

Objective Type

BUSINESS MATHEMATICS

L.K.No. 1557

Paper Code No. 6641

Paper I

1st - A - Exam- 2024

Inter (PART - I)

Time : 15 Minutes, Marks: 10

Session (2022 - 24) & (2023 - 2025) (Commerce Group)

Note: Four possible choices A, B, C, D to each question are given. Which choice is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circle will result in zero mark in that question.

Q1

(1)	The Simplest form of 40 : 240 is: (A) 6 : 1 (B) 1 : 6 (C) 2 : 6 (D) 6 : 3
(2)	If $\frac{35}{125} = \frac{7}{x}$; then x = : (A) 25 (B) 30 (C) 35 (D) 40
(3)	Simple Interest is Calculated by Formula: (A) $I = prt$ (B) $I = pt$ (C) $I = \frac{prt}{r}$ (D) $I = \frac{pr}{t}$
(4)	In which quadrant ; (-3 , 2) lies: (A) I (B) II (C) III (D) IV
(5)	If $4x - 6 = 2x + 8$ then value of x: (A) 4 (B) 5 (C) 6 (D) 7
(6)	The Solution set of $x - 1 = 0$ is: (A) {0 , 1} (B) {0 , -1} (C) {-1 , 1} (D) {1 , 2}
(7)	$(11)_2 + (10)_2 = :$ (A) $(100)_2$ (B) $(110)_2$ (C) $(101)_2$ (D) $(111)_2$
(8)	Conversion of $(4)_{10}$ into binary system is: (A) $(10)_2$ (B) $(11)_2$ (C) $(111)_2$ (D) $(100)_2$
(9)	For two matrices $(AB)^t = :$ (A) A^tB^t (B) AB^t (C) B^tA^t (D) A^tB
(10)	If $A = \begin{bmatrix} 2 & 4 \\ 4 & 8 \end{bmatrix}$; then $ A = :$ (A) 0 (B) 32 (C) 16 (D) 10

Answers:

1. B	2. A	3. A	4. B	5. D	6. C	7. C	8. D	9. C	10. A
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Subjective Type

BUSINESS MATHEMATICS

L.K.No. 1557 - 1500

Inter (Part - I)

Paper I

1st - A - Exam- 2024

(Commerce Group)

Time : 1:45 Hours, Marks: 40

Session (2022 - 24) & (2023 - 2025)

Note: It is compulsory to attempt any (6-6) parts each from Q No. 2 and Q. No. 3 while attempt any (2) Questions from Part - II. Write same Question No. and its Part No. as given in the Question Paper.

Q2

Part - I

12 × 2 = 24

(i) Define Inverse Proportion.

Ans. If two quantities are so related that an increase in one causes a corresponding decrease in the other or vice versa, is called inverse or indirect proportion.

(ii) Find $x : \frac{1}{4} :: 13 : 2$

Sol. $x : \frac{1}{4} :: 13 : 2$

Product of extremes = Product of means

$$(x)(2) = \left(\frac{1}{4}\right)(13) \Rightarrow 2x = \left(\frac{1}{4}\right)(13)$$

$$8x = 13 \Rightarrow x = \frac{13}{8}$$

(iii) 15% of the profit on investment if Rs. 400/-. Find the Investment.

Sol. Let investment = x

$$\text{Profit rate} = 15\% = \frac{15}{100} = 0.15$$

$$\text{Profit} = 400$$

As $\text{Profit} = \text{Investment} (\text{rate}) \Rightarrow 400 = (x) \left(\frac{15}{100}\right)$

$$\frac{400 \times 100}{15} = x \Rightarrow x = 2666.67$$

Thus, the investment is Rs. 2666.67

(iv) Find Simple Interest on Rs. 50,000/- invested for 3 years at rate of 4% p.a.

Sol. $P = \text{Rs. } 50000$

$$N = 3 \text{ years}$$

$$I = 4\% \text{ p.a.}$$

As $\text{Simple Interest (S.I.)} = PIN = (50000) \left(\frac{4}{100}\right) (3) = \text{Rs. } 6000$

(v) A Shirt is sold at Rs. 960/- the shopkeeper lost 20%. Find the cost price of Shirt and loss.

Sol. Given, $\text{Selling price} = S = \text{Rs. } 960$

$$\text{Rate of loss} = R' = 20\%$$

$$\text{Required: Cost} = C$$

Using the formula, $R' = \left[\frac{(C-S)}{S} \times 100 \right] \%$

$$20\% = \left[\frac{(C-S)}{S} \times 100 \right] \% \Rightarrow 20 = \frac{C-960}{C} \times 100$$

$$\frac{20}{100} = \frac{C-960}{C}$$

$$0.20C = C - 960$$

$$960 = C - 0.20C$$

$$960 = 0.80C$$

$$C = 1200$$

So, the cost price of the shirts 1200

Now, $\text{Loss} = \text{Cost price} - \text{Sale price}$

$$= 1200 - 960$$

$$L = 240$$

So, loss is Rs. 240

(vi) Solve $4x - 2x = 7 + 3$

Sol. $4x - 2x = 7 + 3$

$$2x = 10$$

$$x = 5$$

(vii) How many root contain linear equation?

