Objective Type

Intermediate Part First

Roll No. _____

Paper Code
6641

BUSINESS MATHEMATICS

Time: 15 Minutes

Marks: 10

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many question as given in objective types question paper and leave other circle blank.

Q1.

Sr.	Questions	(A)	(B)	(C)	(D)
1	The ratio between 3.5kg and 7kg is:	1:2	1:5	2:1	5:1
2	25% means:	$\frac{1}{5}$	$\frac{1}{4}$	$\frac{1}{6}$	$\frac{1}{8}$
3	Interest is classified in:	Two classes	Three classes	Four classes	Five classes
4	The value of function f(x)=4x+100 at x=2 is:	104	100	108	116
5	A first degree equation is called:	Non-linear	Quadratic	Cubic	Linear
6	The solution set of equation $4x^2-16=0$ is:	$\{\pm2\}$	$\{\pm4\}$	$\{2\}$	$\{4\}$
7	$(111)_2$ in decimal form:	7	6	8	9
8	Binary number system is based on:	8 digits	2 digits	5 digits	4 digits
9	If the order of A is 2×3 and order B is 3×2, then order of AB is:	3×3	2×3	3×2	2×2
10	If $A=\begin{bmatrix} 1 & 5 \\ -1 & 0 \end{bmatrix}$, then $|A| = ?$	0	−5	5	4

Answers:

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

Subjective Type

Intermediate Part First Roll No. _____

BUSINESS MATHEMATICS

Time 01:45 Hours   Marks: 40

SECTION - I

Q2 Write short answers to any SIX parts.   12

(i) Divide Rs. 60000 in the ratio 5 : 7

Sol. Given ratio = 5 : 7

Sum of ratio = 5 + 7 = 12

1st share = $\frac{5}{12}$ × 60000 = 25000 , 2nd share = $\frac{7}{12}$ × 60000 = 35000

(ii) Find the missing quantity $\frac{9}{x} = \frac{30}{270}$

Sol. $\frac{9}{x} = \frac{30}{270}$

$\frac{x}{9} = \frac{270}{30}$

$x = \frac{270}{30} \times 9 = 81$

(iii) Shahid got 680 marks out of 850 marks. Find percentage of his marks.

Sol. Using the formula of abc

$$a \times 850 = 100 \times 680$$

$$a = \frac{100 \times 680}{850} = \frac{68000}{850} = 80\%$$

(iv) Define principal amount.

Ans. The amount that initially invested in any business deal is called principal amount.

(v) What is commission on Rs. 3000 at rate of $33\frac{1}{3}\%$

Sol. Using formula

$$\text{Commission} = \frac{\text{Comm}\%}{100} \times \text{price}$$

$$\text{Commission} = \frac{33\frac{1}{3}}{100} \times 3000 = \frac{\frac{100}{3}}{100} \times 3000 = \frac{100}{300} \times 3000 = 100 \times 10 = \text{Rs. } 1000$$

(vi) Find the value of x if $\frac{3x-1}{2-x} = 2$

Sol. $\frac{3x-1}{2-x} = 2 \Rightarrow 3x-1 = 2(2-x) \Rightarrow 3x-1 = 4-2x$

$$3x + 2x = 4 + 1 \Rightarrow 5x = 5 \Rightarrow x = \frac{5}{5} \Rightarrow x = 1$$

(vii) If $\frac{1}{4}$ of an amount is Rs. 60. What is the amount?

Sol. $\frac{1}{4}$ of an amount = 25% of amount

Using the formula to calculate amount

$$ab = 100c$$
$$25 \times b = 100 \times 60$$
$$b = \frac{6000}{25} = 240$$

(viii) Solve the equation $x^2 + 5x + 6 = 0$

Sol. $x^2 + 5x + 6 = 0 \Rightarrow x^2 + 3x + 2x + 6 = 0 \Rightarrow x(x+3) + 2(x+3) = 0$

$x + 2 = 0$ or $x + 3 = 0 \Rightarrow x = -2$ or $x = -3 \Rightarrow S.S = \{-2, -3\}$

(ix) What is standard from of quadratic equation? Also write the quadratic formula.

Ans. The standard form is

$$ax^2 + bx + c = 0$$

The quadratic formula is

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2(a)}$$

Q3. Write short answers to any SIX parts. 12

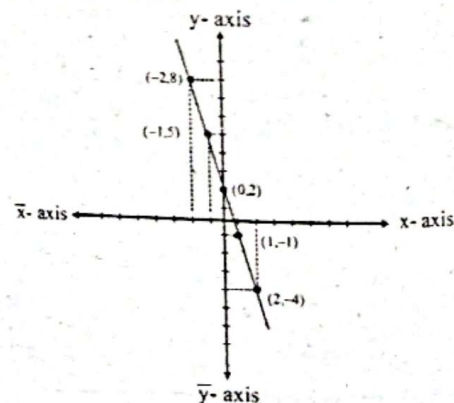**(i) What is linear function?**

Ans. Linear functions are those whose graph is a straight line. and A linear function has one independent variable and one dependent variable. $y = f(x) = a + bx$

(ii) Draw graph of linear function $3x = -y + 2$

Sol.

x	y
-2	8
-1	5
0	2
1	-1
2	-4

(iii) Convert 21 into binary system.

