K18U 1004

Reg. No. : .....

Name : .....

IV Semester B.Sc. Degree (CBCSS – Reg./Sup./Imp.)
Examination, May 2018
(2014 Admn. Onwards)
COMPLEMENTARY COURSE IN MATHEMATICS
4C04MAT-BCA : Mathematics for BCA – IV

Time : 3 Hours Max. Marks : 40

Instruction : *Non-programmable scientific calculator may be* ***used***.

SECTION – A

All the **first 4** questions are **compulsory**. They carry **1** mark **each**.

1. What is linear programming ?

2. Define Random variable.

3. What is meant by extrapolation ?

4. Give Newton's backward interpolation formulae. **(4×1=4)**

SECTION – B

Answer **any 7** questions from among the questions **5** to **13**. These questions carry **2** marks **each**.

5. Find the sample space S if a coin is tossed twice.

6. What do you understand by expectation of a random variable which is discrete ?

7. Write the steps in formulation of a linear programming problem.

P.T.O.

8. Find the feasible solution of the following transportation problem using North-West Corner method.

		Warehouses				
		W_1	W_2	W_3	W_4	Supply
Factories	F_1	14	25	45	5	6
	F_2	65	25	35	55	8
	F_3	35	3	65	15	16
Requirement		4	7	6	13	30 (Total)

9. By using Lagrange's interpolation formula find x if $y_1 = 4$, $y_3 = 12$, $y_4 = 19$ and $y_x = 7$.

10. State the Trapezoidal rule.

11. Give the integral equation in Picard's method of successive approximation.

12. Solve the equation $y' = x + y^2$ subject to the condition $y = 1$ when $x = 0$.

13. State intermediate value theorem. **(7×2=14)**

SECTION – C

Answer **any 4** questions from among the questions **14** to **19**. **Each** question carries **3** marks.

14. Suppose that a game is to be played with a single die assumed fair. In this game a player wins Rs. 20 if a 2 turns up, Rs. 40 if a 4 turns up loses Rs. 30 if a 6 turns up while the player neither wins nor loses if any other face turns up. Find the expected sum of money to be won.

15. Find the expected value of x if the density function of a random variable x given by $f(x) = \begin{cases} \frac{1}{2}x, & 0 < x < 2 \\ 0, & \text{otherwise} \end{cases}$.

16. A manufacturing company is engaged in producing three types of products A, B and C. The production department produces each day components sufficient to make 50 units of A, 25 units of B and 30 units of C. The management is confronted with the problem of optimizing the daily production of the products

in the assembly department, where only 100 man-hours are available daily for assembling the products. The following additional information is available.

Type of Product	Profit Contribution/Unit	Assembly time/product
A	12	0.8
B	20	1.7
C	45	2.5

The company has a daily order commitment for 20 units of product A and a total of 15 units of products B and C. Formulate this problem as an LP model so as to maximize the total profit.

17. Solve by Vogel's Approximation method, the transportation problem.

		Destinations				
		1	2	3	4	Availability
Sources	1	21	16	25	13	11
	2	17	18	14	23	13
	3	32	27	18	41	19
Requirement		6	10	12	15	43

18. Find a real root of the equation $f(x) = x^3 - x - 1 = 0$.

19. Certain corresponding values of x and $\log_{10}x$ are (300, 2.4771), (304, 2.4829), (305, 2.4843) and (307, 2.4871), find $\log_{10}301$. **(4×3=12)**

SECTION – D

Answer **any 2** questions from among the questions **20** to **23**. These questions carry **5** marks **each**.

20. Define Variance. Find the variance and standard deviation of the random variable X given by $f(x) = \begin{cases} \frac{1}{2}x, & 0 < x < 2 \\ 0, & \text{otherwise} \end{cases}$

21. Use the graphical method to solve the following LP problem.
Maximize $Z = 2x_1 + x_2$
S.t. to the constraints
$x_1 + 2x_2 \leq 10$, $x_1 - x_2 \leq 2$
$x_1 + x_2 \leq 6$, $x_1 - 2x_2 \leq 1$
$x_1, x_2 \geq 0$

22. Find the cubic polynomial which takes the following values y(1) = 24, y(3) = 120, y(5) = 336 and y(7) = 720. Hence obtain the value of y(8).

23. From the following table of values of x and y obtain $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$ for x = 1.2.

x	y
1	2.7183
1.2	3.3201
1.4	4.0552
1.6	4.9530
1.8	6.0496
2.0	7.3891
2.2	9.0250

(2×5=10)