

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION DECEMBER 2024
(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	The simple interest on Rs.5000 at 10% for 3 years is ----- (a) Rs.500 (b) Rs.1000 (c) Rs.1500 (d) Rs.6500	K1	CO1
	2	Amount due under immediate annuity is----- a) $\frac{A}{i} [1 - (1+i)^{-n}]$ b) $A + \frac{A}{i} [1 - (1+i)^{-(n-1)}]$ c) $\frac{A}{i} (1+i) [(1+i)^n - 1]$ d) $\frac{A}{i} (1+i) [(1+i)^n - 1]$	K2	
2	3	In a Hermitian matrix, the diagonal elements are ----- a) Real b) Complex c) Positive d) zero	K1	CO2
	4	If A is a singular matrix, $ A =$ ----- a) 0 b) 1 c) ∞ d) I	K2	
3	5	Find the eigen values of the matrix $\begin{pmatrix} 4 & 1 \\ 1 & 4 \end{pmatrix}$ a) 3, -3 b) -3, -5 c) 3, 5 d) 5, 0	K1	CO3
	6	$ A - \lambda I = 0$ is called ----- a) Characteristic equation c) eigen value b) Characteristic Polynomial d) eigen vector	K2	
4	7	The differential coefficient of a constant c is----- a) 0 b) 1 c) c d) ∞	K1	CO4
	8	$\frac{d}{dx} \left(\frac{1}{x} \right) =$ ----- a) $\log x$ b) 0 c) $-1/x^2$ d) $1/x^2$	K2	
5	9	$\int_{-1}^1 5x^4 dx =$ ----- a) 0 b) 2 c) 5 d) 3	K1	CO5
	10	$\int a^x dx =$ ----- a) $\frac{a^{x+1}}{x+1} + c$ b) $a^x + c$ c) $\frac{a^x}{\log a} + c$ d) $1/\log a + c$	K2	

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.	Mr. X borrows Rs.1,716. He repays Rs. 250 at the end of each year. In how many years can he clear the debt if the rate of compound interest is 7.5% p.a.?	K1	CO1
		(OR)		
	11.b.	Find the effective rate of interest equivalent to a nominal rate of 12% p.a. compounded monthly. Further, find the effective rate when interest is compounded continuously.		

Cont...

2	12.a.	Show that the matrix $\frac{1}{3} \begin{bmatrix} -1 & 2 & 2 \\ 2 & -1 & 2 \\ 2 & 2 & -1 \end{bmatrix}$ is orthogonal.	K2	CO2
	(OR)			
	12.b.	Express $\begin{bmatrix} 6 & 8 & 5 \\ 4 & 2 & 3 \\ 9 & 7 & 1 \end{bmatrix}$ as the sum of a symmetric and a skew symmetric matrices.		
3	13.a.	Find all the characteristic vectors of the matrix $\begin{bmatrix} 3 & 2 \\ 2 & 3 \end{bmatrix} = 0$.	K3	CO3
	(OR)			
	13.b.	Verify Cayley-Hamilton theorem or $A = \begin{bmatrix} 1 & 2 & -2 \\ 2 & 5 & -4 \\ 3 & 7 & -5 \end{bmatrix}$		
4	14.a.	Differentiate the following with respect to (i) $(3x^2 + 4x - 5)^3$ (ii) x^x	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 and decrease continuously as the output increases.		
5	15.a.	Evaluate (i) $\int_0^2 (x^2 - 4x + 5)dx$ and (b) $\int_0^4 (\sqrt{x} + e^x)dx$	K5	CO5
	(OR)			
	15.b.	Integrate with respect to x. (i) $\sqrt{5x + 3}$ (ii) e^{7x} .		

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	(i): Calculate the compound interest for Rs. 2,500 for 4 years at 8% per annum. (ii): Calculate the compound interest in the above case when interest is compounded (a) half yearly and (b) quarterly.	K1	CO1
2	17	Find the rank of the matrix $A = \begin{bmatrix} 1 & 1 & 1 & -1 \\ 1 & 2 & 3 & 4 \\ 3 & 4 & 5 & 2 \end{bmatrix}$	K2	CO2
3	18	Find the eigen values and eigen vectors of the matrix $\begin{bmatrix} 3 & 10 & 5 \\ -2 & -3 & -4 \\ 3 & 5 & 7 \end{bmatrix}$.	K3	CO3
4	19	If $y = ae^{mx} + be^{-mx}$, show that $\frac{d^2y}{dx^2} = m^2y$.	K4	CO4
5	20	Integrate $(\log x)^3$ with respect to x.	K5	CO5

Z-Z-Z

END