Ans. A linear equation in one variable has the general form is

$$ax + b = 0$$

$$ax = -b$$

$$x = \frac{-b}{a}$$

This shows that a linear equation in one variable has exactly one root.

(viii) Solve by Factorization $x^2 - 10x + 9 = 0$

Sol. $x^2 - 10x + 9 = 0 \Rightarrow x^2 - 9x - x + 9 = 0 \Rightarrow x(x-9) - 1(x-9) = 0$
 $(x-9)(x-1) \Rightarrow x-9=0, x-1=0 \Rightarrow x=9, x=1 \Rightarrow S.S = \{9, 1\}$

(ix) Write down the quadratic Formula.

Ans. The solution set $\left[\frac{-b \pm \sqrt{b^2 - 4ac}}{2a} \right]$ is called quadratic formula.

Q3.

(i) Find the range of relation $\{(1, 4), (2, 6), (3, 12), (4, 17)\}$

Sol. Domain = $\{1, 2, 3, 4\}$, Range = $\{4, 6, 12, 17\}$

(ii) Draw the graph of $3x - 2y = 6$

Sol. $3x - 2y = 6$

X-intercept

put $y = 0$

$$3x = 6$$

$$x = 2$$

$$\Rightarrow (2, 0)$$

Y-intercept

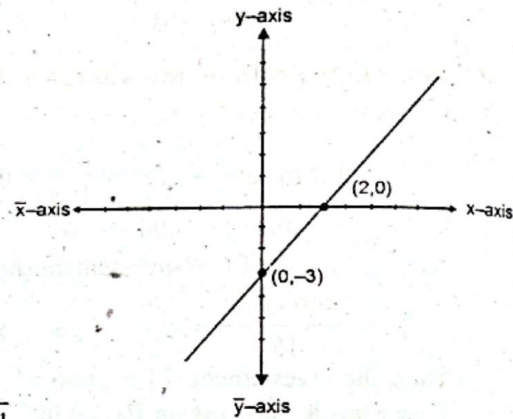
put $x = 0$

$$-2y = 6$$

$$y = -3$$

$$\Rightarrow (0, -3)$$

Graph:



(iii) Convert $(7777)_{10}$ to Binary Number System.

Sol. $(7777)_{10}$

2	7777
2	3888-1
2	1944-0
2	972-0
2	486-0
2	243-0
2	121-1
2	60-1
2	30-0
2	15-0
2	7-1
2	3-1
	1-1

So, $(7777)_{10} = (1111001100001)_2$

(iv) Convert $(101101)_2$ to Decimal Number System.

Sol. $(101101)_2 = 1 \times 2^5 + 0 \times 2^4 + 1 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 1 \times 2^0$
 $= 1 \times 32 + 0 \times 16 + 1 \times 8 + 1 \times 4 + 0 \times 2 + 1 \times 1$
 $= 32 + 0 + 8 + 4 + 0 + 1 = (45)_{10}$

(v) Evaluate $(1101)_2 + (1111)_2$

Sol.
$$\begin{array}{r} (1101)_2 \\ + (1111)_2 \\ \hline (11100)_2 \end{array}$$

(vi) Define "Row Matrix"

Ans. A matrix having single row but having any number of columns is called row matrix.

For example: $A = [2 \ 3 \ 4]$

Row matrix is also called row vector.

(vii) If $A = \begin{bmatrix} 2 & 4 \\ 3 & 7 \end{bmatrix}$ Find A^t .

Sol. $A = \begin{bmatrix} 2 & 4 \\ 3 & 7 \end{bmatrix}$

$$A^t = \begin{bmatrix} 2 & 4 \\ 3 & 7 \end{bmatrix}^t = \begin{bmatrix} 2 & 3 \\ 4 & 7 \end{bmatrix}$$

(viii) If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ find $|A|$.

Sol. $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$
 $|A| = \begin{vmatrix} 1 & 2 \\ -1 & 3 \end{vmatrix} = 3 + 2 = 5$

(ix) Find the value x , if $\begin{bmatrix} 2 & 1 \\ 3 & x \end{bmatrix}$ is Singular Matrix.

