APPLIED MATHEMATICS-I
1st Exam/Common/2952/Jan'2022
(FOR 2018 BATCH ONWARDS)

Duration: 1.15Hrs.   **M.Marks:25**

SECTION-A

Q1. Attempt any three questions.   **3x5=15**

a. Prove that $\cos \alpha + \cos\left(\alpha + \frac{2\pi}{3}\right) + \cos\left(\alpha + \frac{4\pi}{3}\right) = 0$

b. Express the complex number $-1 + \sqrt{3}i$ in polar form.

c. Prove that $\tan 13A - \tan 9A - \tan 4A = \tan 13A \tan 9A \tan 4A$

d. Find the value of k in order that the points (k,1), (5,5) and (10,7) may be collinear.

e. Prove that $7 \log\frac{10}{9} - 2 \log\frac{25}{24} + 3 \log\frac{81}{80} = \log 2$.

f. Resolve $\frac{x^2+1}{(x^2+2)(x^2+3)}$ into partial fractions

g. Solve by using Crammer's rule $3x - 2y = 5, \quad x - 3y = -3$

SECTION-B

Q2. Attempt any one question.   **1x10=10**

i. If x is so small that its square and higher powers may be neglected, then show that
$$\frac{(1+\frac{2x}{3})^{-5}+\sqrt{4+2x}}{\sqrt{(4+3x)^3}} = \frac{3}{8} - \frac{95}{192}x$$

ii. Solve the following equations by matrix method
$3x + y + 2z = 3;$
$2x - 3y - z = -3;$
$x + 2y + z = 4$

iii. Find the equation of circle passing through three points (5,7), (6,6) and (2,-2).

iv. Prove that $\sin 20° \sin 40° \sin 60° \sin 80° = \frac{3}{16}$.