays ?
7. In how many ways can one make a first, second, third and fourth choice among 12 firms leasing construction equipment ?
8. State addition law of probability.
9. What are the three components of an LPP ?

P.T.O.



10. Write the canonical form of
 $\max Z = 2x_1 + 3x_2$
 sub to $2x_1 - 4x_2 \leq 4$
 $x_1 + x_2 \geq 3$
 $x_1 + 7x_2 \leq 7$
 $x_1, x_2 \geq 0$.
11. State fundamental theorem on Linear programming.
12. Explain a directed network. Give an example.
13. What is meant by link capacity in network analysis?
14. Explain the Trapezoidal rule.
15. Evaluate $\int_0^{\pi/2} \frac{1}{x} dx$ using Simpson's rule

PART - C

Answer **any 4** questions. **Each** question carries **3** marks :

(4×3=12)

16. A problem is given to three students A, B and C whose chances of solving it are $\frac{1}{2}$, $\frac{1}{3}$ and $\frac{1}{4}$ respectively. What is the probability that the problem will be solved?
17. Explain the characteristics of general LP form.
18. Use graphical method to solve that LPP
 Maximize $z = 4x_1 + 3x_2$
 Sub to $2x_1 + x_2 \leq 1000$
 $x_1 + x_2 \leq 800$
 $0 \leq x_1 \leq 400$ and $0 \leq x_2 \leq 700$.
19. Explain Konigsberg network flow problem.
20. State the characteristics of minimal spanning tree problem.
21. From the Taylor series for $y(x)$, find $y(0.1)$ correct to four decimal places if $y(x)$ satisfies $y' = x - y^2$ and $y(0) = 1$.
22. Determine the value of y when $x = 0.1$, given that $y(0) = 1$ and $y' = x^2 + y$.



PART – D

Answer **any 2** questions. **Each** question carries **5** marks :

(2×5=10)

23. A committee consists of 9 students two of which are from 1st year, three from 2nd year and four from 3rd year. Three students are to be removed at random. What is the chance that

- i) the three students belongs to different classes
- ii) two belongs to the same class and third to the different classes,
- iii) the three belong to the same class ?

24. Use simplex method to solve the LPP

$$\text{Maximize } z = 4x_1 + 10x_2$$

$$\text{Sub to } 2x_1 + x_2 \leq 50$$

$$2x_1 + 5x_2 \leq 100$$

$$2x_1 + 3x_2 \leq 90$$

$$x_1, x_2 \geq 0.$$

25. Use Dijkstra's algorithm to determine the shortest route and hence the shortest distance from city 1 to city 7. (Given the network in figure – 1)

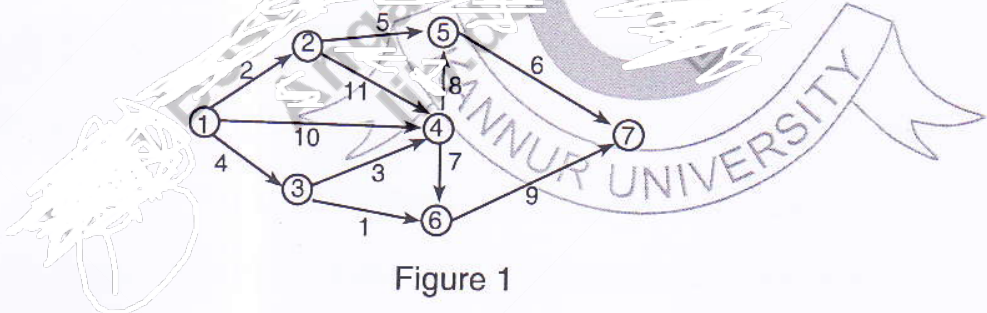


Figure 1

26. Using Runge-Kutta method of both second order and fourth order formula, find $y(0.1)$ and $y(0.2)$ correct to four decimal places, given $\frac{dy}{dx} = y - x$ where $y(0) = 2$, $h = 0.1$.