# FINAL –TEST
# Class XII
# Maths

## SECTION-A

1.Find the angle between two vectors $\vec{a}$ and $\vec{b}$ with magnitude $\sqrt{3}$ and 2 respectively and such that $\vec{a} \bullet \vec{b} = \sqrt{6}$.

2.Find $|\vec{a}|$ and $|\vec{b}|$, if ( $\vec{a}+\vec{b}$ ) • ( $\vec{a}-\vec{b}$ )=8 and $|\vec{a}|$=8$|\vec{b}|$

3.Find $|\vec{a}\times\vec{b}|$, if $\vec{a}$ = $\hat{i}-7\hat{j}+7\hat{k}$ and $\vec{b}$ =3$\hat{i}-2\hat{j}+2\hat{k}$ .

4.Show that the matrix B′AB is symmetric or skew symmetric according as A is symmetric or skew symmetric.

5.If det.A=7/8 find the value of det.8/7$A^{-1}$

6.Evaluate- $\int \frac{xdx}{(x+7)^9}$

7. Evaluate- $\int_{-\pi/2}^{\pi/2} \log\left(\frac{2-\sin x}{2+\sin x}\right)dx$

8. *For what values of* $x \,\&\, y$ *are the following matrices equal,* $A = \begin{bmatrix} 2x+1 & 3y \\ 0 & y^2-5y \end{bmatrix}$,

$B = \begin{bmatrix} x+3 & y^2+2 \\ 0 & -6 \end{bmatrix}$.

9. Solve the diff eqn. $\sin^{-1}\left(\frac{dy}{dx}\right) = x + y$

10. Find an angle $\theta$, which increases twice at fast as its sine.

## SECTION --B

**11.Evaluate** $\int_0^{\pi/4} \frac{\sin x + \cos x}{9 + 16\sin 2x} dx$ **or** $\int_0^{\pi/2} \log \sin x dx$

**12. If P(A) = 0.2, P(B) = 0.3 and P (A U B ) = 0.4, where A & B are two events associated with a random experiment. Find (i) P(A/B) (ii) P(B/A) (iii) P(A′/B ′) (iv) P(B′/A′) where P(A′)=1-P(A) and P(B′)=1-P(B).**

**0r, . Let f: X→R be a relation defined as f(x) = 4x$^2$+12x+15. Show that f: N→ Range of f is inversible. Find the inverse of f.**

**13. Evaluate:** $\int \left[ \log(\log x) + \frac{1}{(\log x)^2} \right] dx........or...........\int \frac{dx}{\sec x + \sin x}$

**14. .Evaluate** $\int \frac{x^2+4}{x^4 - x^2 + 16} dx.......................or......................\int \frac{Sinx}{Sin4x} dx$

**15. Prove that :** $\begin{vmatrix} 1 & x & x^2 \\ x^2 & 1 & x \\ x & x^2 & 1 \end{vmatrix}$ **= (1- x$^3$)$^2$** **OR**

**Prove that :** $\begin{vmatrix} 1+a & 1 & 1 \\ 1 & 1+b & 1 \\ 1 & 1 & 1+c \end{vmatrix}$ **= abc + bc + ca + ab.**

**16. Verify the hypothesis and conclusion of Lagrange's MVT for the function**

$f(x) = \frac{1}{4x-1}, 1 \le x \le 4$ **OR.**

If Cos y = x $\cos^2(a + y)$, with Cos a ≠ 1, prove that $dy/dx = \cos^2(a + y)/\sin a$

17. Find the equation of the plane passing through the points (3,2,1) and (0,1,7) and parallel to the line r=2i-j+k+ λ (i-j-k).OR.

Find the shortest distance between the lines whose vector equations are

$$\vec{r} = (1-t)\,i + (t-2)\,j + (3-2t)k \;\; and \;\; \vec{r} = (s+1)\,i + (2s-1)\,j - (2s+1)k$$

18. Find a unit vector perpendicular to each of the vectors $\vec{a} + \vec{b}$ and $\vec{a} - \vec{b}$ where
$\vec{a}$ = i + j + k , $\vec{b}$ = i + 2 j + 3 k OR

*Let* $\vec{a}, \vec{b}, \vec{c}$ *be three vectors* $|\vec{a}| = 3, |\vec{b}| = 4, |\vec{c}| = 5$ *and each oneof them is being*

