

CLASS XII MATHEMATICS PRACTICE PAPER

TIME – 3 Hrs

M.M- 100

Section- A

1 Evaluate : $\int \frac{2x+3}{x^2+3x-18} dx$

2 If A is a square matrix of order 3 such that $|\text{adj } A| = 64$, find $|A|$

3 Find the inverse of $f(x) = \frac{ax+b}{c}$

4 If $\vec{a} = i+j$, $\vec{b} = j+k$, $\vec{c} = k+i$, find a unit vector in the direction of $\vec{a} + \vec{b} + \vec{c}$

5 Evaluate $\sin^{-1}(-\frac{1}{2}) + \cos^{-1}(-\frac{\sqrt{3}}{2})$

6 Find the value of μ for which $(2\hat{i} + 6\hat{j} + 27\hat{k}) \times (\hat{i} + 3\hat{j} + \mu\hat{k}) = 0$

7 Find a point on the curve $y = 2x^2 - 6x - 4$ at which the tangent is parallel to x-axis.

8 Evaluate: $\int_0^1 \frac{2x}{5x^2+1} dx$

9 find $\vec{b} \times 2\vec{a} = \begin{vmatrix} \hat{i} & \hat{j} & \hat{k} \\ 3 & 0 & 2 \\ 8 & 6 & 4 \end{vmatrix}$

10 Evaluate $\begin{vmatrix} x^2 - x + 1 & x - 1 \\ x + 1 & x + 1 \end{vmatrix}$

Section- B

11 A bag contains 4 red and 4 black balls, another bag contains 2 red and 6 black balls. one of the two bags is selected and a ball is drawn from the bag which is found to be red. Find the probability that the ball is drawn from bag first.

12 Using properties of determinants Evaluate:
$$\begin{vmatrix} x & y & x+y \\ y & x+y & x \\ x+y & x & y \end{vmatrix}$$

13 Show that the curves $2x = y^2$ and $2xy = k$ cut each other at right angles if $k^2 = 8$.

14 Find the equation of plane through the intersection of planes: $x+3y-z=5$ & $2x-y+z=3$ and passing through the point $(2, 1, -2)$.

15 Prove that $\int_0^{\pi/4} \log(1 + \tan x) dx = \pi/8 \log 2$

16 Differentiate: $x^{\sin x} + \sin x^{\cos x}$ with respect to x

17 If the function $F(x) = \begin{cases} 3ax+b & \text{for } x > 1 \\ 11 & \text{for } x = 1 \\ 5ax-2b & \text{for } x < 1 \end{cases}$ is continuous at $x=1$, find a and b

18 Express the following in simplest form $\tan^{-1} \left(\frac{\sqrt{1+x} - \sqrt{1-x}}{\sqrt{1+x} + \sqrt{1-x}} \right)$

19 Show that the relation R in set of real numbers defined as $R = \{(a, b) : a \leq b^2\}$ is neither reflexive nor symmetric nor transitive.

20 Find the shortest distance between two lines $\vec{r} = (\hat{i} + 2\hat{j} + 3\hat{k}) + \lambda(2\hat{i} + 3\hat{j} + 4\hat{k})$ and $\vec{r} = (2\hat{i} + 4\hat{j} + 5\hat{k}) + \mu(3\hat{i} + 4\hat{j} + 5\hat{k})$

21 Evaluate $\int \frac{e^x}{\sqrt{5-4e^x-e^{2x}}} dx$

22 Evaluate $\int_0^{\pi} \frac{x}{1 + \sin x} dx$

Section- C

23 Solve the equations by Matrices :

$$x+2y-3z=6 ,$$

$$3x+2y-2z=3 ,$$

$$2x-y+z=2$$

24 A wire of length 28 m is to be cut into two pieces. One of the piece is to made into a Square and other into a Circle. What should be the length of two pieces so that the combined are of circle and square is minimum

25 Solve the differential equation : $(x dy - y dx)y \sin \frac{y}{x} = (y dx + x dy) x \cos \frac{y}{x}$

26 Find the area of the region using integration by $\{(x, y) : x^2 + y^2 \leq 1 \leq x + y\}$

27 Find the foot of perpendicular from the point (2,3,4) to the line $\frac{4-x}{2} = \frac{y}{6} = \frac{1-z}{3}$. Also find the perpendicular distance from the given point to the line.

28 A pair of dice is thrown three times . Find yhe probability distribution of No. of sixes. Also find its mean and variance.

29 A company manufactures nuts and bolts. It takes 1 hour of work on machine A and 3 hours of work on machine B to produce a Package of nuts. It takes 3 hour of work on machine A and 1 hours of work on machine B to produce a Package of bolts. He earns a profit of Rs17.50 on nuts & Rs.7.00on bolts. Hoe many Packages of should be manufactured in order to maxmise his profit if he operates his machines atmost 12 hours daily.