PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BCom DEGREE EXAMINATION DECEMBER 2023
(First Semester)

Branch – COMMERCE (BUSINESS ANALYTICS)

MATHEMATICAL TECHNIQUES FOR BUSINESS ANALYTICS

Time: Three Hours   Maximum: 75 Marks

SECTION-A (10 Marks)
Answer ALL questions
ALL questions carry EQUAL marks $(10 \times 1 = 10)$

Module	Question No.	Question	K Level	CO
1	1	Find the invoice price if the list price is Rs. 750 with a trade discount of 30% (a) 500 (b) 525 (c) 550 (d) 575	K1	CO1
	2	The first term of Geometric progression is 20 and common ratio is 4. Then the fifth term is (a) 10240 (b) 40960 (c) 2560 (d) 5120	K2	CO1
2	3	Find the type of the matrix $\begin{pmatrix} a & h & g \\ h & b & f \\ g & f & c \end{pmatrix}$ (a) diagonal matrix (b) row matrix (c) column matrix (d) symmetric matrix	K1	CO2
	4	A matrix is said to be non-singular if _____ (a) $|A| = 0$ (b) $|A| \neq 0$ (c) $|A| = 1$ (d) $|A| \neq 1$	K2	CO2
3	5	The slope of the line joining P(-2,3) and Q(8,-5) is (a) -3/5 (b) -4/5 (c) -5/3 (d) -5/4	K1	CO3
	6	Find the equation of the line passing through the point (2,-3) having the slope -5/7 is (a) 7x+5y+11=0 (b) 2x-5y+11=0 (c) 5x+7y+11=0 (d) 5x-2y+11=0	K2	CO3
4	7	$log_a 1 =$ _____ (a) 1 (b) a (c) 0 (d) ∞	K1	CO4
	8	The marginal revenue is Rs.25 and the elasticity of demand with respect to price is 2, then the average revenue (AR) is _____ (a) 25 (b) 50 (c) 75 (d) 100	K2	CO4
5	9	$\int e^{7x} dx=$ _____ (a) $e^{7x} + c$ (b) $7e^{7x} + c$ (c) $\frac{1}{7} e^{7x} + c$ (d) $\frac{1}{7x} e^{7x} + c$	K1	CO5
	10	$\int a^x dx =$ _____ (a) $a^x log_e a + c$ (b) $\frac{1}{a^x} log_e a + c$ (c) $log_e a + c$ (d) $log_e a^x + c$	K2	CO5

SECTION - B (35 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks $(5 \times 7 = 35)$

Module	Question No.	Question	K Level	CO
1	11.a.	A dealer got a profit of 20% by selling an article for Rs. 72. But he wants to make a profit of 35%. What should be his new selling price.	K2	CO1
		(OR)		
	11.b.	Find the sum up to n terms of the series 6+66+666+6666+......		

			K	CO
2	12.a.	Given $A = \begin{pmatrix} 2 & 0 & 9 \\ -1 & 6 & 11 \\ 4 & 8 & -11 \end{pmatrix} B = \begin{pmatrix} 1 & 2 & 3 \\ -1 & 0 & 0 \\ 1 & -1 & -4 \end{pmatrix}$ and $C = \begin{pmatrix} 2 & 0 & -5 \\ 3 & 7 & 2 \\ -1 & 0 & -1 \end{pmatrix}$, then find $A + 2B$ and $2A - B + 5C$	K3	CO2
		(OR)		
	12.b.	Find the inverse of the matrix $\begin{pmatrix} 2 & 2 \\ 3 & 5 \end{pmatrix}$ using elementary row operations		
3	13.a.	Prove that the points P(1,1), Q(-1,-1) and R(-$\sqrt{3}$, $\sqrt{3}$) are the vertices of an equilateral triangle.	K3	CO3
		(OR)		
	13.b.	Find the equation of the straight line through the intersection of $2x - 3y + 4 = 0$ and $3x + 4y - 5 = 0$ parallel to $6x - 7y + 8 = 0$		
4	14.a.	Find the derivative of (i) $x^5 + 3 \log x - 4e^x$ (ii) $\sqrt{2x} + 3^{2m}$	K4	CO4
		(OR)		
	14.b.	The total cost function y for x units is given by $y = \frac{3x(x+7)}{x+5} + 5$. Show that the marginal cost decreases continuously as the output increases.		
5	15.a.	Integrate $(\log x)^3$ with respect to x.	K4	CO5
		(OR)		
	15.b.	IGiven $M = \frac{a}{\sqrt{at+b}}$ is the marginal cost function where t is the output and if the cost of zero output is zero, then find the total cost, $\pi = \int_0^x M(t)\, dt$, x being the total output.		

SECTION -C (30 Marks)
Answer ANY THREE questions
ALL questions carry EQUAL Marks   (3 × 10 = 30)

Module	Question No.	Question	K Level	CO
1	16	Find the equated due date of payment of the following bills. Rs. 512 due on February 22nd Rs. 638 due on March 27th Rs. 742 due on May 15th .	K4	CO1
2	17	Solve using Crammer's rule $x + 2y - z = 2$, $3x - 4y + 2z = 1$ and $-x + 3y - z = 4$.	K4	CO2
3	18	Given two cities located at (2,1) and (8,9) be connected by a straight road and 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.	K4	CO3
4	19	Find the fourth derivative of $\log_e \sqrt{3x + 4}$.	K4	CO4
5	20	Using partial fractions, solve $\int \frac{(x^2+x+1)}{(x-1)^2(x-2)}\, dx$.	K4	CO5

Z-Z-Z   END