PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION DECEMBER 2022
(First Semester)

Branch – COMMERCE (BUSINESS ANALYTICS)

MATHEMATICAL TECHNIQUES FOR BUSINESS ANALYTICS

Time: Three Hours   Maximum: 50 Marks

SECTION-A (5 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (5 x 1 = 5)

1   Find the common ratio of the following 27, 9, 3, ...
   i) 3   ii) 9   iii) $\frac{1}{3}$ iv) $\frac{1}{9}$

2   If $|A| = 0$, then A is_____.
   i) 0   ii) Zero matrix
   iii) Singular matrix   iv) Non-singular matrix

3   Find the slope of the line joining P(-2,3) and Q(8,-5) is _____
   i) $-\frac{4}{5}$ ii) $-\frac{4}{3}$ iii) $\frac{4}{5}$ iv) $\frac{4}{3}$

4   Find the derivative of x^9.
   i) $10x^{10}$ ii) $9x^9$ iii) $9x^8$ iv) $8x^8$

5   Find $\int \frac{1}{x} dx$
   i) x^2+c   ii) $\frac{-1}{x^2} + c$ iii) $2x^2$+c   iv) log x+c

SECTION - B (15 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 3 = 15)

6   a   Find the sum of the first eight terms of the sequence 3, 9, 27, 81,............
                              OR
    b   Find the principal for which the difference of simple interest and compound interest for 2 years is Rs. 20 at 4% p.a.

7   a   Find the inverse of $A = \begin{bmatrix} 3 & 2 \\ 3 & 3 \end{bmatrix}$.
                              OR
    b   If $A = \begin{bmatrix} 2 & 3 \\ -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 & 2 \\ -2 & 3 & 1 \end{bmatrix}$, Find AB.

8   a   15 radios are sold when the price is Rs.400 and 25 radios are sold when the price is Rs.350. what is the equation of demand curve assuming it to be linear?
                              OR
    b   Find the equation of the line passing through (2,-3) and (-4,5).

9   a   Differentiate the following with respect to x. $\frac{1-x^2}{1+x^2}$.
                              OR
    b   Differentiate the following with respect to x. $(x^2 + 1)(2x^4 - 3x^2 + 1)$.

10   a   Evaluate $\int (x^3 + 4x^2 - 5x - 6)dx$.

OR

      b   Show that $\int_1^2 xe^{x^2}dx = \frac{1}{4}(e^4 - e)$.

SECTION -C (30 Marks)
Answer ALL questions
ALL questions carry **EQUAL** Marks   (5 x 6 = 30)

11   a   Find Sum of the series to n terms : 5+55+555+5555+...............

OR

      b   Mr. X borrows a certain sum of money at 5% p.a compound interest and agrees to pay both the principal and interest in 10 equal yearly installments of Rs.1100 each. If the first installment is to be paid at the end of 5 years from the date of borrowing and the other yearly installments are paid at the end of the subsequent years, find the sum borrowed by him.

12   a   Solve the system of equations

$2x - y + 3z = 8; x - 2y - z = -4; 3x + y - 4z = 0$.

OR

      b   Find the inverse of $A = \begin{bmatrix} 4 & 0 & 2 \\ 2 & 10 & 2 \\ 3 & 9 & 1 \end{bmatrix}$.

13   a   A company estimates that when its sales is Rs. 60000 its variable expense will be Rs. 30000 for a fixed expense of Rs. 10000. Find the break-even point. What is the profit when the sales is Rs. 50000?

OR

      b   Let two cities located at (2,1) and (8,9) be connected by a straight road. Let a third city be at (4,7). Find the point on the road which should be connected to the third city so that its distance from the road is least.

14   a   Examine the cost function, $y = 40 - 4x + x^2$ for maximum or minimum.

OR

      b   If $y = x^3 - 2x^2$ prove that $x^2 \frac{d^2y}{dx^2} - 4x \frac{dy}{dx} + 6y = 0$.

15   a   Solve $\int \left(x + \frac{1}{x}\right)^2 dx$.

OR

      b   Evaluate $\int_1^{10}(\log x)^2 dx$.

Z-Z-Z   END