

B. COM
Second Semester
BUSINESS MATHEMATICS
(BCM- 07)

Duration: 3Hrs.

Full Marks: 70

Part-A (Objective) =20
Part-B (Descriptive) =50

PART-B (Descriptive)

Duration: 2 hrs. 40 mins.

Marks: 50

1. Answer the following questions (any five):

2 x 5=10

- Find the 18th term of the series 2, 4, 6....
- Find the value of $\log_2 32$, where $\log_2 = 0.03010$
- Find the 8th term of the series 4, 12, 36...
- Write any two properties of limits.
- Evaluate $\frac{d}{dx}(3x^2 + 4x)$
- Find the equation of a line passing through points (4, 2) and (3, 0).
- Define null matrix. Give an example.

2. Answer the following questions (any five):

3 x 5=15

- Examine the continuity at $x=2$ of the following function,

$$f(x) = \begin{cases} 2x+3, & x > 2 \\ 3x+y, & x \leq 2 \end{cases}$$

- Find the roots of the equation $x^2 + 35 = 11x + 5$
- Find the area of the triangle whose vertices are (-2, 3), (6, 2) and (4, 7).
- Find $\frac{dy}{dx}$ and $\frac{d^2y}{dx^2}$, where $y = 3x^4 + 5x^3 + 23x + 5$

PTO

- e) The simple interest on a sum equals $\frac{1}{10}$ of itself in 4 years. Find the rate of interest.
- f) If the 1st term and 4th term of G.P. series are 1 and 27 respectively then find sum of the series up to 10th terms.

g) Show that
$$\begin{vmatrix} 1 & 1 & 1 \\ a & b & c \\ a^3 & b^3 & c^3 \end{vmatrix} = (b-c)(c-a)(a-b)(a+b+c)$$

3. Answer the following questions (any five)

5 x 5=25

- a) If a^2, b^2, c^2 are in A.P. then show that $\frac{1}{b+c}, \frac{1}{c+a}, \frac{1}{a+b}$ are in A.P.
- b) The length of a line segment whose end points are (2, -3) and (10, y) is 10 cm. Find y.
- c) Solve the equations using Cramer's rule,
 $x+y+z=3, 2x-y+4z=5, x-3y-9z=-11$
- d) Find maximum and minimum value of the function, $y = x^3 - 3x^2 - 9x + 27$.
- e) How many terms of the series, $27+24+21+18+\dots$ will add up to 126?
- f) Find AB and BA if $A = \begin{pmatrix} 2 & 5 \\ 1 & 3 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & -1 \\ -3 & 2 \end{pmatrix}$.
- g) Solve the following LPP by graphical method:
 Maximize: $z = 3x + 4y$
 Subject to: $4x + 2y \leq 80$
 $2x + 5y \leq 180$
 $x \geq 0, y \geq 0$

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(The figures in the margin indicate full marks for the questions)

Duration: 20 minutes

Marks – 20

(PART A- Objective)

Time: 20 mins

Total Marks: 20

I. Choose the correct answer from the following:

1×20=20

- If a is the 1st term and d is the common difference in a A.P. series then t_n is equal to
(a) $a + nd$ (b) $a + (n-1)d$ (c) $a + d$ (d) $d + (n-1)a$
- The common difference of 1, 3, 5, 7,.... is
(a) 2 (b) 3 (c) 4 (d) 5
- Which one of the following series is in A.P. ?
(a) 9, 27, 81,.... (b) 7, 37, 47,....
(c) 6, 4, 8,.... (d) 57, 61, 65,....
- The sum of the series a, ar, ar^2, \dots up to ∞ (infinite) is
(a) $\frac{1}{1-r}$ (b) $\frac{a}{1-r}$ (c) $\frac{a}{1+r}$ (d) $\frac{1}{1+r}$
- The roots of $ax^2 + bx + c = 0$ are equal if
(a) $b^2 = ac$ (b) $b^2 > 4ac$ (c) $b^2 = 4ac$ (d) $b^2 < 4ac$
- The roots of $ax^2 + bx + c = 0$ are imaginary and unequal if
(a) $b^2 = ac$ (b) $b^2 > 4ac$ (c) $b^2 = 4ac$ (d) $b^2 < 4ac$
- The value of $\log 1$ is
(a) 0 (b) 1 (c) 2 (d) 3
- The slope of the line passing through two points (x_1, y_1) and (x_2, y_2) is
(a) $\frac{x_1 - x_2}{y_1}$ (b) $\frac{x_1 - x_2}{y_2}$ (c) $\frac{y_1 - y_2}{x_1 - x_2}$ (d) $\frac{y_1 + y_2}{x_1 + x_2}$

9. Which one of the following series is in G.P. ?

(a) 9, 27, 81,...

(b) 7, 37, 47,...

(c) 6, 4, 8,...

(d) 57, 61, 65,...

10. Which one of the following matrix is a diagonal matrix ?

(a) $\begin{pmatrix} 0 & 1 \\ 2 & 0 \end{pmatrix}$

(b) $\begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$

(c) $\begin{pmatrix} 1 & 1 \\ 1 & 1 \end{pmatrix}$

(d) $\begin{pmatrix} 0 & 0 \\ 2 & 0 \end{pmatrix}$

11. Which one of the following matrix is a row matrix ?

(a) $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$

(b) $\begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$

(c) (1 3 4)

(d) $\begin{pmatrix} 0 & 0 \\ 2 & 0 \end{pmatrix}$

12. Which one of the following matrix is a column matrix ?

(a) $\begin{pmatrix} 1 \\ 2 \\ 3 \end{pmatrix}$

(b) $\begin{pmatrix} 1 & 0 \\ 0 & 2 \end{pmatrix}$

(c) (1 3 4)

(d) $\begin{pmatrix} 0 & 0 \\ 2 & 0 \end{pmatrix}$

13. The value of $\lim_{x \rightarrow 2} x^2$ is

(a) 4

(b) 5

(c) 6

(d) 7

14. The value of $\frac{dx^n}{dx}$ is

(a) nx

(b) x^n

(c) nx^{n-1}

(d) nx^{1-n}

15. If P is the principal, r is the rate of interest, then the simple interest in n years is

(a) $\frac{Prn}{100}$

(b) $\frac{100}{Prn}$

(c) $\frac{100}{Pr}$

(d) $\frac{Pr}{100}$

16. If P is the principal, r is the rate of interest, then the compound interest in n years is

(a) $\frac{Prn}{100}$

(b) $\frac{100}{Prn}$

(c) $P(1 + \frac{r}{100})^n$

(d) $P(1 + \frac{r}{100})$

17. The size of the matrix $\begin{pmatrix} a \\ b \\ c \end{pmatrix}$

(a) 1x3

(b) 3x1

(c) 1x1

(d) none of these

18. Differentiation of a constant 'c', i.e. $\frac{dc}{dx}$ is equal to

(a) 0

(b) 1

(c) 2

(d) 3

19. $\frac{d}{dx} \log x$ is equal to

- (a) x (b) $\frac{1}{x}$ (c) x^2 (d) None of these

20. A linear function in three variable is of the form

- (a) $ax+by(a \neq 0)$ (b) $ax+by+c(a \neq 0, b \neq 0)$
(c) $ax+by+cz+d(d \neq 0)$ (d) $ax+by+cz+d(a \neq 0, b \neq 0, c \neq 0)$
