

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BCom DEGREE EXAMINATION DECEMBER 2024
(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 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	What percentage of 10 is 25? a) 400% b) 500% c) 250% d) 120%	K1	CO1
	2	In _____ series the common constant which multiplies any term to yield the following term is called the common ratio. a) arithmetic b) geometric c) harmonic d) hyperbolic	K2	CO1
2	3	A _____ matrix is a diagonal matrix in which all the diagonal elements are equal. a) skew symmetric b) scalar c) diagonal d) square	K1	CO2
	4	The rank of a matrix is the order of the largest square sub matrix whose determinant is not _____. a) - I b) I c) 0 d) -1	K2	CO2
3	5	The x- coordinate is also called as _____. a) slope b) plane c) ordinate d) abscissa	K1	CO3
	6	_____ is the slope intercept form. a) $y = mx + c$ b) $y = mx - c$ c) $y = c - mx$ d) $y = \frac{m}{x}$	K2	CO3
4	7	The differential coefficient of e^{2x-3} is _____. a) $2e^{2x-3}$ b) $2e^{2x-3} + 3$ c) $2e^{2x-3} - 3$ d) $(2x-3)e^{2x-3}$	K1	CO4
	8	Price elasticity of demand is _____. a) $-\frac{p}{x} \frac{dp}{dx}$ b) $\frac{p}{x} \frac{dx}{dp}$ c) $\frac{p}{x} \frac{dp}{dx}$ d) $-\frac{p}{x} \frac{dx}{dp}$	K2	CO4
5	9	$\int e^{2x} dx =$ _____. a) $-\frac{1}{2}e^{2x} + c$ b) $\frac{1}{2}e^{2x} + c$ c) $\frac{1}{2}e^{-2x} + c$ d) $\frac{1}{2x}e^{2x} + c$	K1	CO
	10	If $\int f(x)dx = F(x)$ then then $\int_a^b f(x)dx =$ _____. a) $F(b) + F(a)$ b) $F(a) - F(b)$ c) $F(b) - F(a)$ d) $F(b) * F(a)$	K2	CO5

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.	Two firms A and B have the same list price for an item. A offers discounts of 25% and 15%, B offers discounts of 20%, 10% and 10%. Which is the more advantageous to the purchaser?	K3	CO1
		(OR)		
	11.b.	What sum of money must be paid now to receive a freehold estate that will yield Rs.1200 a year, 10years hence if the rate of compound interest is 4% per annum?		

Cont...

Cont...

2	12.a.	Verify $(AB)C = A(BC)$ for $A = \begin{pmatrix} 2 & 1 \\ 4 & -1 \end{pmatrix} \quad B = \begin{pmatrix} 1 & 3 & 2 \\ 2 & 0 & -1 \end{pmatrix} \quad C = \begin{pmatrix} 2 & 1 & 3 \\ 3 & 4 & 1 \\ -1 & 3 & 2 \end{pmatrix}$	K3	CO2
	(OR)			
	12.b.	Find the inverse of $\begin{pmatrix} 1 & 2 & -1 \\ 3 & 8 & 2 \\ 4 & 9 & -1 \end{pmatrix}$		
3	13.a.	i) Find the equation of the line whose slope is $3/2$ which cuts off 3 units along OY. ii) As the number of units manufactured increases from 2000 to 3000, the total cost of production increases from Rs.11000 to Rs 15000. Find the relation between the cost(y) and the number of units made (x), if the relationship is linear.	K3	CO3
	(OR)			
	13.b.	Find the point of intersection of the lines $x+3y-5=0, x-2y+5=0$ and the equation of the line passing through the point (2, -3) having the slope $-5/7$.		
4	14.a.	Compute $\frac{d(x^n)}{dx}$ and $\frac{d(e^x)}{dx}$ from the first principle.	K3	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.	Evaluate $\int \frac{x^3 - x + 4}{x^2}$ with respect to x.	K3	CO5
	(OR)			
	15.b.	The marginal cost function for producing x units is $y=23+16x-3x^2$ and the total cost for producing one unit is Rs.40. Obtain the total cost function and the average cost function.		

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 has Rs.1000 to his credit in his account on 1 st January. The bank allows interest at 4% per annum which is calculated on 30 th June and 31 st December and charge $\frac{1}{4}$ % commission for collecting and paying cheques. At the end of each month the bank collect cheques to the value Rs.400 for account holder and paid out a total of Rs.300. Find the sum in his account on 30 th June.	K3	CO1																				
2	17	Consider an economy of 2 industries P and Q, where the data in millions of Rs. is given below. <table border="1"> <tr> <td></td><td>P</td><td>Q</td><td>FINAL DEMAND</td><td>TOTAL OUTPUT</td></tr> <tr> <td>P</td><td>14</td><td>6</td><td>8</td><td>28</td></tr> <tr> <td>PRODUCER</td><td></td><td></td><td></td><td></td></tr> <tr> <td>Q</td><td>7</td><td>18</td><td>11</td><td>36</td></tr> </table>		P	Q	FINAL DEMAND	TOTAL OUTPUT	P	14	6	8	28	PRODUCER					Q	7	18	11	36	K3	CO2
	P	Q	FINAL DEMAND	TOTAL OUTPUT																				
P	14	6	8	28																				
PRODUCER																								
Q	7	18	11	36																				
3	18	i) Sam buys a radio making a payment of Rs.200 at the time of purchase with the agreement that he will pay at the rate of Rs.15 for the next 20 months. Find the relationship between the amount (y) he has paid and the number of months (x) since he bought the radio. ii) When the price is Rs.50, 60 cameras of a particular type are available and when the price is Rs.80,140 cameras of the same type are available in the market. Determine the supply curve.	K3	CO3																				
4	19	If $y = ae^{mx} + be^{-mx}$ show that $\frac{d^2 y}{dx^2} = m^2 y$	K3	CO4																				
5	20	Solve $\int (\log x)^3$ with respect to x.	K3	CO5																				

P Z-Z-Z

END