

SOMAIYA

VIDYAVIHAR UNIVERSITY

Somaia School of Humanities and Social Science

QUESTION PAPERS

BRANCH: Master of Arts (Economics)	SEM: II
	DEC-2024

Sr. No.	Subject	Available
1.	231P26C104 – Mathematical Economics	
2.		
3.		
4.		
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10.		



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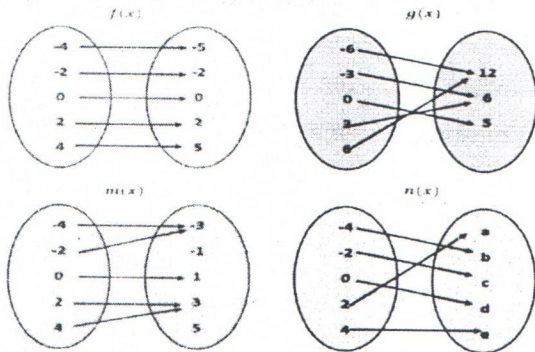


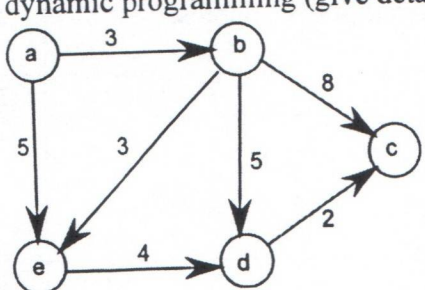
SOMAIYA
VIDYAVIHAR UNIVERSITY



ATKT March 25
economics sem
26/03/25

Semester (November / December 2024)			
Examination: End Semester Examination (PG Programmes)			
Programme code: 26		Class: FY	Semester: I
Programme: MA-Economics			
Name of the Constituent College: S K Somaiya College		Name of the Department : Economics	
Course Code: 231P26C104	Name of the Course: Mathematical Economics		
Duration : 2 Hrs.	Maximum Marks : 60		
Instructions: 1) All questions are compulsory 2) Figures to the right indicate full marks. 3) Use of Simple calculators allowed			

		Max Marks	CO PO Mapping
Q1		(15M)	
A)	1) State properties of sets with respect to union, intersection and difference 2) Define function and its related concepts with an example.	04 03	1
B)	1) For the following matrix A verify $AA^T = I$ where $A = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}$ 2) Solve by Cramer's Rule : $3x - y + 2z = 13$; $2x + y - z = 3$; $x + 3y - 5z = -8$	08	1
	OR		
C)	i) Consider the functions given below, Justify which of them are one-one, onto and hence bijective :  ii) Given $f(x) = x^2 + 2$. draw graph of $f(x)$	04 03	1
D)	i) Let Demand and Supply functions be : $Q_d = 51 - 3P$, $Q_s = 6P - 10$. Find equilibrium price and quantity, P^* , Q^* by elimination of variables. ii) Explain General Market Equilibrium	05 03	1
Q2		(15M)	
A)	1) Find inverse of $A = \begin{bmatrix} 2 & -2 & 2 \\ 2 & 3 & 0 \\ 9 & 1 & 5 \end{bmatrix}$ 2) Explain Static Analysis.	05 02	2
B)	1) Find dy/dx : (State the rules used) i) $(2x^{4/3} - 8x)(6\log x + \frac{10}{\sqrt{x}})$ ii) $\frac{x + \sqrt{x}}{\sqrt{x} - 2}$ 2) Find $\frac{d^2y}{dx^2}$: $e^x - 2x + 20$	06 02	2
	OR		
			[P.T.O]

Q.2	1) Define injective, surjective and bijective functions. Give one example for same.	05	2
C)	2) calculate all partial derivatives for $f(x,y) = x^2y^2 + 3xy^2$	02	
D)	1) The cost for producing x units is Rs $x^2 + 2x + 5$ and price is Rs $(30 - x)$ per unit. Find profit function, cost and revenue function at $x = 10$. 2) Define order and degree of differential equations, hence find the same for $12(d^4y/dx^4) - 2(dy/dx)^4 + (d^2y/dx^2) + 4 = 0$	05 03	2
Q3		(15M)	
A)	1) Find extreme values : $f(x) = 3x^3 - 36x^2 + 135x - 13$ 2) Distinguish between constrained and unconstrained optimization.	05 02	3
B)	Solve : i) $\int \frac{1}{\sqrt[3]{x}} dx$ ii) $\int (2e^x + 5 \cos x) dx$ iii) $\int (x^4 - 12 + \frac{1}{x})x^2 dx$ iv) $\int x^5 \sqrt{x} dx$	08	3
	OR		
C)	1) check if differential equation is exact and hence solve : $(2xy + 6x)dx + (x^2 + 4y^3)dy = 0$ 2) Solve difference equation : $y_{t+1} = y_t + 3 ; y_0 = 5$	05 02	3
D)	Solve : i) $\int_0^1 (x + 5x^3) dx$ ii) $\int_2^3 (\frac{4x^2}{x} + 7) dx$ iii) $\int_2^4 (x^{5/2} + x) dx$ iv) $\int_0^1 (e^x + \sqrt[3]{x}) dx$	08	3
Q4		(15M)	
A)	1) The marginal revenue of a company is given by : $MR = 200 + 30Q + 5Q^2$, Where Q is amount of units sold for a period. Find total revenue if at $Q = 2$ it is equal to 260. 2) State the areas where optimization can be applied.	05 02	4
B)	1) Elaborate on terminologies used in dynamic programming. 2) Explain characteristics of Dynamic Programming	08	4
	OR		
C)	1) For a certain product, the demand function is $D(Q) = 100 - 25Q$ and the supply function is $S(Q) = 100 + Q^2$. Compute consumer and producer surplus 2) What is optimization? List its types.	05 02	4
D)	Consider the following network . Find the optimal path to travel from a to c using dynamic programming (give detailed steps): 	08	4