Perpendicular to the sum of the other two find $|\vec{a} + \vec{b} + \vec{c}|$

19.Evaluate $\int_1^3 (2x^2 + 5 + e^{2-3x})\, dx$ as limit of a sum. OR

Evaluate $\int_3^6 (|x-3| + |x-4| + |x-5|)\, dx$

20. Find the diff.eqn of all the circles with radius 'r' OR

solve the diff .equation : x dy/dx = y ( log y - log x + 1 )

21. ) For the curve y= $4x^3 - 2x^5$ find all points at which the tangent passes through the origin. OR

Sand is being poured at the rate of 0.3 $m^3$/sec into a conical pile. If the height of the conical pile is thrice the radius of the base, Find the rate of change of height when the pile is 5cm high.

22. If f(x) = $\begin{cases} 3ax+b & If\ \ x>1 \\ 11 & If\ \ x=1 \\ 5ax-2b & If\ \ x<1 \end{cases}$ is continuous at x=1.Find the values of a and b.OR

Find the interval in which the function f is given by

$f(x) = Sinx - Cosx, \quad 0 \le x \le 2\pi$ (i) Increasing (ii) Decreasing.

Section - C

23. Find the area of the region { ( x, y ) : $0 \le y \le x^2 + 1$ ; $0 \le y \le x + 1$ ; $0 \le x \le 2$ }

OR

Using the method of integration find the area of the region bounded by

2x + y = 4 , 3 x – 2 y = 6 and x – 3 y + 5 = 0

24. Evaluate : $\int_{-1}^{3/2} |x\,Sin\pi\,x|\,dx$ or Evaluate

$\int_0^{\pi/2} \frac{x\,Sinx\,Cosx}{Sin^4x + Cos^4x}\,dx$

25. If A= $\begin{bmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{bmatrix}$, find $A^{-1}$ using elementary row operation. *or*

If A= $\begin{bmatrix} 3 & 2 & 1 \\ 4 & -1 & 2 \\ 7 & 3 & -3 \end{bmatrix}$ Find $A^{-1}$ and hence solve the system of linear equation:

x+2y-3z=0. 2x-y+3z=4, 3x+4y+7z=14,

26.A Cylindrical container with a capacity of 20 cubic feet is to be produced. The top and bottom of the container are to be made of a material that costs Rs.6 per squares foot while the side of the container is made of material costing Rs.3 per squares foot. Find the dimension that will minimize the total cost. *Or*

Prove that the Volume of the largest cone that can be inscribed in a sphere of radius R is $\frac{8}{27}$ of the volume of the sphere. Or

Show that the height of the cylinder of greatest volume which can be inscribed in a right circular cone of height h and semi vertical angle $\alpha$ is one third of the cone and the greatest volume of the cylinder is $4/27\ \pi\ h^3 \tan^2 \alpha$

27.Find the distance of the point (2,3,4) from the plane $3x + 2y + 2z + 5 =0$ measured parallel to the line $(x+3)/3 = (y-2)/6 = z/2$ or

If a line makes angles x, y, z & w with the 4 diagonals of a cube then find the value of cos2x+cos2y+cos2z+cos2w.

28 In a test, an examinee either guesses or copies or knows the answer to a multiple choice question with four choices. The probability that he makes a guess is 1/3 and the probability that he copies the answer is 1/6. The probability that his answer is correct given that he copied it is 1/8. Find the probability that he knows the answer to the question, given that he correctly answered it. Or

Suppose a girl throws a die. If she gets a 5 or 6, she tosses a coin three times and notes the number of heads. If she gets 1,2,3 or 4 she tosses a coin once and notes whether a head or tail is obtained. If she obtained exactly one head, what is the probability that she threw 1,2,3 or 4 with the die.

29. Two godowns A and B have a grain storage capacity of 100 quintals and 50 quintals respectively. They supply 3 ration shops D, E and F, whose requirements are 60,50 and 40 quintals respectively. The cost of transportation per quintal from the shop are given below.

Transportation costs per quintal (in Rs)

| TO\FROM | A | B |
|---|---|---|
| D | 6.00 | 4.00 |
| E | 3.00 | 2.00 |
| F | 2.50 | 3.00 |

**How should the supplies be transported in order that the transportation cost is minimum?**

**ALL THE BEST**

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