Sol. Let $A = \begin{bmatrix} 2 & 1 \\ 3 & x \end{bmatrix}$
 If A is singular matrix then

$$|A| = 0$$

$$\begin{vmatrix} 2 & 1 \\ 3 & x \end{vmatrix} = 0$$

$$2x - 3 = 0$$

$$2x = 3 \Rightarrow x = \frac{3}{2}$$

Part - II

$$8 \times 2 = 16$$

Q1 (a) Mr. Khan, Mr. Furqan and Mr. Touseef are three partners, they earn a Profit of Rs. 18000/-. The profit can be shared in the ratio $A : B = 2 : 5$ and $B : C = 10 : 4$ Find share of each Partner in Profit. (4)

Sol. Total amount of profit = 18000
 Given ratios may be written as:

$$\begin{array}{ccc} A & : & B & : & C \\ 2 & : & 5 & & \\ & \searrow & \swarrow & & \\ & & 10 & : & 4 \\ \hline 20 & : & 50 & : & 20 \end{array}$$

Sum of ratios = $20 + 50 + 20$

$$\text{Share of A} = \frac{20}{90} \times 18000 = 4000$$

$$\text{Share of B} = \frac{50}{90} \times 18000 = 10000$$

$$\text{Share of C} = \frac{20}{90} \times 18000 = 4000$$

Therefore the shares of each partner in the profit are

$$\Rightarrow \text{khan (A)} = \text{Rs. } 4000$$

$$\Rightarrow \text{Furqan (B)} = \text{Rs. } 10000$$

$$\Rightarrow \text{Touseef (C)} = \text{Rs. } 4000$$

(b) Find the amount of an annuity of Rs. 1200/- Payable at the end of each year for 15 years at the rate of 8% Compounded annually. (4)

Sol. It is given that

$$\text{Installment} = R = \text{Rs. } 1200$$

$$\text{Rate of interest} = i = 8\% \text{ per annum} \\ = 0.08 \text{ per annum}$$

$$\text{Time} = n = 15 \text{ years}$$

Using the formula

$$S = R \left[\frac{(1+i)^n - 1}{i} \right] = (1200) \left[\frac{(1+0.08)^{15} - 1}{0.08} \right] \\ = (1200) [27.1521] \\ = \text{Rs. } 32582.54$$

05 (a) If $f(x) = x^2 - 2x + 1$ and find $f(2)$, $f(0)$, $f(-1)$ and $f(3)$ (4)

Sol. $f(x) = x^2 - 2x + 1$
 Put $x = 2$, $f(2) = (2)^2 - 2(2) + 1 = 4 - 4 + 1 = 1$
 Put $x = 0$, $f(0) = (0)^2 - 2(0) + 1 = 1$
 Put $x = -1$, $f(-1) = (-1)^2 - 2(-1) + 1 = 1 + 2 + 1 = 4$
 Put $x = 3$, $f(3) = (3)^2 - 2(3) + 1 = 9 - 6 + 1 = 4$

(b) Solve the equation by factorization method $x^2 - 10x = 24$ (4)

Sol. $x^2 - 10x = 24$
 $x^2 - 10x - 24 = 0$
 $x^2 - 12x + 2x - 24 = 0$
 $x(x - 12) + 2(x - 12) = 0$
 $(x - 12)(x + 2) = 0$
 $x - 12 = 0$; $x + 2 = 0$
 $x = 12$; $x = -2$
 $S = \{12, -2\}$

06 (a) Solve the system of equation by use of matrices methods : $x + 4y = 5$ (4)
 $3x - 2y = 1$

Sol. $x + 4y = 5$
 $3x - 2y = 1$

The matrix form is

Let $\begin{bmatrix} 1 & 4 \\ 3 & -2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 1 \end{bmatrix}$
 $AX = B$ (i)

Here $A = \begin{bmatrix} 1 & 4 \\ 3 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 5 \\ 1 \end{bmatrix}$, $x = \begin{bmatrix} x \\ y \end{bmatrix}$

From (i) $X = A^{-1}B$ (ii)

As $A^{-1} = \frac{1}{|A|} \text{Adj}A$ (iii)

$|A| = \begin{vmatrix} 1 & 4 \\ 3 & -2 \end{vmatrix} = -2 - 12 = -14$

$\text{Adj}A = \begin{bmatrix} -2 & -4 \\ -3 & 1 \end{bmatrix}$

\Rightarrow (iii) becomes $A^{-1} = \frac{1}{-14} \begin{bmatrix} -2 & -4 \\ -3 & 1 \end{bmatrix}$

Putting values in (ii)

$x = \frac{1}{-14} \begin{bmatrix} -2 & -4 \\ -3 & 1 \end{bmatrix} \begin{bmatrix} 5 \\ 1 \end{bmatrix} = \frac{1}{-14} \begin{bmatrix} -10 - 4 \\ -15 + 1 \end{bmatrix} = \frac{1}{-14} \begin{bmatrix} -14 \\ -14 \end{bmatrix}$
 $= \begin{bmatrix} 1 \\ 1 \end{bmatrix} \Rightarrow \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \Rightarrow x = 1, y = 1$

(b) Simplify $(1001)_2 \times (101)_2$ (4)

Sol. $(1001)_2 \times (101)_2$

	(1	0	0	1) ₂	
x	(1	0	1) ₂		
	1	0	0	1	
	0	0	0	0	x
1	0	0	1	x	x
(1	0	1	1	0	1) ₂