Seat No. : 1224

AT-120

April-2024

B.B.A., Sem.-II

MDC-BMT-124 : Advanced Business Mathematics

Time : 2 Hours] [Max. Marks : 50

Instructions : (1) Use of simple calculator is allowed.

(2) Figures to the right indicate marks.

1. (A) Find the equation of a line passing through the intersection of $3x - 2y - 17 = 0$ and $9x + 2y + 5 = 0$ and parallel to $4x + 2y - 10 = 0$. 5

(B) Prove that the lines $9x + 12y + 6 = 0$ and $36x + 48y - 21 = 0$ are parallel. 5

OR

1. (A) A line passes through the point of intersection of $2x + 5y - 9 = 0$ and $4x - 5y - 3 = 0$ and makes the intercepts on both the axes equal in magnitude. Find the equation. 5

(B) The line joining the points (K, 6) and (–2, 4) is parallel to the line joining the points (–3, 4) and (0, 2). Find the value of K. 5

2. (A) Kapil Sharma borrowed ₹ 15,000 for 10 years at 5% per annum compounded interest for the first four years, 8% per annum for the next three years and 10% per annum for the remaining 3 years. Find the amount paid after 10 years. 5

(B) Salman borrows ₹ 45,000 for 2 years at 8% per annum Simple Interest. He immediately leads it to his sister Katrina for 2 years at 7% per annum on compound interest. Find gain or loss to Salman in the transaction. 5

OR

2. (A) Tiger Shroff deposits ₹ 4,000 from his salary towards his PF account. The same amount is credited by his employer also. If 12% rate of compound interest is paid then find balance amount after his service of 10 years. 5

$[(1.01)^{120} = 3.3003]$

(B) Parv creates a Sinking Fund for payment of ₹ 46,935 for 6 years. How much should Parv deposit half yearly into Sinking Fund at 4% per annum. 5

$[(1.02)^{12} = 1.2682]$

3. (A) If $A = \begin{bmatrix} 2 & 5 & 0 \\ 2 & 1 & 0 \\ 3 & 4 & 0 \end{bmatrix}$; $B = \begin{bmatrix} 0 & 4 & 9 \\ 0 & -2 & 4 \\ 0 & 6 & 8 \end{bmatrix}$, find the value of $(AB)^T - B^TA^T$. 5

(B) Solve the following equations, using matrix inversion : 5

$4x - 6y + 10 = 0$

$6x + 2y = 18$

OR

3. (A) Find inverse of the following matrix : 5

$$A = \begin{bmatrix} 2 & -2 & 2 \\ -6 & 4 & 2 \\ -4 & 2 & 0 \end{bmatrix}$$

(B) If $A = \begin{bmatrix} 3 & 6 & 6 \\ 6 & 3 & 6 \\ 6 & 6 & 3 \end{bmatrix}$, find the value of $A^2 - 9A - 54I$. 5

4. (A) For a group photo a principal, 4 professors, 2 girls and 4 boys are to be arranged in chairs, in a row. If the principal is to occupy the middle chair, the boys to occupy the last two chairs, on either side and if the girls do not want to sit with the boys, find the number of ways in which the arrangement can be made. 5

(B) Solve the following equation ${}^{2x}C_3 = {}^{x}P_4$ 5

OR

4. (A) A cricket team of 17 players consists of 3 fast bowlers, 4 spinners, 2 wicket-keepers and 1 captain. In how many ways 11 players can be selected out of them so that captain, 2 fast bowlers, 1 wicket keeper and 2 spinners are included ? **5**

(B) Find m and n if ${}^{m+n}P_2 = 56$ and ${}^{m-n}P_2 = 12$. **5**

5. Answer the following : (Any **Ten**) (**Note :** Write in sequence) **10**

(1) $A = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 2 \end{bmatrix}$ is a _____ matrix.

(2) If the order of A is p × r and the order of B is r × q then what is the order of A × B is _____.

(3) What is the equation of a line passing through origin and having slope 1 ?

(4) For $5x - 3y = 15$, x – intercept = _____.

(5) _____ is an annuity whose payment continuous forever.

(6) The annual compound interest rate is called the effective interest rate.

(a) True (b) False

(7) Circular permutations of 'n' things = (n – 1)!

(a) True (b) False

(8) If two lines are perpendicular then the sum of their slope is –1.

(a) True (b) False

(9) Every symmetric matrix must be a square matrix.

(a) True (b) False

(10) Alia's mother told Alia to take one lunch box or one water bottle, out of 3 lunch box and 4 water bottles. In how many ways Alia chooses one of it ?

(a) 12 (b) 7

(c) 1 (d) None of the above

(11) Ordinary Annuity is also known as _____.

(a) Annuity Immediate (b) Annuity Due

(c) Deferred Annuity (d) Perpetual Annuity

(12) Find the value of ${}^{12}C_2$ = _____.

(a) 220 (b) 440

(c) 110 (d) 330

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