II REVISION EXAM – 2021

MATHEMATICS

Standard- XII

Time : 3 hours Maximum marks : 90

PART – I

I. **ALL QUESTIONS ARE COMPULSORY** **20 X 1 = 20**

1	If A = $\begin{pmatrix} 2 & 0 \\ 1 & 5 \end{pmatrix}$ $and\ B = \begin{pmatrix} 1 & 4 \\ 2 & 0 \end{pmatrix}$ then $|adj(AB)| =$ 1) -40 2) -80 3) -60 4) -20
2	If A = $\begin{pmatrix} 2 & 3 \\ 5 & -2 \end{pmatrix}$be such that л$A^{-1}$ = A then л is 1) 17 2) 14 3) 19 4) 21
3	When X is real which of the following if true? 1) Z = -$\overline{Z}$ 2) Z = $\overline{Z}$ 3) $\overline{\overline{Z}}$ = -Z 4) $|Z|^2$
4	If $|Z - \frac{3}{2}| = 2\ then\ the\ least\ value\ of\ |Z| is$ 1) 1 2) 2 3) 3 4) 5
5	A Polynomial equation in n of degree n always has 1) n distinct roots 2) n real roots 3) n imaginary roots 4) at most one root
6	The domain of the function defined by f(x) $= \sin^{-1}\sqrt{n-1}\ is$ 1) [1,2] 2) [-1,1] 3) [0, 1] 4) -1,0]
7	The Centre of the circle $2^{x2} + 2^{y2}$+4x – 6y +10 =0 is 1) (2,3) 2) (-2, -3) 3) (2, -3) 4) (-2, 3)
8	Area of the greatest rectangle inscribed in the ellipse $\frac{x2}{a2} + \frac{y2}{b2} = 1$ 1) 2ab 2) ab 3) $\sqrt{ab}$ 4) a/b
9	If $\underset{a}{\rightarrow}$ x $\underset{b}{\rightarrow}$ $= \underset{b}{\rightarrow}$ x $\underset{c}{\rightarrow} = \underset{c}{\rightarrow}$ x $\underset{a}{\rightarrow} = 0$ then the value of $[\underset{a}{\rightarrow}\ \underset{b}{\rightarrow}\ \underset{c}{\rightarrow}]$ is 1) $|\vec{a}|\vec{b}|\vec{c}|$ 2) $\frac{1}{3}$ $|\vec{a}|\vec{b}\ |\vec{c}|$ 3) 1 4) -1
10	If the planes $\vec{\lambda}$ ($\overleftarrow{21} -$ $\vec{\lambda}j +$ $\vec{k}$) =3 and $\vec{\lambda}$ ($\overrightarrow{4\,1}$ $+ \vec{j} -$ μ$\vec{k}$) = 5 are parallel, then the value of λ and μ are 1) ½, -2 2) -1/2, 2 3) -1/2, -2 4) ½, 2
11	Angle between ^{y2}= x and ^{x2} = y at the origin is 1) $\tan^{-1}(\frac{3}{4})$ 2) $\tan^{-1}(\frac{4}{3})$ 3) $\frac{\pi}{2}$ 4) $\frac{\pi}{4}$
12	A stone is thrown up vertically. The height it reaches at time t seconds is given by x = 80t-16t^2 The stone reaches the maximum height in time t seconds is given by 1) 2 2) 2.5 3) 3 4) 3.5
13	The approximate change in the volume v of a cube of side x meters caused by increasing the side by 1 % is 1) 0.03xm^3 2) 0.3 xdxm^3 3) 0.03x^2m^3 4) 0.03x^3m^3
14	The value of $\int_{-1}^{2} 1xdx\ \ is$ 1) $\frac{1}{2}$ 2) $\frac{3}{2}$ 3) $\frac{5}{2}$ 4) $\frac{7}{2}$
15	The value of $\bigcup_0^a \sqrt{a^2 + x^2}$)^3 dx is) $\frac{\pi a3}{16}$ 2) $\frac{3\pi a4}{16}$ 3) $\frac{3\pi a2}{8}$ 4) $\frac{3\pi a4}{8}$

16 The order and degree of the differential equation $\sqrt{sinx}$ (dx + dy) = $\sqrt{cosx}$ (dx – dy) is
1) 1,2 2) 2,2 3) 1,1 4) 2,1