Sol.

```
2 | 21
  |------
2 | 10 - 1
  |------
2 | 5 - 0
  |------
2 | 2 - 1
  |------
    1 - 0
```

So, $21 = (10101)_2$

(iv) Convert $(10100)_2$ into decimal system.

Sol. $(10100)_2$

$= 1 \times 2^4 + 0 \times 2^3 + 1 \times 2^2 + 0 \times 2^1 + 0 \times 2^0$

$= 1 \times 16 + 0 \times 8 + 1 \times 4 + 0 \times 2 + 0 \times 1 = 16 + 0 + 4 + 0 + 0 = 20$

(v) Solve $(110)_2 - (10)_2 + (11)_2$

Sol. $(110)_2 - (10)_2 + (11)_2$

$= (100)_2 + (11)_2$

$= (111)_2$

$$
\begin{array}{r}
(1 \quad 1 \quad 0)_2 \\
- \ (\quad 1 \quad 0)_2 \\
\hline
(1 \quad 0 \quad 0)_2 \\
+ \ (\quad 1 \quad 1)_2 \\
\hline
(1 \quad 1 \quad 1)_2
\end{array}
$$

(vi) Define order of matrix

Ans. The order of matrix is the number of rows and columns present in a matrix.

Example: $\begin{bmatrix} 1 & 1 \\ 2 & 2 \end{bmatrix}$, Order is $2 - by - 2$

(vii) If $A = \begin{bmatrix} -2 & 4 \\ 1 & -3 \end{bmatrix}$, find |A| and Adj A.

Sol. $A = \begin{bmatrix} -2 & 4 \\ 1 & -3 \end{bmatrix}$

$|A| = \begin{vmatrix} -2 & 4 \\ 1 & -3 \end{vmatrix} = (-2)(-3) - (4)(1) = 6 - 4 = 2$

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

(viii) If $A = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$, find A^2

Sol. $A^2 = A.A = \begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}\begin{bmatrix} 4 & 3 \\ 2 & 5 \end{bmatrix}$

$= \begin{bmatrix} 4 \times 4 + 3 \times 2 & 4 \times 3 + 3 \times 5 \\ 2 \times 4 + 5 \times 2 & 2 \times 3 + 5 \times 5 \end{bmatrix} = \begin{bmatrix} 16 + 6 & 12 + 15 \\ 8 + 10 & 6 + 25 \end{bmatrix} = \begin{bmatrix} 22 & 27 \\ 18 & 31 \end{bmatrix}$

(ix) Find the inverse of matrix $\begin{bmatrix} 4 & 9 \\ 7 & 6 \end{bmatrix}$

Sol. $A = \begin{bmatrix} 4 & 9 \\ 7 & 6 \end{bmatrix}$

$|A| = \begin{vmatrix} 4 & 9 \\ 7 & 6 \end{vmatrix} = (4 \times 6 - 9 \times 7) = (24 - 63) = -39$, $Adj(A) = \begin{bmatrix} 6 & -9 \\ -7 & 4 \end{bmatrix}$

$A^{-1} = \dfrac{Adj\ (A)}{|A|} = \dfrac{\begin{bmatrix} 6 & -9 \\ -7 & 4 \end{bmatrix}}{-39} = \begin{bmatrix} -\dfrac{6}{39} & \dfrac{9}{39} \\ \dfrac{7}{39} & \dfrac{-4}{39} \end{bmatrix} = \begin{bmatrix} \dfrac{-2}{13} & \dfrac{3}{13} \\ \dfrac{7}{39} & \dfrac{-4}{39} \end{bmatrix}$

Note: Attempt any TWO questions. Each question carries 08 mark. $2 \times 8 = 16$

Q4. **(a)** If stay of 12 men for 28 days in a hotel costs Rs. 6720. Find the cost for stay of 8 men for 14 days in the hotel. **04**

Sol. Let x be the required units by compound proportion.

Men	:	Daily working hours	:	Units
12		28		6720
(increase) 8		14 (decrease)		x (increase)

$$\Rightarrow \quad \frac{x}{6720} = \frac{14}{28} \times \frac{8}{12}$$

$$\frac{x}{6720} = \frac{1}{2} \times \frac{2}{3}$$

$$\frac{x}{6720} = \frac{1}{3}$$

$$x = \frac{6720}{3} = 2240$$

(b) What is the compound interest on Rs.1000 for 4 years at 5% compounded annually? **04**

Sol. It is given that principle $= P = $ Rs 1000

$$i = 5\% \text{ Compound annually}$$

$$= \frac{5}{100} = 0.05 \text{ Compound annually}$$

$$\text{Time} = n = 4 \text{ years}$$

As
$$A = P(1+i)^n = 1000(1+0.05)^4 = 1000(1.05)^4$$
$$= 1000(1.2155) = 1215.5$$

$$\text{Compound Interest} = C.I = A - P$$
$$= 1215.51 - 1000$$
$$= 215.51$$

Q5. **(a)** Draw the graph of $f(x) = 2x - 5$ **04**

Sol. $f(x) = 2x - 5$

Let $y = f(x) \qquad \Rightarrow y = 2x - 5$ _____(i)

As the given function is a linear function and its graph will be a straight line, so we can draw that straight line just by taking two points only. The most sustable two points are the intercepts forms.

