



SOMAIYA

VIDYAVIHAR UNIVERSITY

Dr. Shantilal K. Somaia School of Commerce and Business Studies

QUESTION PAPERS

BRANCH: Bachelor of Business Administration	SEM: II
	MAR/APR-2023

Sr. No.	Subject	Available
1.	131U07C201 – Quantitative Techniques II (A)	
2.	131U07C201 – Quantitative Techniques II (B)	
3.	131U07C201 – Quantitative Techniques II (C)	
4.		
5.		
6.		
7.		
8.		
9.		
10.		

LIBRARY





Semester (November 2022 to March 2023)

Examination: End Semester Examination March/April 2023 (UG Programmes)

Programme code:7		Class: FY	Semester: II
Programme: BBA			
Name of the Constituent College: S K Somaiya College		Name of the Department: Business Studies	
Course Code:131U07C201	Name of the Course: Quantitative Techniques-II		
Duration: 2 Hrs.	Maximum Marks: 60		
Instructions: 1) Use of calculator is allowed 2) Assume suitable data if necessary			

Q. No.				Max. Marks	CO Attainment
Q.1.	A)	i)	Shriniketan Co-op Hsg. Society has 8 members and collects Rs. 2500 as maintenance charges from every member per year. The rate of compound interest is 8% p.a. If after 4 years the society needs to do a work worth Rs. 100000, are the annual charges enough to bear the cost?	4	CO3
		ii)	The S.I. on a sum of money is one-fourth the principal. If the period is same as that of the rate of interest then find the rate of interest.	3	CO3
Q.1.	B)		Find the compound amount and compound interest of Rs. 10000 invested for 5 years at 5% if the interest is compounded (i) annually, (ii) semiannually, (iii) quarterly and (iv) monthly	8	CO3
			OR		
Q.1.	C)		Mr. Prabhakar Naik has borrowed a sum of Rs. 60,000 from a person at 6% p.a. and is due to return it back in 4 monthly installments. Find the EMI he has to pay and also prepare the amortization table of repayment.	7	CO3
Q.1.	D)		There are 2 families A and B. There are 4 men, 6 women and 2 children in a Family A and 2 men, 2 women and 4 children in Family B. The recommended requirement of calories in Man:2400, Woman: 1900, Child:1800 and for proteins in Man:55gm, Woman:45gm and Child:33gm. Represent the above information by matrices in using matrix multiplication method.	8	CO3
Q.2.	A)		Solve the equations using Cramer's Rule $5x+3y-2z=6$ $3x+3y-4z=2$ $8x+2y-3z=7$	7	CO1
	B)		Using elementary row transformations, find inverse of A. Where $A = \begin{bmatrix} 1 & 2 & 5 \\ 1 & 3 & 5 \\ 1 & 5 & 12 \end{bmatrix}$	8	CO1
			OR		
Q.2.	C)		Express equations $x+y+z=9$, $2x+3y-z=9$ and $3x-y-z=-1$ in the matrix form $AX=B$. Solve the equations.	7	CO1
	D)		Differentiate the following functions		CO1
		i)	$\frac{x^3 - 2x^2 + 1}{3x^2 + 4}$	4	
		ii)	$\frac{x^3 - 2e^x}{4x^3 + 8^x}$	4	



