**APPLIED MATHEMATICS-I**
**1st Exam/Common/2952/Feb'2021**
**(For 2018 Batch onwards)**

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

**SECTION-A**

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

a.  Prove that
    Sin (420°) cos (390°) +cos (-300°) sin (-330°) = -1

b.  Resolve $\dfrac{2x+1}{x^2-3x+2}$ into partial fr actions

c.  Find the co-efficient of x $^{16}$ in the expansion of
    $\left(x^2-2x\right)^{10}$

d.  Two vertices of a triangle are (4,-6) and (2,-2) and its centroid is $\left(\dfrac{8}{3},-1\right)$.Find the third vertex.

e.  Obtain the perpendicular form of equation of line from the given value of P=3 and α=45°

f.  Find the equation of a straight line through (4,5) and parallel to 2x-3y-5=0

g.  Prove by using trigonometric formulae that
    Tan 28° = $\dfrac{\cos 17°-\sin 17°}{\cos 17°+\sin 17°}$

h.  If $Z_1$ = 5+7i      and     $Z_2$ = 9-3i      then find $Z_1/Z_2$

**SECTION-B**

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

i.  Find the equation of the circle passing through the points (1,-5),(5,7) and (-5,1).

ii. Show that $(\cos α + \cos β)^2 + (\sin α + \sin β)^2$    = $4\cos^2(\dfrac{α-β}{2})$

iii. If x is small enough that its higher powers may be neglected then show that
    $$\frac{\sqrt{9+7x}-(16+3x)^{1/4}}{(4+5x)} = \frac{1}{4} - \frac{17}{384}x(approx)$$

iv. A boy observes the angle of elevation of a mountain top to be 60° and after walking directly away from it on level ground through 100mt, the angle of elevation is 45°. Find the height of the mountain and the distance between the mountain and first postion of the boy.

v.  Solve the following equation by Crammer's Rule
    x+y-z= -2
    2x-y-z= -7
    4x+y+2z= 4