NP – 230

IV Semester Degree Examination, July/August 2024
(NEP Scheme) (Open Elective)
MATHEMATICS – IV
OE 4.1(B) : Mathematical Finance

Time : 2½ Hours Max. Marks : 60

Instruction *: Answer* ***all*** *the Parts.*

PART – A

Answer **any 4** questions. **(4×2=8)**

1. Find the present value and true discount of Rs. 327 due in 18 months hence at 6% simple interest p.a.
2. Find the true discount on a sum of Rs. 1,750 due in 18 months at 6% p.a.
3. Solve the linear equation : $5 - 7n = 1 - 8n$.
4. What are 5 inequality symbols in Mathematics ?
5. What is an unbalanced transportation problem ?
6. Define types of transportation problem.

PART – B

Answer **any 4** questions. **(4×5=20)**

7. A bill for Rs. 12,000 was payable after sight. It was accepted on 4-03-1983 and discounted on 20-03-1983. What was the discounted value if the rate of discount be $4\frac{4}{5}\%$?
8. The T.D. and B.G. on a certain bill of exchange due after a certain time are respectively Rs. 50 and Rs. 0.05. Find the face value of the bill.

P.T.O.

9. A company manufactures laptops and desktops that fetches profit of Rs. 700 and Rs. 500 each unit respectively. Each unit of laptop takes 4 hours of assembly time and 2 hours of testing time while each unit of desktop requires 3 hours of assembly time and 1 hour for testing. In a given month the total number of hours available for assembly is 210 hours and for inspection is 90 hours. Formulate LPP in such way that total profit is maximum.

10. Solve the LPP by graphical method.

$Z_{max} = 4x_1 + x_2$ subject to constraints :

$x_1 + x_2 \leq 50$

$3x_1 + x_2 \leq 90$ and $x_1, x_2 \geq 0$.

11. Find the initial basic feasible solution of the following transportation problem by North West Corner Rule.

From	To				
	C_1	C_2	C_3	C_4	Supply
P_1	8	6	10	9	35
P_2	9	12	13	7	50
P_3	14	9	16	5	40
Demand	45	20	30	30	

12. Determine the initial basic feasible solution for the following transportation problem by Least Cost Method.

From	To			
	x	y	z	Supply
A	8	7	3	60
B	3	8	9	70
C	11	3	5	80
Demand	50	80	80	

PART – C

Answer **any 4** questions. **(4×8=32)**

13. a) A owes B Rs. 2,400 payable 3 years hence, B owes A Rs. 2,072 payable 18 months hence. If however they want to settle their accounts by ready payments now, what sum should be paid and by whom, reckoning money at 8% p.a. ?

    b) A bill for Rs. 1,224 is due in 6 months. Find the difference between true discount and banker's discount, the rate of interest being 4% p.a.

14. a) A bill of exchange drawn on 5-01-1983 for Rs. 2,000 payable at 3 months was accepted on the same date and discounted on 14-01-1983, at 4% p.a. Find the value of the bill

    b) A banker discounts a bill for a certain amount which was 32 days to run before it matures legally at 5%. The discounted value of the bill is Rs. 726.80, find the face value of the bill.

15. a) A person requires 10, 12 and 12 units of chemicals A, B and C respectively for his garden. A liquid product contains 5, 2 and 1 units of A, B and C respectively per jar. A dry product contains 1, 2 and 4 units of A, B, C per carton. If the liquid product is sold for Rs. 3 per jar and the dry product is sold for Rs. 2 per carton, how many units of each product should be purchased in order to minimize the cost and meet the requirements ?

    b) Find the intersection point of the straight lines $x + y = 10$ and $x - y = 2$.

16. Using graphical method find

    $Z_{max} = 3x_1 + 4x_2$ subject to

    $5x_1 + 4x_2 \leq 200$

    $3x_1 + 5x_2 \leq 150$

    $8x_1 + 4x_2 \geq 80$

    $5x_1 + 4x_2 \geq 100$ and $x_1, x_2 \geq 0$.

17. a) Determine an initial basic feasible solution for the following transportation problem using column minima method.

	D_1	D_2	D_3	Supply
O_1	10	13	6	10
O_2	16	7	13	12
O_3	8	22	2	8
Demand	6	11	13	

b) Find an initial feasible solution by Vogel's approximation method.

	D_1	D_2	D_3	D_4	Supply
O_1	2	3	11	7	6
O_2	1	0	6	1	1
O_3	5	8	15	9	10
Demand	7	5	3	2	

18. a) Solve the inequality $4(x + 2) - 1 > 5 - 7(4 - x)$.

b) Plot the set of ordered pairs (0, –1), (3, 1), (–3, – 2), (–6, 3).