X – Intercept	**Y – intercept**
put y = 0 in (i)	put x = 0 in (i)
$0 = 2x - 5$	$y = 2(0) - 5$
$x = \dfrac{5}{2}$	$y = -5$
	$\Rightarrow (0, -5)$
So $\left(\dfrac{5}{2}, 0\right)$	

Graph
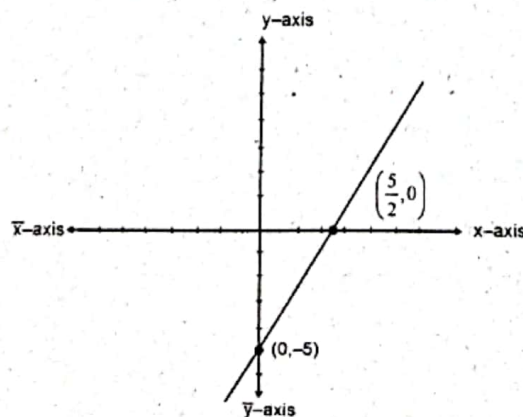
(b) Solve the equation $x^{\frac{2}{3}} - 2x^{\frac{1}{3}} = 8$

Sol. $x^{\frac{2}{3}} - 2x^{\frac{1}{3}} = 8$

Let $y = x^{\frac{1}{3}}$

Squaring on bs

$$y^2 = \left(x^{\frac{1}{3}}\right)^2$$

$$y^2 = x^{\frac{2}{3}}$$

So, (i) becomes

$$y^2 - 2y = 8$$
$$y^2 - 2y - 8 = 0$$
$$y^2 - 4y + 2y - 8 = 0$$
$$y(y-4) + 2(y-4) = 0$$
$$(y-4)(y+2) = 0$$

$y - 4 = 0$; $\quad y + 2 = 0$

$y = 4$; $\quad y = -2$

put $y = x^{\frac{1}{3}}$; $\quad$ put $y = x^{\frac{1}{3}}$

$\Rightarrow \quad x^{\frac{1}{3}} = 4$; $\quad x^{\frac{1}{3}} = -2$

$\left(x^{\frac{1}{3}}\right)^3 = (4)^3$; $\quad \left(x^{\frac{1}{3}}\right)^3 = (-2)^3$

$x = 64$; $\quad x = -8$

$S.S = \{-8, 64\}$

Q6 (a) Solve the system of linear equations by using Cramer's rule $2x + 3y = 5$, $5x + 2y = 7$ $\quad$ 04

Sol. $2x + 3y = 5$

$5x + 2y = 7$

The matrix form is

$$\begin{bmatrix} 2 & 3 \\ 5 & 2 \end{bmatrix} \begin{bmatrix} x \\ y \end{bmatrix} = \begin{bmatrix} 5 \\ 7 \end{bmatrix}$$

Let $A = \begin{bmatrix} 2 & 3 \\ 5 & 2 \end{bmatrix}$

Then according to cramer rule

$$x = \frac{|A_x|}{|A|} = \frac{\begin{vmatrix} 5 & 3 \\ 7 & 2 \end{vmatrix}}{\begin{vmatrix} 2 & 3 \\ 5 & 2 \end{vmatrix}} = \frac{(10-21)}{(4-15)}$$

$$= \frac{-11}{-11} = 1 \quad \Rightarrow \quad x = 1$$

$$y = \frac{|A_y|}{|A|} = \frac{\begin{vmatrix} 2 & 5 \\ 5 & 7 \end{vmatrix}}{\begin{vmatrix} 2 & 3 \\ 5 & 2 \end{vmatrix}} = \frac{(14-25)}{(4-15)} = \frac{-11}{-11} = 1 \quad \Rightarrow \quad y = 1$$

(b) **Without converting into decimal number system, simplify:** $\quad$ 04

$\{(100111)_2 + (10101)_2\} - (10111)$

Sol. $\{(100111)_2 + (10101)_2\} - (10111)$

$= (111100)_2 - (10111)_2$

$= (100101)_2$

$$\begin{array}{r} (1\ 0\ 0^1\ 1^1\ 1^1\ 1)_2 \\ + \quad (1\ 0\ 1\ 0\ 1)_2 \\ \hline (1\ 1\ 1\ 1\ 0\ 0)_2 \end{array}$$

$$\begin{array}{r} (1\ 1\ 1\ 1\ 0\ 0)_2 \\ - \quad (1\ 0\ 1\ 1\ 1)_2 \\ \hline (1\ 0\ 0\ 1\ 0\ 1)_2 \end{array}$$