M. A. COLLEGE OF ENGINEERING, KOTHAMANGALAM-686666
(GOVERNMENT AIDED AUTONOMOUS ENGINEERING COLLEGE)
DEPARTMENT OF MATHEMATICS
SECOND SESSIONAL EXAMINATION, OCTOBER 2026
B24MA2T03A-COMPLEX VARIABLES AND APPLICATIONS OF PDE
THIRD SEMESTER (ECB)

Time: 1.5 Hours **Maximum Marks: 40**

Answer all questions.

PART A

1. Write any three assumptions involved in the derivation of one dimensional wave equation. **(CO 2) · · · (3 marks)**

2. Find the steady state temperature distribution in a rod of 10 cm having its ends at **20°C** and **40°C** respectively. **(CO 2) · · · (3 marks)**

3. Check whether the real part of the function $f(z) = \sin z$ is harmonic or not. **(CO 3) · · · (3 marks)**

4. Find the image of the straight line $x = c$ under the mapping $w = e^z$. **(CO 3) · · · (3 marks)**

PART B

5. (a) Solve $pxy + pq + qy - yz = 0$ using Charpit's method.
   (b) Derive all possible solutions of one-dimensional wave equation. **(CO 2) · · · (14 marks)**

6. (a) Check whether the function $u(x, y) = x^3 - 3xy^2 - 5y$ is harmonic and hence find the harmonic conjugate.
   (b) Find the image of the circle $|z - i| = 1$ under the mapping $w = \frac{1}{z}$. **(CO 3) · · · (14 marks)**

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VISION

Excellence in education through resource integration.

MISSION

The institution is committed to transform itself into a centre of excellence in Technical Education upholding the motto "Knowledge is Power". This is to be achieved by imparting quality education to mould technically competent professionals with moral integrity, ethical values and social commitment, and by promoting innovative activities in the thrust areas emerging from time to time.

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