Name:		Roll#:		Class:	Inter Part-II
Subject:	Mathematics-12	Date:		Time:	
Test Type #	Type 15 - Full Test - Board Paper Pattern - Marks=100				
Test Syllabus:	Unit-1, Unit-2, Unit-3,				

1. $f(x)=x^{\frac{2}{3}}$ is a/an__________
(A) Even Function (B) Odd Function (C) Neither even nor odd (D) Cubic Function

2. $tanh^{-1}x=$
(A) $\frac{1}{2}ln\left(\frac{1+x}{1-x}\right)$ (B) $\frac{1}{2}ln\left(\frac{x+1}{x-1}\right)$ (C) $ln\left(\frac{1+\sqrt{1-x2}}{2}\right)$ (D) $ln\left(\frac{1+\sqrt{x2++1}}{2}\right)$

3. **Parametric equations: *x* = a cos q, *y* = b sin q represent the equation of:**
(A) parabola (B) hyperbola (C) ellipse (D) circle

4. The notation used for derivative of f(x) by Cauchy is:
(A) Df(x) (B) f'(x) (C) f(x) (D) $\frac{df}{dx}$

5. $\frac{d}{dx}(cosec^{-1}x)=$______
(A) $\frac{1}{x\sqrt{x2-1}}$ (B) $\frac{-1}{x\sqrt{x2-1}}$ (C) $\frac{1}{x\sqrt{x2+1}}$ (D) $\frac{1}{x\sqrt{1-x2}}$

6. The derivative fo Cot x w.r.t x equals:
(A) -Cosec^2 x (B) Cosec^2 x (C) -Sec^2 x (D) Sec^2 x

7. If $y=sin^{-1}\frac{x}{a}$, then sin y=:
(A) cos y (B) cos x (C) $\frac{x}{a}$ (D) $\frac{y}{a}$

8. $\frac{\mathrm{d}}{\mathrm{d}x}(coth\,x)=$:
(A) -cosech^{2}x (B) cosech^{2}x (C) tanh^{2}x (D) -coth x sech x

9. $1-\frac{x^2}{2!}+\frac{x^4}{4!}-\frac{x^2}{6!}+...$ is Maclaurin:
(A) $cos\,x$ (B) $sin\,x$ (C) $ln(1+x)$ (D) $\sqrt{1+x}$

10. $f'(x_1)>0$ implies f is a/an _____ function at the point x_1:
(A) increasing (B) decreasing (C) maxima (D) minima

11. If f(c) _____ f(x) for all $x\,\epsilon(c-\delta,c+\delta x)$, then the function f is siad to have a relative minima at x = c.
(A) = (B) $\leq$ (C) $\neq$ (D) $\geq$

12. **Let f be a differentiable function on the interval (a , b). Then f is a\an ---------- on (a , b) if f ¢(x) > 0 for each x Î (a , b).**
(A) increasing (B) decreasing (C) maxima (D) minima

13. $\int\frac{-1}{x\sqrt{x^2-1}}dx=$_____:
(A) $tan^{-1}x+c$ (B) $cosec^{-1}x+c$ (C) $sec^{-1}x+c$ (D) $sin^{-1}x+c$

14. $\int(2x+3)^8dx=$
(A) $\frac{(2x+3)^9}{18}$ (B) $(2x+3)^9$ (C) $18(2x+3)^9$ (D) None

15. $\int a\times f(x)\,dx=$.........., where a is any constant.
(A) $\int f(x)\,dx$ (B) f (x) (C) $a\times\int f(x)\,dx$ (D) $a+\int f(x)\,dx$

16. **To integrate $\int\frac{dx}{x\sqrt{x^2+144}}$ dx we will make substitution:**
(A) x = 14 sin q (B) x = 144 tan q (C) x = 14 tan q (D) x = 12 tan q

17. $\int_0^{\frac{\pi}{2}}sin^2x\,dx=$_____:
(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{6}$

18. $\int_0^1(3-x)dx$ equals:
(A) $\frac{3}{2}$ (B) $\frac{2}{3}$ (C) $\frac{5}{2}$ (D) $\frac{2}{5}$

19. $\int_{-1}^{0}\frac{1}{1+x^2}dx$ =:
(A) $\frac{\pi}{4}$ (B) $\frac{4}{\pi}$ (C) $-\frac{\pi}{4}$ (D) $-\frac{4}{\pi}$

20. If $\int_a^b f(x)\,dx$, then 'b' is knownas the _______ of integration.
(A) domain (B) range (C) lower limit (D) upper limit

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(SECTION-I)

2- Write short answers to any EIGHT (8) of the following questions. (8x2=16)

i. Given that $f(x)=x^3-2x^2+4x-1$ find $f\left(\frac{1}{x}\right)$.

