PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2025
(First Semester)

Branch – **COMMERCE**

MATHEMATICS

Time: Three Hours | Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 x 1 = 10)

1. Find the sum of first 20 natural numbers is **[K1] [CO1]**
a) 200 b) 210 c) 215 d) 220

2. What is the general form of the n-th term in a harmonic series? **[K1] [CO1]**
a) $\frac{1}{n^2}$ b) $\frac{1}{n}$ c) $\log n$ d) $\frac{1}{n^3}$

3. Formula to calculate Banker's Discount **[K1] [CO2]**
a) $\frac{Anr}{100}$ b) $\frac{pnr}{100}$ c) $\frac{100}{pnr}$ d) $\frac{100}{Anr}$

4. How much interest will you earn on ₹2,000 invested at a simple interest rate of 4% per annum for 5 years? **[K1] [CO2]**
a) ₹200 b) ₹300 c) ₹400 d) ₹500

5. For what values of x and y the matrix $A = \begin{pmatrix} x & 0 \\ 0 & y \end{pmatrix}$ is scalar matrix? **[K1] [CO3]**
a) 1, -1 b) 1, 0 c) 1, 1 d) 1, 2

6. Let A be the 3x3 matrix and $|A| = 2$, then $|-A| =$ ____. **[K1] [CO3]**
a) 2 b) -2 c) 6 d) -6

7. Derivative of the constant function is **[K1] [CO4]**
a) always zero b) non-zero number c) positive number d) negative number

8. Let $y = x^n$ then the derivative of y is **[K1] [CO4]**
a) $x^n + c$ b) x^{n+1} c) nx^{n+1} d) nx^{n-1}

9. Which of the following is an iterative method for solving a system of linear equations? **[K1] [CO5]**
a) LU decomposition b) Gauss elimination c) Jacobi method d) Cramer's rule

10. The linear equation $2x + 3y = 0$ has **[K1] [CO5]**
a) Unique solution b) No solution c) only two solutions d) Infinitely many solution

SECTION - B (35 Marks)
Answer **ALL** Questions
ALL Questions Carry **EQUAL** Marks (5 x 7 = 35)

11. a) Find three numbers in A.P. whose sum is 12 and the sum of whose cubes is 408. **[K2] [CO1]**

OR

b) Find the sum of the series 0.7+0.07+0.007+... to infinity. **[K2] [CO1]**

12. a) Find the compound interest on Rs. 2,500 for 4 years at 8% per annum. **[K3] [CO2]**

OR

b) The sum of money amounted to Rs. 1071 in 6 months and Rs. 1016 in 16 months. Calculate the rate of simple interest. **[K3] [CO2]**

13. a) If $A = \begin{bmatrix} 3 & 5 \\ 1 & 2 \end{bmatrix}$ and $B = \begin{bmatrix} 2 & -5 \\ -1 & 3 \end{bmatrix}$ prove that $(BA)^{-1} = A^{-1}B^{-1}$. **[K4] [CO3]**

OR

b) Find the inverse of the matrix $\begin{pmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{pmatrix}$. **[K4] [CO3]**

Cont...

14. a) Find the derivative of $\log\sqrt{2x+3}$. **[K4] [CO4]**

OR

b) If $f(x) = e^{2x} - xe^{4x}$. Find $\frac{d}{dx}f(x)$ at $x = 2$. **[K4] [CO4]**

15. a) Solve the following system by Gauss-Jordan method
$x + 2y + z = 8;\ 2x + 3y + 4z = 20;\ 4x + y + 2z = 12.$ **[K5] [CO5]**

OR

b) Solve the following system by Gauss elimination method
$2x + y = 4z = 12;\ 8x - 3y + 2z = 20;\ 4x + 11y - z = 33.$ **[K5] [CO5]**

SECTION -C (30 Marks)

Answer **ANY THREE** Questions
ALL questions carry **EQUAL** Marks (3 x 10 = 30)

16. The first and the last terms of an A.P. are -4 and 146 and the sum of the A.P. is 7171. Find the number of terms in the A.P. and the common difference. **[K2] [CO1]**

17. The difference between the compound interest and the simple interest for 3 years at 5% p.a. on a certain sum of money was Rs. 610. Find the sum. **[K3] [CO2]**

18. Using matrix inversion method, solve the system of equation.
$2x - y + 3z = 1,\ x + y + z = 2,\ x - y + z = 4$ **[K4] [CO3]**

19. Find the $\frac{dy}{dx}$ if $x = at^3$ and $y = 3at$ **[K4] [CO4]**

20. Solve the following system by Gauss-Jacobi method
$10x - 5y - 2z = 3; 4x - 10y + 3z = -3; x + 6y + 10z = -3$ **[K5] [CO5]**

Z-Z-Z END