Q.3.	A)	Examine for maxima and minima using Sufficient conditions the function $f(x) = 2x^3 - 9x^2 - 24x + 11$	7	CO2																
	B)	Find the 6 th term of the sequence 6,11,18,27,38 using forward difference table.	8	CO2																
		OR																		
Q.3	C)	Find the third-degree polynomial $f(x)$ of the curve $y=f(x)$ passing through the points (0,3), (1,7), (2,13) and (3,27).	7	CO2																
	D)	Prove that:		CO1																
	i)	$f(a + 2h) = f(a) + 2\Delta f(a) + \Delta^2 f(a)$	4																	
	ii)	$\Delta^4 y_0 = y_4 - 4y_3 + 6y_2 - 4y_1 + y_0$	4																	
Q.4		Attempt the following questions.																		
	A)	Find Technology matrix for the following input-output table.	5	CO3																
		<table><tr><td>Industry</td><td colspan="2">Consumption by</td><td>Final Demand</td></tr><tr><td></td><td>X</td><td>Y</td><td></td></tr><tr><td>X</td><td>80</td><td>60</td><td>120</td></tr><tr><td>Y</td><td>40</td><td>70</td><td>150</td></tr></table>	Industry	Consumption by		Final Demand		X	Y		X	80	60	120	Y	40	70	150		
Industry	Consumption by		Final Demand																	
	X	Y																		
X	80	60	120																	
Y	40	70	150																	
	B)	A manufacturer makes toys for which the demand function is $p=100-3x$, where p is the price and x is no. of units. The total cost includes Rs.200 as a fixed cost and a variable cost of Rs.50 per unit of x . Obtain Revenue, Cost and Profit functions. Also find the value of x , the no. of units at which there will be no profit no loss.	5	CO3																
	C)	Construct Backward difference table for the following. Also find $\nabla f(4)$, $\nabla^2 f(4)$, $\nabla^3 f(4)$ and $\nabla^4 f(4)$	5	CO2																
		<table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>f(x)</td><td>3</td><td>-3</td><td>3</td><td>-3</td><td>3</td></tr></table>	x	0	1	2	3	4	f(x)	3	-3	3	-3	3						
x	0	1	2	3	4															
f(x)	3	-3	3	-3	3															



Semester (November 2022 to March 2023)

Examination: End Semester Examination March/April 2023 (UG Programmes)

Programme code:7

Programme: BBA

Class: FY

Semester: II

Name of the Constituent College: S K Somaiya College

Name of the Department: Business Studies

Course Code: 131U07C201

Name of the Course: Quantitative Techniques-II

Duration : 2 Hrs.

Maximum Marks: 60

Instructions: 1) Use of calculator is allowed 2) Assume suitable data if necessary

Q. No.				Max. Marks	CO Attainment
Q.1.	A)	i)	Find the principal which will amount to Rs. 11,236 in 2 years at 6% compound interest compounded annually.	4	CO3
		ii)	Mr. Ravi invested Rs. 5000 in an annuity with quarterly payments for a period of 2 years at the rate of interest of 10%. Find the accumulated value of the annuity at the end of 2nd year.	3	CO3
	B)		Find the compound amount and compound interest of Rs. 500 invested for 5 years at 5% if the interest is compounded (i) annually, (ii) semiannually, (iii) quarterly and (iv) monthly	8	CO3
			OR		
Q.1.	C)	i)	Find the rate of interest at which a sum of Rs. 2000 amounts to Rs. 2690 in 3 years given that the interest is compounded half yearly. (Given = $\sqrt[5]{1.345} = 1.05$)	4	CO3
		ii)	Find the future value after 2 years of an immediate annuity of Rs. 5000, the rate of interest being 6% p.a compounded annually.	3	CO3
	D)	i)	Take suitable example and show that multiplication of matrices is distributive with respect to addition of matrices.	4	CO1
		ii)	Show that matrix $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$ satisfies the equation $A^2 - 5A - 2I = 0$	4	CO1
Q.2	A)		Solve the equations by Cramer's rule $2x - y + z = 4$ $x + 3y + 2z = 12$ $3x + 2y + 3z = 16$	7	CO1
	B)		Using elementary column transformation, find inverse of A, Where $A = \begin{bmatrix} 1 & 3 & 3 \\ 1 & 4 & 3 \\ 1 & 3 & 4 \end{bmatrix}$	8	CO1
			OR		