17 If sin x is the integrating factor of the linear differential equation $\frac{dy}{dx}$ + py – Q then P is
1) log sin x 2) cos x 3) tan x 4) cot x

18 A pair of dice numbered 1,2,3,4,5,6 of a six-sided die and 1,2,3,4 of a four – sided die is rolled and the sum is determined Let the random variable X denote this sum. Then the number of elements in the inverse image of 7 is
1) 1 2) 2 3) 3 4) 4

19 The operation * defined by a*b $= \frac{ab}{7}$ is not a binary operation on
1) Q+ 2) Z 3) R 4) C

20 The dual of ~ (pvq) ^ (pv (p ^ ~ r)] is
1) ~ (p^q) ^ (pv(p^~r)] 2) (p^q) ^ (p^(pv ~ r)]
3) ~ (p^q) ^ (p^ (p^λ)] 4) ~(p^q) ^ (pv ~ r)]

PART – II

NOTE: i) ANSWER ANY SEVEN QUESTIONS 7 X 2 = 14
ii) QUESTION NUMBER 30 IS COMPULSORY

21 Find the rank of the matrix : $\begin{bmatrix} 1-2-1 & 0 \\ 3-6\ -3 & 1 \end{bmatrix}$

22 Find the square root of 6 – 8i

23 Find a polynomial equation of minimum degree with rational co-efficients having 2 - $\sqrt{3}$ as a root

24 A concrete bridge is designed as a parabolic arch. The road over bridge is 40m long and the maximum height of the arch is 15m. Write the equation of the parabolic arch

25 If $\underset{a}{\rightarrow}$, $\underset{b}{\rightarrow}$, $\underset{c}{\rightarrow}$, $\underset{d}{\rightarrow}$ are coplanar vectors show that $(\underset{a}{\rightarrow} \text{ x } \underset{b}{\rightarrow})\ x \left(\underset{c}{\rightarrow} x \underset{d}{\rightarrow}\right) = \underset{0}{\rightarrow}$

26 Evaluate the limit of $\lim_{x \to 0} \left(\frac{sinx}{x^2}\right)$

27 Evaluate $\int_0^1 x^3$ $(1 – x)^4$ dx

28 Show that y = mx + $\frac{7}{m}$ m + 0 is a solution of the differential equation $xy^1 + 7\frac{1}{y^1}$ - y = 0

29 If x is the random variable with distribution function F(x) given by
$f(x) = \begin{cases} 0, & x < 0 \\ ½\ x^2 + x) & x \geq 1 \end{cases} o \leq x \leq 1$ then find the propability density function f(x)

30 Prove that (i) PV~P is tautology (ii) P ^ ~ P is contradiction

PART – III

NOTE: (i) ANSWER ANY SEVEN QUESTIONS 7 X 3 = 21
(ii) QUESTION NUMBER 40 IS COMPULSORY

31 Show that $(2 + i\sqrt{3})^{10}$ - $(2 - i\sqrt{3})^{10}$ is purely imaginary

32 Find the value of tan (cos -1 $(\frac{1}{2})$ - $\sin^{-1} (-\frac{1}{2})$]

33 Find the equation of the circle described on the chord
3x + y + 5 = 0 of the circle $x^2 + y^2 = 16$ as diameter

34 Prove that $((\underset{a}{\rightarrow} \text{ x } \underset{b}{\rightarrow}, \underset{b}{\rightarrow} x \underset{c}{\rightarrow}, \underset{c}{\rightarrow} x \underset{a}{\rightarrow}\ ] = \left[\underset{a}{\rightarrow} \underset{b}{\rightarrow} \underset{c}{\rightarrow}\right] 2$

