

Reg. No.:

Name:.....



University of Kerala

First Semester Degree Examination, November 2024

Four Year Under Graduate Programme

Discipline Specific Core Course

MATHEMATICS

UKIDSCMAT109- MATHEMATICS FOR SOCIAL SCIENCE I

Academic Level: 100-199

Time: 2 Hours

Max. Marks: 56

Part A.

Answer All Questions, Objective Type. 1 Mark Each.
(Cognitive Level: Remember/Understand) 6 Marks. Time: 5 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
1.	Define finite set.	Remember	CO 1
2.	Give examples for A and B such that $A \subset B$.	Remember	CO 1
3.	Give an example of a quadratic equation	Understand	CO 2
4.	Solve $13x - 4(5x - 8) + 17 = 0$	Understand	CO 2
5.	Solve $ x+5 x-1 = x-3 x+2 $.	Understand	CO 2
6.	What do you mean by an objective function of an L.P.P	Understand	CO 3

Part B.

Answer All Questions, Two-Three sentences. 2 Marks Each.
(Cognitive Level: Understand/Apply) 10 Marks. Time: 20 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
7.	Let $A=\{0,1,2,3\}$ and $x \in A$ and $y \in A$ then find the relation $x > y$.	Understand	CO 1
8.	Define a basic and feasible solution of a L.P problem.	Understand	CO 3
9.	Solve $x^2 - 16x + 48 = 0$	Apply	CO 2
10.	Write an example of Linear Programming Problem	Apply	CO 3
11.	Trace the demand function $p = 2 - x$	Apply	CO 4

Part C.

Answer all 4 questions, choosing among options within each question. Short Answer.
4 Marks Each. (Cognitive Level: Apply/Analyse) 16 Marks. Time: 35 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
12.	(A). State De-Morgan's laws and verify for $A=\{a,b,c\}$, $B=\{c,e,f\}$ and $\Omega=\{a,b,c,d,e,f\}$ OR (B). Verify $(A-B) \cup (B-A) = (A \cup B) - (A \cap B)$ for $A=\{1,2,3,4\}$, $B=\{3,4,5,6\}$.	Apply	CO 1
13.	(A) Solve $(x-3)(x-5) - (x-4)(x-6) = 3$ OR (B) Solve $14(x-4) + 3(x+5) = 6(7-2x) + 4$	Apply	CO 2
14.	(A) Plot the demand curve $p = 10 - x^2$. OR (B) Plot the demand curve $p = (10 - 2x)^2$.	Analyse	CO 4
15.	A) Maximize $f(X,Y) = X + 2Y$ Subject to : $X + 4Y \leq 24$, $3X + Y \leq 21$, $X + Y \leq 9$ and $X, Y \geq 0$. OR B) Maximize $Z = 4X + 6Y$ subject to: $X + Y \leq 20$, $3X + 4Y \leq 72$, and $X, Y \geq 0$	Analyse	CO 3

Part D.

Answer all 4 questions, choosing among options within each question. Long Answer.
6 Marks Each. (Cognitive Level: Analyse/Evaluate/Create) 24 Marks. Time: 60 Minutes

Qn. No.	Question	Cognitive Level	Course Outcome (CO)
16.	(A). If $A=\{1,2,3,4,5\}$, $B=\{3,4,5,6,7\}$, $C=\{0,1,8,9\}$ Find i. $A \cup (B \cap C)$ ii. $(A \cup B) - C$ iii. $(A - B) \cup (B - A)$ OR (B) If $A=\{1,2\}$, $B=\{3,4\}$ and $C=\{1,4,5\}$. Prove that i. $A \cdot (B \cap C) = (A \cdot B) \cap (A \cdot C)$ ii. $A \cdot (B \cup C) = (A \cdot B) \cup (A \cdot C)$	Analyse	CO 1
17.	(A) A market demand curve is given by $D=50-5p$. Find i. the maximum price anybody will pay for the commodity ii. amount demanded when the commodity is a free good OR (B) i. Sketch the supply function $S=20+3p$ where S is the quantity supplied and p, the price. ii. Find the equilibrium price and the quantity when the demand is $D=160-2p$	Evaluate	CO 4
18.	(A) Maximize $f=3X_1 + 4 X_2$ Subject to $X_1+X_2 \leq 6$ $2X_1+4X_2 \leq 21$ $X_1, X_2 \geq 0$ OR (B) Maximize $z = 2x + y$ Subject to $x \leq 4$; $y \leq 3$ $x+2y \leq 8$; $x \geq 0$; $y \geq 0$	Evaluate	CO 3
19.	(A) Solve $\frac{4}{x} + \frac{10}{y} = 2$, $\frac{3}{x} + \frac{2}{y} = \frac{19}{20}$ OR (B) Solve the system of equations $51x-31y=51$ and $31x-51y=31$	Create	CO 2