ii. If f(x) = $3x^4-2x^2$ and g(x) = $\frac{2}{\sqrt{x}}$, then find g(f(x)).

iii. Evaluate each limit by using algebraic techniques: $\underset{x\to 1}{Lim}\frac{x^3-3x^2+3x-1}{x^3-x}$

iv. $f(x)=\begin{cases}2x+5 & if\ x\le 2\\ 4x+1 & if x>2\end{cases}$ at x=2.

v. Find the derivative of x^3+2x+3.

vi. Define implicit function also write one example.

vii. Find $f'(x)$ if $f(x)=ln(\sqrt{e^{2x}+e^{-2x}})$.

viii. Evaluate $\int\frac{1-x^2}{1+x^2}dx$.

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

x. Evaluate $\int x^2tan^{-1}x\,dx$.

xi. Find area bounded by the curve $y=4-x^2$ and x-axis.

xii. Solve the differential equation $\frac{1}{x}\frac{dy}{dx}=\frac{1}{2}(1+y^2)$.

3- Write short answers to any EIGHT (8) of the following questions. (8x2=16)

i. Define parameter and parametric function.

ii. Find the domain and range of the function g defined below and sketch of g: $g(x)=\frac{x^2-16}{x-4}, x\neq 4$

iii. Define function.

iv. State the sandwich theorem.

v. Evaluate the limit $\underset{x\to+\infty}{lim}\left(1+\frac{3}{n}\right)^{2n}$.

vi. Evaluate each limit by using algebraic techniques: $\underset{h\to 0}{Lim}\frac{\sqrt{x+h}-\sqrt{x}}{h}$

vii. Divide 20 into two parts so that the sum of their squares will be maximum.

viii. Evaluate $\int x^2ln\,x\,dx$.

ix. Evaluate $\int e^x\left(\frac{1}{x}+ln\,x\right)dx$.

x. Evaluate $\int\frac{2x}{x^2-a^2}\,dx$.

xi. Solve the differential equation $\frac{dy}{dx}=-y$.

xii. Solve the differential equation $x\,dy+y(x-1)dx=0$.

4- Write short answers to any EIGHT (8) of the following questions. (8x2=16)

i. Show that $x=at^2, y=2at$ are parametric equations of parabola $y^2=4ax$.

ii. Show that $\frac{dy}{dx}=\frac{y}{x}$ if $\frac{y}{x}=tan^{-1}\frac{x}{y}$.

iii. Find $\frac{dy}{dx}$ if $y=ln\sqrt{\frac{x^2-1}{x^2+1}}$.

iv. Find $\frac{dy}{dx}$ then y = $(x+1)^x$.

v. Find the extreme values for the following functions defined as: $f(x)=5x^2-6x+2$

vi. Evaluate $\int(a-2x)^{\frac{3}{2}}dx$.

vii. Evaluate $\int\frac{x}{\sqrt{4+x^2}}dx$

viii. Find $\int tan^{-1}x\,dx$.

ix. Evaluate $\int x^4\,lnx\,dx$

x. Evaluate $\int\frac{3-x}{1-x-6x^2}\,dx$.

xi. Evaluate the following integrals: $\int\frac{1}{6x^2+5x-4}dx$

xii. Find the area below the curve $y=3\sqrt{x}$ and above the x-axis between $x=1$ to $x=4$.

xiii. Define first order differential equation.

(SECTION-II)

Attempt any THREE (3) questions. (3x8=24)

5.(a) If $y=e^{ax}sin\,bx$ then show that $\frac{d^2y}{dx^2}-2a\frac{dy}{dx}+(a^2+b^2)y=0$.

(b) Find $f'(x)$ when $f(x)=(ln\,x)^{ln\,x}$.

6.(a) If $y=a\,cos(ln\,x)+b\,sin(ln\,x)$, prove that $x^2\frac{d^2y}{dx^2}+\frac{xdy}{dx}+y=0$.

(b)

Evaluate $\int \sqrt{x^2+4}\,dx$.

7.(a) Find the derivative of $\frac{x\sqrt{x^2+3}}{x^2+1}$ with respect to x.

(b) Use differentials to approximate the value of $cos\,29^o$.

8.(a) Evaluate $\int sec^4 x\,dx$.

(b) Evaluate $\int \frac{dx}{(1+x^2)^{\frac{3}{2}}}$.

9.(a) Evaluate the following integrals: $\int \frac{2x^2-x-7}{(x+2)^2(x^2+x+1)}dx$

(b) Evaluate the following integrals: $\int \frac{9x-7}{(x+3)(x^2+1)}dx$