

GUJARAT UNIVERSITY

B.Sc. SEMESTER-V EXAMINATION : Dec-2021

MATHEMATICS PAPER-306 (PRACTICAL-I, BASED ON MAT-303)

Max. Marks 28 + 7

Time: 12.00 to 3.00

Date : 21-12-2021

SECTION-A

- Note :
1. Attempt any TWO Questions.
 2. All questions carry equal marks.
 3. Viva and Journal carries 7 marks jointly.
 4. Use separate answer-sheets to write answers of section-A and section-B.

- Q-1 (A) Find the 5th root of $-\sqrt{3} + i$.
 (B) Determine where Cauchy-Riemann equations are satisfied for the function $f(z) = (x-y)^2 + 2i(x+y)$. Determine region of analyticity.
- Q-2 (A) show that the function $u(x, y) = 3x^2y + 2x^2 - y^3 - 2y^2$ is harmonic. Find the harmonic conjugate function v and analytic function $f(z)$.
 (B) Determine an analytic function whose real part is $e^{2x}(x \cos 2y - y \sin 2y)$.
- Q-3 (A) Find the image of the infinite strip $0 < y < \frac{1}{2}$ under the transformation $w = \frac{1}{z}$.
 (B) Find the bilinear transformation that maps respectively the points $i, 1, -i$ in Z plane onto the points $-i, 1, i$ in W plane.
- Q-4 (A) Obtain the fourier series expansion of $f(x) = x \sin x$. Hence deduce that $\frac{\pi}{4} = \frac{1}{2} - \frac{1}{1.3} + \frac{1}{3.5} - \frac{1}{5.7} + \dots$
 (B) Obtain the fourier series in $[0, 2\pi]$ for the function $f(x) = \begin{cases} x, & x \in [0, \pi] \\ 2\pi - x, & x \in (\pi, 2\pi] \end{cases}$.

MATHEMATICS PAPER-306 (PRACTICAL-I, BASED ON MAT-304)

Date : 21-12-2021

SECTION-B

Time: 12.00 to 3.00

- Note : 1. Attempt any TWO Questions.
 2. All questions carry equal marks.
 3. Viva and Journal carries 7 marks jointly.
 4. Use separate answer-sheets to write answers of section-A and section-B.

Q-1 (A) Solve the following LPP by graphical method.

Maximize $Z = 5X_1 + 7X_2$

Subject to the constraints: $X_1 + X_2 \leq 4$; $3X_1 + 8X_2 \leq 24$; $10X_1 + 7X_2 \leq 35$;

$X_1, X_2 \geq 0$.

(B) Solve the following LPP by simplex method.

Maximize $Z = X_1 + X_2 - 3X_3$

Subject to the constraints: $3X_1 + 2X_2 + X_3 \leq 3$; $2X_1 + X_2 + X_3 \leq 2$; $X_1, X_2, X_3 \geq 0$.

Q-2 (A) Solve the following LPP by big-M method.

Maximize $Z = 3X_1 + 2X_2$

Subject to the constraints:

$3X_1 + 4X_2 \leq 2$; $3X_1 + 4X_2 \geq 12$; $X_1, X_2 \geq 0$.

(B) Solve the following LPP by 2-phase method.

Maximize $Z = X_1 + X_2$

Subject to the constraints:

$2X_1 + X_2 \geq 4$; $X_1 + 7X_2 \geq 7$; $X_1, X_2 \geq 0$.

Q-3 (A) Using duality solve the following LPP.

Minimize $Z = 3X_1 + 2X_2$

Subject to the constraints:

$2X_1 + X_2 \leq 5$; $X_1 + X_2 \leq 4$; $X_1, X_2 \geq 0$.

(B) Using "Hungarian method" to solve the following AP. Find the minimum cost solution of following 5×5 assignment problem :

	A	B	C	D	E
A	10	5	13	15	16
B	3	9	18	13	6
C	10	7	2	2	2
D	7	11	9	7	12
E	7	9	10	4	12

Q-4 (A) Using MODI method to solve the following TP :

	D ₁	D ₂	D ₃
O ₁	19	70	40
O ₂	30	30	8
O ₃	50	40	70
O ₄	10	60	20

(B) Using MODI method to solve the following TP :

	D ₁	D ₂	D ₃	D ₄
O ₁	11	20	7	8
O ₂	21	16	10	12
O ₃	8	12	8	9