BK BIRLA CENTRE FOR EDUCATION

SARALA BIRLA GROUP OF SCHOOLS
SENIOR Secondary Co-Ed DAY CUM BOYS' RESIDENTIAL SCHOOL

MID TERM EXAMINATION- 2024

APPLIED MATHEMATICS (241)

Class: XII Commerce   Duration: 3 Hour
Date: 25/09/24   MARKING SCHEME   Max. Marks: 80

Q No.	Answer	Scheme
1	**(A)**	**5**
2	**(C)**	**5**
3	**(D)**	**12 minutes**
4	**(C)**	$x\in (-\infty, -5] \cup [9, \infty)$
5	**(A)**	**-9$\leq x \leq$ 9**
6	**(B)**	$[-7, 3]$
7	**(C)**	**square matrix**
8	**(C)**	**x=y**
9	**(C)**	**3or -3**
10	(D)	$-3, \frac{3}{2}$
11	**(A)**	**seasonal trend**
12	**(A)**	**short term**
13	**(D)**	**irregular**
14	**(B)**	**15750**
15	**(D)**	**9%**
16	**(C)**	**8 yrs**
17	**(C)**	**(3,4)**
18	**(B)**	**(0,8)**
19	**(B)**	
20	**(B)**	
21		147-3 is divisible by m, vales of m are 2,3,4,6,8,9,12,18,24,36,48,72,144.
22		3-2x$\geq$ x-32 -2x $\geq x - 35 \Longrightarrow$-3x $\geq$-35 x$\leq \frac{35}{3}$ When x$\in$I the solution set is $\{..., -3, -2, -1, 0, 1, 2, 3 ... 11\}$
23		Product of matrices …. We have 2a-b=5, a+b=-2 On solving we get a= 1, b= -3
24		Value of determinant is 0… 18x+45- 15x-6 =0 X= -13
25		P=500000, i= 0.01, n= 36 EMI = 680000/36 = 18888.89
26		Let the number be x,

	x> 5 and x+(x+2)< 23 $5 < x < 10.5$ **OR** 4x-5< 11 , -3x-4≥ 8 x< 4 , x≤ −4 x∈ $(-\infty, -4)$
27	Let X= $\begin{bmatrix} a & b \\ c & d \end{bmatrix}$ As per question 5a+4c =1, a+c=1 and 5b+4d =-2 , b+d =3 on solving a= -3, b= -14, c = 4 and d = 17.
28	D = 91 , D1 = 91 D2 = 182 , D3 = 91 X = $\frac{D1}{D}$ =1 , y = $\frac{D2}{D}$ = 2, z= $\frac{D3}{D}$ = 1 **OR** $\|A\|$ = 35, X = A^{-1}B adjA = $\begin{bmatrix} 5 & 0 & 10 \\ 5 & 7 & -11 \\ -5 & 7 & 4 \end{bmatrix}$ X= A^{-1}B = $\frac{1}{35}\begin{bmatrix} 5 & 0 & 10 \\ 5 & 7 & -11 \\ -5 & 7 & 4 \end{bmatrix}\begin{bmatrix} 3 \\ 6 \\ 2 \end{bmatrix}$ = $\frac{1}{35}\begin{bmatrix} 35 \\ 35 \\ 35 \end{bmatrix}$ = $\begin{bmatrix} 1 \\ 1 \\ 1 \end{bmatrix}$ x=1, y=1 and z=1
29	Proper table formation a= 138.86 b= 7.64 so, the require straight line trend is y_1 = 138.86+7.64x Trend values are as follows 115.94, 123.58, 131.22, 138.86, 146.50, 154.14, 161.78.
30	A= 500000, r= 0.05, n = 10 R=? Formula…. R= 25000/ 0.629 = Rs.39745.63 **OR** Proper table formation 3 year moving average is 1.73,1.97,2.23,2.83,4.1,4.07,5.13
31	Proper graph Corner points (0,0), (30,0), (20,30) and (0,50) Minimum value of z is at (0,0) i.e 0
32	Quantity of milk in mixture A = 14/24 part Quantity of milk in mixture B = 17/24 parts Quantity of milk in new mixture = 15/24 parts Quantity of mixture A / quantity of mixture B = $\frac{2/24}{1/24}$ = 2/1 **OR** t= 3 hrs, d=12km, y = 3km/hr

	$d = \dfrac{t(x^2 - y^2)}{2x}$ $x^2 - 9 = 8x$ $(x-9)(x+1) = 0$ $x = 9$ The speed of the boat in still water = 9km/hr.
33	$(A+B)^2 = A^2 + B^2$ $A^2 + AB + BA + B^2 = A^2 + B^2$ $AB + BA = 0$ $2a - b + 2 = 0$, $-a + 1 = 0$, $2a - 2 = 0$, $-b + 4 = 0$ $a = 1$, $b = 4$
34	r= 10% p.a, p= 2 half years, effective rate = 0.1025x100% = 10.25% r=9.8%pa, p = 4 quarters, 0.1017x100% = 10.17% hence first option is better for Mr. Dinesh
35	Z= x+y Subject to constraint 2x+5y≤ 100 8x+5y≤ 200, x,y≥ 0 Proper graph Corner points (0,00, (25,0), (0,20) (50/3, 40/3) Value of Z is maximum at (50/3, 40/3)
36	(A) 95 marks , (B) [50,80] , (C) 50 marks or [50,70]
37	(A) $\begin{bmatrix} 5 & -4 \\ -5 & 8 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 40 \\ 80 \end{bmatrix}$ (B) Adj A= $\begin{bmatrix} 8 & 4 \\ 5 & 5 \end{bmatrix}$ (C) No. of children = 32, amount denoted = Rs. 960
38	(A) which are corner points of the feasible region (B) Proper graph (C) (4,5)