

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION MAY 2026
(First Semester)

Branch – COMMERCE (BUSINESS PROCESS SERVICES)

MATHEMATICS FOR BUSINESS PROCESS

Time: Three Hours

Maximum: 75 Marks

SECTION-A (10 Marks)

Answer ALL questions

ALL questions carry EQUAL marks

(10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	If the nominal rate of interest per annum is 10% and the interest is compounded half-yearly, then the effective rate of interest is (a) 10.25% (b) 10% (c) 12% (d) 15%	K1	CO1
	2	The banker's gain on a bill after 6 months at 4% interest per annum is Rs20. Then the sum is (a) 51000 (b) 5100 (c) 5200 (d) 2500	K2	CO2
2	3	The matrix which satisfies the relation $AA^T = A^T A = I$ is called (a) symmetric (b) Hermitian (c) orthogonal (d) Unit matrix	K1	CO2
	4	The matrix $\begin{pmatrix} 0 & 1 & 2 \\ 2 & 0 & 5 \\ 3 & 2 & 0 \end{pmatrix}$ is (a) skew-symmetric (b) not skew-symmetric (c) Hermitian (d) not symmetric matrix	K2	CO3
3	5	If $A = \begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$, then the eigen values of A^{-1} are (a) 1,0 (b) 1,1 (c) -1,-1 (d) 1,-1	K1	CO1
	6	If the eigen values of a matrix A are 2,1 then write the eigen values of $\frac{1}{3}A$. (a) 2/3, 1/3 (b) 2/5, 1/5 (c) 7/5, 1/5 (d) 3/5, 7/5	K2	CO3
4	7	Write the relation between marginal revenue and elasticity of demand. (a) $M_e = 2 - \frac{1}{\text{elasticity of demand}}$ (b) $M_e = 2 + \frac{1}{\text{elasticity of demand}}$ (c) $M_e = 1 - \frac{1}{\text{elasticity of demand}}$ (d) $M_e = 1 + \frac{1}{\text{elasticity of demand}}$	K1	CO
	8	Derivative of $y = \frac{(x-2)^2}{(x+3)^3}$ with respect to x is (a) $y[\frac{2}{x-2} + \frac{3}{x+3}]$ (b) $y[\frac{2}{x-2} - \frac{3}{x+3}]$ (c) $y[\frac{5}{x-2} - \frac{3}{x+3}]$ (d) $y[\frac{3}{x-2} + \frac{2}{x+3}]$	K2	CO3
5	9	$\int (x - \frac{1}{x})^2 dx$ equals to (a) $\frac{x^3}{3} + 2x - \frac{1}{x} + c$ (b) $\frac{x^2}{2} - 2x - \frac{1}{x} + c$ (c) $\frac{x^3}{3} + 2x + \frac{1}{x} + c$ (d) $\frac{x^2}{2} - 2x - \frac{1}{x} + c$	K1	CO2
	10	The relation between average revenue function and marginal revenue function is (a) $\frac{R(x)}{2x}$ (b) $\frac{R'(x)}{x}$ (c) $\frac{R(x)}{x}$ (d) $\frac{R'(x)}{2x}$	K2	CO4

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks

(5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	A sum of Rs5044 is borrowed to be paid in three yearly equal instalments. Find the annual instalment if the rate of interest is 5% per annum.	K1	CO2
		(OR)		

Cont...

	11.b.	The simple interest on a certain principal for 5 years is Rs360 and the interest is $\frac{9}{20}$ of the principal. Find the principal and the rate of interest.		
2	12.a.	Show that the vectors $(1,2,-1,0)$, $(1,3,1,2)$, $(4,1,2,0)$, $(6,1,0,1)$ are linearly independent.	K3	CO5
	12.b.	(OR) Express the matrix $\begin{pmatrix} 1 & 1+i & 2 \\ -2-i & i & 3i \\ 4i & 7-2i & 5+4i \end{pmatrix}$ as sum of a Hermitian and a skew-Hermitian matrix.		
3	13.a.	Find the eigen values of the matrices A^3 and A^{-1} where $A = \begin{pmatrix} 2 & -2 & 2 \\ 1 & 1 & 1 \\ 1 & 3 & -1 \end{pmatrix}$.	K4	CO5
	13.b.	(OR) Find the eigen values and eigen vectors of the matrix $\begin{pmatrix} 2 & 1 & -1 \\ 0 & 2 & 1 \\ 0 & 0 & 2 \end{pmatrix}$.		
4	14.a.	If $y = \sqrt{x+1} - \sqrt{x-1}$, then show that $(x^2-1)\frac{d^2y}{dx^2} + x\frac{dy}{dx} - \frac{y}{4} = 0$.	K2	CO4
	14.b.	(OR) Differentiate $\frac{1}{\sqrt[3]{7x^2+3x+2}}$ with respect to x using function of function rule.		
5	15.a.	Evaluate $\int_2^3 x^2 \log x \, dx$.	K3	CO5
	15.b.	(OR) Evaluate $\int \frac{2x+1}{\sqrt{x^2+2x+3}} \, dx$.		

SECTION -C (30 Marks)Answer **ANY THREE** questions**ALL** questions carry **EQUAL** Marks

(3 × 10 = 30)

Module No.	Question No.	Question	K Level	CO
1	16	A man wishes to have Rs 2500 available in a bank account when his daughter's five year college expenses begin. How much must he deposit in the beginning of each year at 3.5 % compounded annually if the girl is to start in college in 6years from now.	K2	CO2
2	17	Test the consistency of following system of equations $x + y + z = 6$ $x + 2y - 2z = -3$ $2x + 3y + z = 11$ and hence solve if consistent.	K3	CO5
3	18	Find the characteristic equation of the matrix $A = \begin{pmatrix} 1 & 3 & 7 \\ 4 & 2 & 3 \\ 1 & 2 & 1 \end{pmatrix}$ and hence find A^3 .	K5	CO4
4	19	The demand function of a particular commodity is $y = e^{-x/5}$, $0 \leq x \leq 8$ where y is unit price and x is the number of units demanded. Determine the price and quantity for which the revenue is maximum.	K2	CO4
5	20	The marginal cost and revenue functions are, respectively, $C'(x) = 5x^2 + 13x$ and $R'(x) = 18$. Given that there is no fixed cost. Find profit function and demand function. Also find the maximum profit.	K4	CO5

Z-Z-Z

END