25CSU103B/ 25COU103

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION DECEMBER 2025
(First Semester)

Common to Branches - **CORPORATE SECRETARYSHIP / COMMERCE**

MATHEMATICS

Time: Three Hours Maximum: 75 Marks

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

Question No.	Question	K Level	CO
1	If the successive terms increase or decrease by a constant, the series is called _____. a) Sequence b) Arithmetic Progression c) Geometric Progression d) Harmonic Progression	K1	CO1
2	Example for Geometric Progression is_____. a)2, 4, 6, 7.... b)5, 10, 15, ... c)7/11, 7/19, 7/27, ... d)7, 42, 252, ...	K2	CO1
3	Simple Interest = _____. a) $\frac{Pnr}{100}$ b) $\frac{100\,I}{nr}$ c) $\frac{100\,I}{nP}$ d) $\frac{100I}{Pr}$	K1	CO2
4	If P(Present Value)=Rs.10000, n(due)= 4 months, r (Interest rate)= 10% p.a., find the true discount. a) Rs.3.33 b) Rs.33.33 c) Rs.333.33 d) Rs.3333.33	K2	CO2
5	If all the elements of a matrix are zeros, it is called a _____ Matrix. a) Null b) Column c) Row d) Skew-Symmetric	K1	CO3
6	In the matrix $\begin{bmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{bmatrix}$, minor of the element a_1 is _____. a) $b_2c_3 - b_3c_2$ b) $b_2c_3 + b_3c_2$ c) $b_2c_3 = b_3c_2$ d) $a_2b_2 - b_3a_3$	K2	CO3
7	$\frac{d(x^n)}{dx}$ = _____. a) x^n b) x^{n-1} c) nx^{n-1} d) nx^n	K2	CO4
8	Average revenue = _____. a) $\frac{Total\ cost}{Number\ of\ units}$ b) $\frac{Total\ revenue}{Number\ of\ units\ sold}$ c) $\frac{Price\ per\ unit}{Total\ revenue}$ d) $\frac{Number\ of\ units\ sold}{Total\ cost}$	K1	CO4
9	Graphical method gives the solution of an L.P.P in which there are _____. a) two constants b) single constant c) single variable d) two variables	K2	CO5
10	In simplex method when all the basic variables are non-zero, the basic solution is called _____. a) degenerate b) non-degenerate c) slack variable d) basis	K1	CO5

SECTION - B (35 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Question No.	Question	K Level	CO
11.a.	The seventh and the ninth terms of an Arithmetic series is 16 and 20 respectively. Find the nth term	K2	CO1
	(OR)		
11.b.	Find the sum of n terms of the following series 7+77+777+....		

Cont...

12.a.	Show that the present value of Rs.500 due in 4 years at 3% compounded semi annually is Rs.444 approximately	K3	CO2
	(OR)		
12.b.	Calculate the rate of interest of a bill of Rs.12937.50 whose true discount for the unexpired period of 4 months is Rs.437.50		
13.a.	If $A = \begin{bmatrix} 2 & 3 & 5 \\ 4 & 7 & 9 \\ 1 & 6 & 4 \end{bmatrix}$ and $B = \begin{bmatrix} 3 & 1 & 2 \\ 4 & 2 & 5 \\ 6 & -2 & 7 \end{bmatrix}$, show that $5(A+B) = 5A + 5B$.	K3	CO3
	(OR)		
13.b.	If $A = \begin{bmatrix} 2 & 0 & -1 \\ 2 & 4 & -1 \\ 1 & -8 & -3 \end{bmatrix}$, show that $A.(\text{Adj } A) = \lvert A \rvert I_3$.		
14.a.	Find the derivatives of : i) $(x^2+5)(3x+1)$ and ii) $\frac{3x^4-x^2+8}{x}$	K1	CO4
	(OR)		
14.b.	If the demand function is $p = 4-5x$, for what value of x will elasticity of demand be unitary?		
15.a.	A company makes three products X,Y and Z which pass through three departments : Drill, Lathe and Assembly. The hours available in each department, hours required by each product in each department and profit contribution of each product are given below: Product — Time required in hours: Drill, lathe, Assembly — Profit per Units (Rs.) X: 3, 3, 8 — 9 Y: 6, 5, 10 — 15 Z: 7, 4, 12 — 20 Hours Available: 210, 240, 260 Formulate the above as an L.P.P.	K3	CO5
	(OR)		
15.b.	Solve by graphical method: Minimize $Z = -3x_1 + 4x_2$ subject to $x_1 + x_2 \leq 4$ $2x_1 + 3x_2 \geq 18$ and $x_1, x_2 \geq 0$.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

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

Question No.	Question	K Level	CO
16	The sum of 3 numbers in G.P. is 35 and their product is 1000. Find the numbers.	K2	CO1
17	A bill was drawn on April 1st 1990 at 6 months and discounted on 23rd July, 1990, at 5% p.a.. If the banker's discount was Rs. 160, find the value of the bill. How much more would be the bill owner obtaining if it were discounted on July 24, 1990.	K2	CO2
18	Show that $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ satisfies the equation $A^2-4A-5I = 0$ where I is the identity matrix and 0 denotes the zero matrix. Hence find the inverse of A.	K3	CO3
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.	K3	CO4
20	Solve the following L.P.P by the Simplex Method Minimize $Z = -x_1 + 2x_2$ Subject to $-x_1 + x_2 \leq 10$ $x_1 + x_2 \leq 6$ $x_1 - x_2 \leq 2$ $x_1, x_2 \geq 0$	K4	CO5

Z-Z-Z END