SARASWATI Education Society's
SARASWATI Institute of Technology
Learn Live Achieve and Contribute
Kharghar, Navi Mumbai - 410 210.

Department of Mechanical Engineering

Vision: "To incorporate technical & professional skills in Mechanical Engineers to fulfill industrial & social needs.".

- **Mission:** ● To educate, guide, and mentor the students for academic excellence.

  ● To improve the practical knowledge of the student as per current scenario of industry

  ● To develop technical skills and discipline among the students as per the requirement of the industry.

Assignment No :- 01 **Subject : Maths**

Topic Name :- Function and limits

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1) if f(x) = $\frac{x^2+1}{x^3-1}$, find f($\frac{1}{2}$)

2) If f(x)= $x^3 - 5x^2 - 4x + 20$

3) If f(x)= $64^x + \log_3 x$, find f($\frac{1}{3}$)

4) If f(x)= $x^2 - 3x + 4$

5) If f(x)= $\frac{x-4}{4x-1}$

6) State whether the function f(x)= $x^3 - 3x + \sin x + x\cos x$ or odd.

7) If f(x)= $\log_{10} x$ and g(x)= 100^x

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Assignment No :- 02 **Subject : Maths**

Topic Name :- Derivatives

Q.1) Find $\frac{dy}{dx}$, if $y = x^{10} + 10^x + e^x$

Q.2) Find $dy\ d$, $y = 5\ .x^7$

Q.3) Find $\frac{dy}{dx}$, $y = \frac{\sin x}{\sqrt{1+\cos}}$

Q.4) Find $\frac{dy}{dx}$, $y = (3x^2 + 2)^5$

Q.5) Find $\frac{dy}{dx}$, $if\ y = e^{x.\sin^{-1}x}$

Q.6) Differentiate $\tan^{-1}\left(\frac{2X}{1+35x^2}\right)$ w.r.t '.x'

Q.7) If $y = \sin^{-1}(3x - 4x^3)$ Find $\frac{dy}{dx}$

Q.8) Find $\frac{dy}{dx}$ $if\ x^2 + y^2 = xy$

Q.9) Find $\frac{dy}{dx} if\ x = \ = cos\theta$

Q.10) If $x^2 + y^2 + xy - y = 0$ find $\frac{dy}{dx}$ at (1,2)

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Assignment No :- 03 **Subject : Maths**

Topic Name :- Application of Derivatives

Q.1) If y = logx show that $x\frac{d^2y}{dx^2}+\frac{dy}{dx}=0$

Q.2) Find the slope of the tangent and normal of the following curves.

a) $\boldsymbol{y = 3x^4 - 4x \ \ at\ x = 4}$

b) $\boldsymbol{y = \sqrt{x^3}\ at\ x = 4}$

Q.3) Find maxima & minima of $x^3 - 18x^2 + 96x$

Q.4) A metal wire 36 cm long is bent to form a rectangle. Find its dimensions when the area is maximum.

Q.5) Find the radius of curvature of the curve $y = x^3$(2,8)

Q.6) Find the maximum &minimum value of$y = x^3 - 9x^2 + 24x$

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Assignment No :- 04 **Subject : Maths**
Topic Name :- Integration

Q.1) Evaluate $\int x\,(x+2)^2\,\boldsymbol{dx}$

Q.2) Evaluate $\int (1-x^2)^{10}\,\boldsymbol{dx}$

Q.3) Evaluate $\sqrt{\frac{1+\cos 2x}{1-\cos}}\,\boldsymbol{dx}$

Q.4) Evaluate $\int \frac{\tan(\log x)}{x}\,\boldsymbol{dx}$

Q.5) Evaluate $\int \frac{e^m \tan^{-1} x}{1+x^2}\,\boldsymbol{dx}$

Q.6) Evaluate $\int sin^5 x\,.cos x\,\boldsymbol{dx}$

Q.7) Evaluate $\int cos-1\,(sinx)\;dx$

Q.8) Evaluate $\int \frac{dx}{x^2+9}$

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.Assignment No :- 05 **Subject : Maths**
Topic Name :- definite integral & application of definite intgration

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Q.1) $Evaluate \int_0^{\frac{\pi}{2}} \frac{dx}{1+x^2}$

Q.2) Evaluate $\int_0^{\frac{\pi}{4}} x.\sec^2 x\, dx$

Q.3)i. Evaluate: $\int_4^5 \frac{\sqrt{5-x}}{\sqrt{x-4}+\sqrt{5-x}}\, dx$

ii. Evaluate: $\int_0^{\pi/2} \frac{\tan x}{\tan x + \cot x}\, dx$ iii $\int_1^e \frac{1}{x}.logx dx$

Q.4) solve the following.

Find the area of an ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$

Find the area of the circle $x^2+y^2=r^2$ by integration.

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Assignment No :- 06 **Subject : Maths**
Topic Name :- Differential Equation & Application of Differential Equation

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Q.1)

Find the order & degree of the differential equation $\frac{d^2x}{dt^2} + \left(\frac{dx}{dt}\right)^3 = \sqrt{5}\,x$

Q.2)

Find the order & degree of the differential equation $\frac{d^2y}{dx^2} = \left(y + \frac{dy}{dx}\right)^{3/2}$

Q.3)

Form the differential equation by eliminating the arbitrary constants if $y = A\,e^{2x} + B\,e^{3x}$

Q.4)

Find the equation of the curve whose slope at any point is $3x^2 - 2x + 1$ and it passes through the point $(2, 3)$

Q.5) Find integrating factor of $(1 + x^2)\frac{dy}{dx} + y = e^{\tan^{-1}x}$

Q.6) Solve: $\frac{dy}{dx} = e^{x-y} + x\,e^{-y}$

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Assignment No :- 06 **Subject : Maths**
Topic Name :- probability Distribution

Q.1) A manufacture can sell x ($x > 0$) items at price is of $(330 - x)$ each. The cost of producing x items in $x^2 + 10x + 12$. How many items must be sold so that his profit is maximum.

Q.2) If the probability of a bad reaction from the certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction. (Given $e^2 = 7.4$).

Q.3) If 20% of the bolts produces by a machine are defective find the probability that out of 4 bolts drawn.

1) One is defective

2) at most two are defective

Q.4)In a sample of 1000 cases the mean of certain test is 14 and S.D is 2.5. Assuming the distribution to be normal. Find

i) How many students score between 12 and 15?

ii) How many students score above 18?

[Given : A (0.8) = 0.2881, A (0.4) = 0.1554, A (1.6) = 0.4452]

Q.5) If the coin is tossed three ti~~mes. Find~~ the probability of getting exactly two Heads.

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