

# JKBOSE Class 12 Maths Sample Paper

## MODEL QUESTION PAPER MATHEMATICS Class 12<sup>th</sup>

Maximum Marks: 75

Time: 3 hrs

All questions are compulsory

Section A [Long Answer Type] 5 x 5 = 25 marks

1. Find the equation of a tangent and normal to an Ellipse

$$\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1 \text{ at } (x_1, y_1).$$

Or

Calculate absolute maximum value and absolute minimum value of

$$f(x) = -x^3 + 10x^2 - 12x; 3 \leq x \leq 9.$$

2. Evaluate

$$\int \frac{e^{2 \log x} - e^{-\log x}}{e^{2 \log x} - e^{\log x}} dx.$$

Or

Evaluate

$$\int \frac{x^3 + 3x^2 + 3x + 4}{x^2 + 2x + 1} dx.$$

3. Evaluate

$$\int_0^{\pi/2} \frac{\sqrt{\tan x}}{\sqrt{\tan x} + \sqrt{\cot x}} dx.$$

Or

Evaluate

$$\int \frac{dx}{(x-a)^2(x-b)}$$

4. A particle is moving in a straight line from a fixed point according to the law  $x = t^3 - 4t^2 + 3t + 5$ . Where  $x$  is in mts.  $t$  is in seconds. Find the distance, velocity & acceleration at the end of 3 seconds.

Or

A particle moves in a straight line according to law  $S = t^3 + at^2 + bt + c$ .

Where  $S$  is in mts.  $t$  is in seconds and  $a, b, c$  are constants. Find the value of

$a, b$  and  $c$  it being given that  $t = 1, S = 7m/s, f = 12m/s^2$ .

5. A weight of 36 kg is suspended by two ropes 6m and 8m long fastened to two points on some horizontal line 10m apart. Find tension in two ropes.

Or

19. If three forces are acting at a point in equilibrium, then find angle between them.

20. Find the acceleration of a body whose displacement is  $S = 3t^3 + 5t^2 + 2$  at the end of 2 sec.s.

21. If the resultant of two forces  $P$  &  $Q$  makes an angle  $\theta$  with  $P$ . Prove that

$$\tan \theta = \frac{R \sin \alpha}{P + Q \cos \alpha}.$$

22. Solve the Differential equation  $x dy = y dx$ .

23. Find the integrating factor of a differential equation  $\frac{dy}{dx} + \tan x y = x^2$ .

**Section D [Objective type Questions] 6 x 1 = 6 marks**

24.  $\int \operatorname{cosec} x dx$

a)  $\log \cot x$

b)  $\log(\operatorname{cosec} x + \cot x)$

c)  $-\log(\operatorname{cosec} x + \cot x)$

d) None of the above

25.  $\int a^x dx$

a)  $a^x / \log a$

b)  $a^x \log a$

c)  $a^x$

d) None of the above

26.  $\int_0^a f(x) dx$

a)  $\int_0^a f(a-x) dx$

b)  $-\int_0^a f(x) dx$

c)  $\int_0^a f(-x) dx$

d) None of the above

27.  $\int_{-a}^a f(x) dx = 2 \int_0^a f(x) dx$

If

a)  $f(x)$  is odd