Q.2.	C)	Examine for maxima and minima using Sufficient conditions the function $y = x^3 - 3x^2 - 45x + 25$	7	CO3																
	D)	i) The Demand function is given by $D = \frac{p+3}{2p-1}$ where D=Demand p=price Find the elasticity of demand when price is 8.	4	CO3																
		ii) Define: Linear Function, Exponential Function, Supply function, Break-even point.	4	CO3																
Q.3	A)	Find derivative $y = \frac{xe^x}{1+x\log x}$	7	CO2																
	B)	The following table represents exports of fruit in lakhs to Dubai for 4 different years. Find the estimated exports in the year 2009. <table><tr><td>Year</td><td>2006</td><td>2008</td><td>2010</td><td>2012</td></tr><tr><td>Exports</td><td>57</td><td>59</td><td>63</td><td>68</td></tr></table>	Year	2006	2008	2010	2012	Exports	57	59	63	68	8	CO2						
Year	2006	2008	2010	2012																
Exports	57	59	63	68																
		OR																		
Q.3.	C)	Estimate f(3.6) using Newton's Interpolation formula, from the following data <table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>f(x)</td><td>2</td><td>2</td><td>6</td><td>20</td><td>50</td></tr></table>	x	0	1	2	3	4	f(x)	2	2	6	20	50	7	CO2				
x	0	1	2	3	4															
f(x)	2	2	6	20	50															
	D)	i) Prove that : $\Delta^4 f(x) = f(x + 4h) - 4f(x + 3h) + 6f(x + 2h) - 4f(x + h) + f(x)$	4	CO2																
		ii) Prove that: $f(3h) = f(0) + 3\Delta f(0) + 3\Delta^2 f(0) + \Delta^3 f(0)$	4	CO2																
Q.4		Answer the following questions.																		
	A)	Find Technology matrix for the following input-output table. <table><tr><td>Industry</td><td colspan="2">Consumption by</td><td>Final Demand</td></tr><tr><td></td><td>A</td><td>B</td><td></td></tr><tr><td>A</td><td>50</td><td>20</td><td>50</td></tr><tr><td>B</td><td>35</td><td>40</td><td>70</td></tr></table>	Industry	Consumption by		Final Demand		A	B		A	50	20	50	B	35	40	70	5	CO1
Industry	Consumption by		Final Demand																	
	A	B																		
A	50	20	50																	
B	35	40	70																	
	B)	A company manufactures notebooks. The weekly total cost function is given by $C=15x+3000$. If each notebook is sold at Rs.25, What is the minimum quantity that needs to be produced to ensure no loss? Also, If selling price of a notebook is increased by 20%, What would be the minimum quantity that needs to be produced and sold to ensure no loss?	5	CO1																
	C)	Define: Compound Interest, Annuity, Sinking Fund, EMI, Effective Rate of Interest.	5	CO1																




Semester (November 2022 to March 2023)

Examination: End Semester Examination March/April 2023 (UG Programmes)

Programme code: 7		Class: FY	Semester: II
Programme: BBA			
Name of the Constituent College: S K Somaiya College		Name of the Department: Business Studies	
Course Code: 131U07C201	Name of the Course: Quantitative Techniques-II		
Duration: 2 Hrs.	Maximum Marks: 60		
Instructions: 1) Use of calculator is allowed 2) Assume suitable data if necessary			

