

S.B. Roll. No.....

APPLIED MATHEMATICS-I
1st Exam/Common/2952/Jun'2021
(For 2018 Batch Onwards)

Duration: 1.15Hrs.

M.Marks:25

SECTION-A

Q1. Attempt any three questions.

3x5=15

- i. Resolve into partial fractions $\frac{5x-2}{x^2-2x-8}$
- ii. Solve the following system of equations using crammer's rule.
 $5x+2y=3$, $3x+2y=5$.
- iii. Find the value of k in order that the points $(k,1)$, $(5,5)$ and $(10,7)$ may be collinear
- iv. If $\tan A = \sqrt{3}$, $\tan B = 2 - \sqrt{3}$ find the value of $\tan (A - B)$
- v. Prove that
$$\begin{vmatrix} x+a & x & x \\ x & x+a & x \\ x & x & x+a \end{vmatrix} = a^2(3x+a).$$
- vi. Find 4th term in the Binomial expansion of $\left(\frac{x}{a} - \frac{a}{x}\right)^{10}$
- vii. If $a^2 + b^2 = 7ab$, show that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2}(\log a + \log b)$
- viii. A $(10, 4)$ B $(-4, 9)$, C $(-2, -1)$ are the vertices of a triangle ABC. Find the equation of the altitude through B.

SECTION-B

Q2. Attempt any one question.

1x10=10

- a. Find the equation of the circle which passes through the points $(5, 7)$, $(6, 6)$ and $(2, -2)$.
- b. Solve the following system of equations by matrix method
 $2x+y+z=1$
 $x-y-z=2$
 $3y-5z=9$
- c. Prove that $\sin 20^\circ \sin 40^\circ \sin 80^\circ \sin 90^\circ = \frac{\sqrt{3}}{8}$
- d. A boy observes the angle of elevation of a mountain top to be 60° and after walking
 - i. Directly away from it on level ground through 100 m the angle of elevation is 45° .
 - ii. Find the height of the mountain and the distance between the mountain and the first Position of the boy.