35 Find the intervals of monotonicity and lence find the local extrema for the function
$f(x) = x^2 – 4x + 4$

<table>
<tr><td>36</td><td>Use the linear approximation to find approximate value of $\sqrt[3]{26}$</td></tr>
<tr><td>37</td><td>Evluate $\int_{\partial}^{\frac{\pi}{6}} \sin^5 3xdx$</td></tr>
<tr><td>38</td><td>Find the differential equation of the curve represented by $xy = ae^{x} + be^{-x} + x^{2}$</td></tr>
<tr><td>39</td><td>Solve the equation $x^4 - 14^{x2} + 45 = o$</td></tr>
<tr><td>40</td><td>If $B^T A^T = \begin{pmatrix} -1 & 2 \\ 0 & 1 \end{pmatrix}$ then find the value of $(AB)^{-1}$</td></tr>
<tr><td></td><td>PART – IV
NOTE : ANSWER ALL THE QUESTION 7 X 5 = 35</td></tr>
<tr><td>41</td><td></td></tr>
<tr><td>(a)</td><td>If $A = \begin{bmatrix} -5 & 1 & 3 \\ 7 & 1 & -5 \\ 1 & -1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 1 & 2 \\ 3 & 2 & 1 \\ 2 & 1 & 3 \end{bmatrix}$
Find the products AB and BA and hence solve the system of equations
$x + y + 2Z = 1, 3x + 2y + Z = 7$ and $2x + y + 3z = 2$</td></tr>
<tr><td></td><td>(or)</td></tr>
<tr><td>(b)</td><td>If $Z = x + iy$ is a complex number such that $\text{Im}\left(\frac{2z+1}{iz+1}\right) = 0$ show that the locus of Z is
$2x^2 + 2y^2 + x - 2y = 0$</td></tr>
<tr><td>42</td><td></td></tr>
<tr><td>(a)</td><td>Solve the equation 6x4 – 35x3 + 62x3 – 35x + 6 = 0
(or)
Prove that by Vector method</td></tr>
<tr><td>(b)</td><td>Sin (α + ß) = sin α cos ß + cos α sin ß</td></tr>
<tr><td>43</td><td></td></tr>
<tr><td>(a)</td><td>Show that $\cot^{-1}\left(\frac{1}{\sqrt{x2-1}}\right) = \sec^{-1}x$, 1x1>1</td></tr>
<tr><td></td><td>(or)</td></tr>
<tr><td>(b)</td><td>Identify the types of conic and find centre, foci vertices and directrics of
$18x^2+12y^2-144x+48y+120=0$</td></tr>
<tr><td>44</td><td></td></tr>
<tr><td>(a)</td><td>Find the non-parametric form of vector equation and carterian equations of the plane passing through the points (2,2,1) (9,3,6) and perpendicular to the plane 2x + 6y+6z=9</td></tr>
<tr><td></td><td>(or)</td></tr>
<tr><td>(b)</td><td>On lighting a rocket crackers it gets projected in a parabolic path and reaches a maximum height of 4m when it is 6m away from the point of projection. Finally it reaches the ground 12m away from the starting point Find the angle of projection.</td></tr>
<tr><td>45</td><td></td></tr>
<tr><td>(a)</td><td>If the curves ax2 +by2 = 1 and cx2 +dy2 =1 intersect each other orthogonally then show that
$\frac{1}{a} - \frac{1}{b} = \frac{1}{c} - \frac{1}{d}$</td></tr>
<tr><td></td><td>(or)</td></tr>
<tr><td>(b)</td><td>Find the area of the region bounded by y = cosx , y = sinx the lines $x = \frac{\pi}{4}$ and $x = 5\frac{\pi}{4}$</td></tr>
<tr><td>46</td><td></td></tr>
<tr><td>(a)</td><td>A random variable x has the following probability mass function
<table>
<tr><td>x</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr>
<tr><td>f(x)</td><td>k^2</td><td>$2k^2$</td><td>$3k^2$</td><td>2k</td><td>3k</td></tr>
</table>
Find (i) the value of k (ii) $p(2 \leq x < 5)$ (iii) $P(3 < x)$</td></tr>
<tr><td></td><td>(or)</td></tr>
</table>

(b)	Verify (i) Closure property (ii) Commutative property (iii) associative property (iv) existence of identify and (v) existence of inverse of the operation $+_5$ on z_5 using table corresponding to addition modulo 5
47	
(a)	Find the population of a city at anytime t, given that the rate of increase of population is proportional to the population at that instant and that in a period of 40 years the instant and that in a period of 40 years the population increased from 3,00,000 to 4,00,000
	(or)
(b)	Prove that $\int_0^{\frac{\pi}{4}} log$ (1 + tanx) dx = $\frac{\pi}{8}$ $\log_2$