



BRAINWARE UNIVERSITY

Course – BCOM

Business Mathematics (BCM402)

(Semester – 4)

Time allotted: 3 Hours

Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

10 x 1 = 10

1. *Choose the correct alternative from the following*
 - (i) The Sum and product of roots of the equation $x^2 - kx + k^2 = 0$ are

a. k, k^2	b. k^2, k
c. $-k, k^2$	d. $k, -k^2$
 - (ii) In transpose of matrix A, columns of matrix A becomes

a. multiple Column	b. rows
c. multiples	d. divisors
 - (iii) If ${}^n P_2 = 30$ then $n = ?$

a. 6	b. 5
c. -6	d. -5
 - (iv) Common difference of sequence 5,8,11,14,... is

a. 3	b. -3
c. 0	d. 1
 - (v) How many terms are there in 20, 25, 30.....140?

a. 22	b. 25
c. 23	d. 24
 - (vi) Unit matrix written in format of square matrix is also called as

a. identity matrix	b. unidentified matrix
c. direction matrix	d. dimension matrix

- (vii) If A and B are sets and $A \cup B = A \cap B$, then
- $A = \Phi$
 - $B = \Phi$
 - $A = B$
 - none of these
- (viii) 5 persons can be seated at a round table in
- 25 ways
 - 24 ways
 - 20 ways
 - None of these
- (ix) Quadratic equation whose roots are α, β is
- $x^2 + (\alpha + \beta)x + \alpha\beta = 0$
 - $x^2 - (\alpha + \beta)x - \alpha\beta = 0$
 - $x^2 + (\alpha + \beta)x - \alpha\beta = 0$
 - $x^2 - (\alpha + \beta)x + \alpha\beta = 0$
- (x) Which of the following sets are null sets?
- $\{0\}$
 - \emptyset
 - $\{ \}$
 - Both (b) & (c)

Group – B

(Short Answer Type Questions)

3 x 5 = 15

Answer any *three* from the following

- Find the Co-efficient of x^5 in the expansion of $(x + 1/2x)^{10}$ using binomial theorem [5]
- Solve the system by using Cramer's Rule:

$$\begin{aligned} x + 2y - z &= 2 \\ 2x + y + 3z &= 13 \\ 3x - y + 2z &= 7 \end{aligned}$$
 [5]
- If $A = \begin{pmatrix} 2 & -1 & 0 \\ 3 & -2 & 1 \\ -3 & 0 & 2 \end{pmatrix}$ and $B = \begin{pmatrix} -1 & 0 & 3 \\ 2 & -3 & 0 \\ 3 & 2 & 2 \end{pmatrix}$
 Then prove that $(A + B)^T = A^T + B^T$ [5]
- If $U = \{1, 2, 3, 4, 5, 6\}$; $A = \{1, 2, 3, 4\}$ and $B = \{2, 3, 4, 5\}$ then prove De Morgan's Law. [5]
- Define union and intersection of a set using Venn diagram. [5]

Group – C

(Long Answer Type Questions)

3 x 15 = 45

Answer any *three* from the following

7. (a) If ${}^{n+r}P_2 = 110$ and ${}^{n-r}P_2 = 20$ then find the value of n and r . [8]
- (b) In a cricket team of 14 players, there are 6 bowlers. How many different teams of 11 players can be formed taking at least 4 bowlers in the team? [7]
8. (a) A committee of 5 members is formed from 7 boys and 4 girls. How many ways this can be done if it includes at least one girl? [4]
- (b) In how many ways the letters of VOWELS can be arranged so that all the consonants will come together? [5]
- (c) A team of 5 is to be made for representing a college event from 20 boys and 10 girls. In how many ways can the team be made if it has to have [6]
- i) 3 boys and 2 girls
ii) At least 2 girls
iii) All boys only
9. (a) The sum of three integers in AP is 21 and their product is 280. Find the three numbers. [5]
- (b) If the First term of an AP is 8 and the common difference is 3, then find the 20th term. [5]
- (c) Find the sum of the series $5+25+45+\dots+385$ [5]
10. (a) If $f(x) = x^2 - x$, then prove that $f(h+1) = f(-h)$. [5]
- (b) Evaluate $\lim \{(x^2 + 3x + 4) / (x + 1)\}$ (where x tends to 2). [5]
- (c) Evaluate dy/dx if $y = 2x^2 + 3x + 5$. [5]
11. (a) Find the 4th term in the expansion of $(x - 1/x)^{10}$ [8]
- (b) Find the constant term of the expansion of $(x + 1/x)^{14}$ [7]