

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

APPLIED MATHEMATICS-I
1st Exam/Common/2952/Dec'22
(For 2018 Batch onward)

Duration: 3Hrs.

M.Marks:75

SECTION-A

Q1. Answer in one line.

15X1=15

- Find the Modulus of $-1+j$.
- Find quotient of fraction $\frac{(x-1)(x+2)}{(2x-8)(x-5)}$
- Find the value of $8!$
- Find the number of terms in Expansion of $(1+2x)^{-4}$
- Find the value of $\frac{2\pi}{3}$ radian in the degrees
- find value of $\sin 360^\circ$
- Evaluate $\sin 20^\circ + \sin 70^\circ$
- Evaluate $\cos 53^\circ \cos 37^\circ - \sin 53^\circ \sin 37^\circ$
- Evaluate $3\sin 10^\circ - 4\sin 30^\circ$
- Find the Polar co-ordinate of the point $(-3, 4)$
- Find the distance between point $(-6, 7)$ and $(-1, -5)$
- Find the slop of line $2x+4y-7=0$
- Find radius of circle $x^2+y^2-8x+16y+7=0$
- Evaluate k if $\begin{vmatrix} 8 & k \\ 4 & 5 \end{vmatrix} = 0$
- Find centroid of triangle whose vertices are $(4, -3)$, $(-9, 7)$, $(8, 8)$

SECTION-B

Q2. Attempt any six questions.

6x5=30

- If $a^2+b^2=7ab$ prove that $\log\left(\frac{a+b}{3}\right) = \frac{1}{2} [\log a + \log b]$
- Prove that $\begin{vmatrix} x+a & x & x \\ x & x+a & x \\ x & x & x+a \end{vmatrix} = a^2(3x+a)$
- Find the middle term (s) in the Binomial expansion of $(x+\frac{1}{x})^{12}$
- Resolve into Partial fraction $\frac{2x+1}{x^2-3x+2}$
- prove that $\tan 13A - \tan 9A - \tan 4A = \tan 13A \tan 9A \tan 4A$
- A $(10, 4)$, B $(-4, 9)$, C $(-2, 1)$ are the vertices of a triangle ABC find the equation of the altitude through B
- Find the equation of straight line through $(4, 5)$ and parallel to $2x-3y-5=0$
- Show that $(\cos \alpha + \cos \beta)^2 + (\sin \alpha + \sin \beta)^2 = 4\cos^2 \frac{\alpha-\beta}{2}$
- Show that $\frac{\cos 16^\circ + \sin 16^\circ}{\cos 16^\circ - \sin 16^\circ} = \tan 61^\circ$

SECTION-C

Q3. Attempt any three questions.

3x10=30

- Find the Equation of circle passing through point $(1, 2)$, $(3, -4)$, $(5, -6)$
- Prove that $\sin 20^\circ \sin 40^\circ \sin 60^\circ \sin 80^\circ = \frac{3}{16}$
- When x is so small that its Square and higher powers may be neglected then show that $\frac{(9+7x)^{1/2} - (16+3x)^{1/4}}{4+5x} = \frac{1}{4} - \frac{17}{384}x$
- From the top of the cliff 150 m high the angles of depression of two boats which are opposite sides of the cliff are 60° and 30° . Find the distance between boats.
- Solve the equation by Cramer's method.
 $3x+y+2z=3$
 $2x-3y-z=-3$
 $x+2y+z=4$