Q. No.				Max. Marks	CO Attainment																									
Q.1	A)	i)	Mr. Akash lent Rs. 5000 to Mr. Prashant and Rs. 4000 to Mr. Sagar for 5 years and received total simple interest of Rs. 4950. Find (i) the rate of interest and (ii) simple interest of each.	4	CO3																									
		ii)	Find the amount for an ordinary annuity with periodic payment of Rs. 3000, at 9% p.a. compounded semi-annually for 4 year	3	CO3																									
	B)	Find the compound amount and compound interest of Rs. 1200 invested for 5 years at 5% if the interest is compounded (i) annually, (ii) semiannually, (iii) quarterly and (iv) monthly.		8	CO3																									
		OR																												
Q.1	C)	Mr. Shyam Rane has borrowed a sum of Rs. 100000 from a bank at 12% p.a. and is due to return it back in 5 monthly installments. Find the EMI he has to pay and also prepare the amortization table of repayment.		7	CO1																									
	D)	i)	If $A = \begin{bmatrix} 1 & 4 & 3 \\ 2 & 0 & 5 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 1 & -1 \\ 1 & 3 & 4 \\ 0 & 5 & 6 \end{bmatrix}$ Find product matrix $A \times B$, can you find $B \times A$?	4	CO1																									
		ii)	Evaluate $A = \begin{vmatrix} 0 & b & -c \\ -b & 0 & a \\ c & -a & 0 \end{vmatrix}$	4	CO1																									
Q.2	A)	Find Inverse of Matrix A by adjoint method $\begin{bmatrix} 1 & 4 & 0 \\ -1 & 2 & 2 \\ 0 & 0 & 2 \end{bmatrix}$		7	CO1																									
	B)	For the following two industry-output model, find technology matrix A. Also calculate the level of output, if final demand of each product increases by 60 units. Further find the labour requirement for this output.		8	CO1																									
		<table><tr><th>Industry</th><th colspan="2">Consumption by</th><th>Final Demand</th><th>Total Output</th></tr><tr><td></td><td>1</td><td>2</td><td></td><td></td></tr><tr><td>1</td><td>120</td><td>130</td><td>150</td><td>400</td></tr><tr><td>2</td><td>120</td><td>180</td><td>200</td><td>500</td></tr><tr><td>Labour</td><td>80</td><td>200</td><td></td><td></td></tr></table>		Industry	Consumption by		Final Demand	Total Output		1	2			1	120	130	150	400	2	120	180	200	500	Labour	80	200				
Industry	Consumption by		Final Demand	Total Output																										
	1	2																												
1	120	130	150	400																										
2	120	180	200	500																										
Labour	80	200																												





		OR																	
Q.2.	C)	By dividing 50 into two parts so that their product is maximum, use maxima and minima in derivatives.				7	CO2												
	D)	i)	If $y = x^3 - 6x^2 + 19x + 100$ find $\frac{d^2y}{dx^2}$			4	CO2												
		ii)	Find derivative $y = \frac{10e^x + 5\log x}{x^3 + 12}$			4	CO2												
Q.3.	A)	The cost of producing X item is given by $2x^2 + 5x + 20$. find the total cost, average cost and marginal cost when $x=10$				7	CO2												
	B)	If $f(x) = 2x^2 - 3x + 1$, find the values of $f(x)$ for $x=0,1,2,3,4$. Prepare the forward difference table and show that Second forward differences are constant.				8	CO2												
		OR																	
Q.3.	A)	Construct a difference table for $f(x) = 5x^2$, $x = 0(1)4$. Hence find $f(1.5)$ using Newton's Forward Difference Formula.				7	CO2												
	B)	Prove that:																	
		i)	$f(a + 2h) = f(a) + 2\Delta f(a) + \Delta^2 f(a)$			4	CO2												
		ii)	$\Delta^4 y_0 = y_4 - 4y_3 + 6y_2 - 4y_1 + y_0$			4	CO2												
Q.4	Answer the following questions.																		
	A)	Define				5	CO2												
		i)	Lower Triangular Matrix																
		ii)	Upper Triangular Matrix																
		iii)	Transpose of Matrix																
		iv)	Symmetric Matrix																
		v)	Diagonal Matrix																
	B)	Show that if rows and columns of a determinant are interchanged, its value remains the same.				5	CO2												
	C)	Construct Backward difference table for the following. Also find $\nabla f(4), \nabla^2 f(4), \nabla^3 f(4)$ and $\nabla^4 f(4)$				5	CO2												
		<table><tr><td>x</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>f(x)</td><td>12</td><td>15</td><td>17</td><td>20</td><td>25</td></tr></table>				x	0	1	2	3	4	f(x)	12	15	17	20	25		
x	0	1	2	3	4														
f(x)	12	15	17	20	25														