

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2024
(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. Insert one AM between 70 and 50?
a) 60 b) 50 c) 40 d) 30
2. What is the formula for the sum of the first 'n' terms of an A.P?
a) $a + (n - 1)d$ b) $\frac{n}{2}[2a + (n - 1)d]$ c) $\frac{n}{2}(l + a)$ d) ar^n
3. What is the formula for Simple interest?
a) $\frac{100I}{Pr}$ b) $\frac{100I}{Pn}$ c) $\frac{100I}{nr}$ d) $\frac{Pnr}{100}$
4. What is the formula for True Discount?
a) $\frac{100A}{100+nr}$ b) $\frac{Anr}{100+nr}$ c) $\frac{100(A-P)}{Pr}$ d) $\frac{A(100-nr)}{100}$
5. If the universal set $U = \{0,1,2,3,4,5\}$ and $A = \{0,1,2,3,4,5\}$ then what is complement of A?
a) $\{0,1,2,3,4,5\}$ b) $\{0,1,2,3,4\}$ c) ϕ d) $\{0,1,3\}$
6. The rank of a matrix is the order of the largest square sub matrix whose determinant is _____.
a) 0 b) not zero c) infinite d) finite
7. $\lim_{x \rightarrow 2} \frac{x-2}{|x-2|} = ?$
a) exists b) 0 c) does not exist d) 1
8. Find $\frac{dy}{dx}$ of $x^2 + y^2 = 1$.
a) $-\frac{y}{x}$ b) xy c) $-\frac{x}{y}$ d) $-xy$
9. The rate of convergence of Gauss-Seidal method is _____.
a) twice of Gauss-Jacobi b) Thrice c) equal d) none
10. What is the name of methods of choosing element at each stage the numerically largest coefficient of the whole matrix?
a) partial pivoting b) complete pivoting
c) diagonally dominating d) none

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 x 7 = 35)

11. a) The first term of a G.P. is 4 whole its sum infinity is 5. Find its sum to 8 terms.
(or)
b) Find the Sum of the series $0.7 + 0.07 + 0.0007 + \dots$ to ∞
12. a) Find the term of a bill of Rs. 18,360 whose true discount at 8% p.a is Rs.360?
(or)
b) The banker's gain on a sum due 10 months hence at 6% p.a is Rs.25. Find the sum due?

Cont...

13. a) If $A = \{2,3,6\}$, $B = \{1,5,10\}$, $C = \{3,5,6\}$ and $D = \{1,2,10\}$. Prove that $(A \cap C) \times (B \cap D) = (A \times B) \cap (C \times D)$.

(or)

- b) Find the rank of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{bmatrix}$.

14. a) Find $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a}$

(or)

- b) Differentiate $x^2 \log_a x$ with respect to x .

15. a) Solve the system of equations of Gauss-Jordan Method

$$x + 2y + z = 3; 2x + 3y + 3z = 10; 3x - y + 2z = 13.$$

(or)

- b) Solve the system of Gauss-Elimination method

$$2x + 3y - z = 5; 4x + 4y - 3z = 3 \text{ and } 2x - 3y + 2z = 2$$

SECTION -C (30 Marks)

Answer ANY THREE questions

ALL questions carry EQUAL Marks (3 × 10 = 30)

16. If S be the sum, P be the product and R be the sum of reciprocals of the first 'A' terms in a G.P. Prove that $P^2 R^2 = S^n$.
17. Find the true discount and the banker's discount on a bill whose present value is Rs.10,000 and which is due 4 months hence at 10% p.a. what are its face value and cash value?
18. Solve the system of simultaneous equations by Cramer's rule:
 $2x + 3y + 3z = 22; x - y + z = 4; 4x + 2y - z = 9.$
19. If $y = x + \sqrt{x^2 + a^2}$, show that $\frac{d^2y}{dx^2} = \frac{1}{2\sqrt{2}a}$ at $x = a$.
20. Solve the following system by Gauss-Jacobi method
 $10x - 5y - 2z = 3; 4x - 10y + 3z = -3; x + 6y + 10z = -3.$

Z-Z-Z END