S. B. Roll. No.....

APPLIED MATHEMATICS-II
2nd Exam/Common/0106/Nov'24
(For 2023 Batch Onwards)

Duration: 3Hrs. **M.Marks:50**

SECTION-A

Q1. Do as directed any nine of the following. **9x1=9**

i. $\int xe^x dx =$ a) $(x+1)e^x$ b) $(x-1)e^x$ c) $(x-1)\bar{e}^x$ d) $-(x-1)e^x$

ii. $\underset{n\to 0}{Lt}\dfrac{\sin x - x}{x} =$ a) 1 b) -1 c) 0 d) $\propto$

iii. If $f(-x) = f(x)$ then $f(x)$ is a) odd function b) even function c) Both d) None

iv. $\int_0^1 \dfrac{1}{1+x^2}dx$ = a) $\dfrac{\pi}{2}$ b) $\dfrac{\pi}{4}$ c) 1 d) 0

v. $\int \log x\,dx = \dfrac{1}{x}$ (T/F)

vi. Degree of $\left(\dfrac{d^2y}{dx^2}\right)^2 + x^2\left(\dfrac{dy}{dx}\right)^3 = 0$ is 2. (T/F)

vii. For tangent parallel to y-axis, $\dfrac{dy}{dx} = \propto$ (*true/ false*)

viii. If $y = \log(Cosx)$, then $\dfrac{dy}{dx} = -\tan x$(*true/ false*)

ix. $\underset{n\to 0}{Lt}\dfrac{2^x - 1}{x} =$ _____

x. If θ is in radians $\lim\limits_{\theta\to 0}\dfrac{\sin(2\theta)}{\theta} =$ .....

xi. Derivative of x^{10} w. r. to. x^5 is_____

xii. $\int e^{\log x}dx =$ _____

SECTION-B

Q2. Attempt any five questions. **5x4=20**

a. Find maximum minimum value of $y = x^3 - 6x^2 + 9x + 15$

b. Evaluate $\int x\cos x\,dx$

c. Evaluate $\int \sin^2 x\,dx$

d. $y = \sin\left(2\tan^{-1}\sqrt{\dfrac{1-x}{1+x}}\right)$, prove that $\dfrac{dy}{dx} = -\dfrac{x}{\sqrt{1-x^2}}$

S. B. Roll. No.....

e. Find derivative of $y=\log\left(x+\sqrt{x^2-a^2}\right)$

f. Differentiate the following function $y=(x)^x$

g. Evaluate $\int_0^{\pi/2}\cos^6(x)\,dx$

SECTION-C

Q3. Attempt any three questions. **3x7=21**

i. Evaluate $\int Sin^4 x\,dx$

ii. Evaluate $\int_0^{\pi/2}\frac{\cos x}{\sin x+\cos x}dx$

iii. Solve the differential equation $(1+x^2)\,dy=(1+y^2)dx$

iv. If $x=a(\theta-\sin\theta);\ y=a(1+\cos\theta)$, find $\frac{d^2y}{dx^2}$

v. Find the area of the region bounded by $y=x^2-x+2$, the $x-$axis and the lines $x=0$ and $x=3$