SWL-18

Roll No.______________ Annual 2018

Mathematics
Paper : II

(INTER PART II CLASS 12th) - (III)
OBJECTIVE

Time :30 Minutes
Marks : 20

Code : 8195

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number with marker or pen. Cutting or filling two or more circles will result in zero mark in that question.

1 i. If $\int_{2}^{k} 2x.dx = 12$ then $K =$

(A) 2 , -2 (B) 2 , 6 (C) 4 , - 4 (D) 4 , 2

ii. Distance of the point $P(x, y)$ from $y-axis$ is

(A) $|x|$ (B) $|y|$ (C) x (D) y

iii. Y - co-ordinate of centroid of the triangle with vertices A(-2 , 3) B (-4 , 1) C (3 , 5) is

(A) 9 (B) 3 (C) 9/2 (D) 3/2

iv. The line ax + by + c = 0 is parallel to $x-axis$ if

(A) a = 0 (B) b = 0 (C) c = 0 (D) b = c

v. Equation of a line passing through (5 , - 7) having slope undefined is

(A) $y = -7$ (B) $x = 5$ (C) $x = -5$ (D) $y = 7$

vi. Length of the diameter of the circle $(x+5)^2 + (y-8)^2 = 12$ is

(A) $4\sqrt{3}$ (B) $2\sqrt{3}$ (C) 12 (D) 24

vii. (3 , 2) is not in the solution of inequality

(A) $x + y > 2$ (B) $x - y > 1$ (C) $3x + 5y > 7$ (D) $3x - 7y < 3$

viii. The length of latus rectum of the ellipse $\frac{x^2}{36} + \frac{y^2}{25} = 1$ is

(A) $\frac{25}{6}$ (B) $\frac{25}{3}$ (C) $\frac{25}{36}$ (D) $\frac{3}{25}$

ix. Length of the major and minor axes of the ellipse $x^2 + 16y^2 = 16$ is

(A) 4 , 1 (B) 10 , 5 (C) 8 , 2 (D) 16 , 2

x. Projection of a vector $\underline{v}$ along vector $\underline{u}$ is

(A) $\frac{\underline{u} \times \underline{v}}{|\underline{v}|}$ (B) $\frac{\underline{u}.\underline{v}}{|\underline{u}|}$ (C) $\frac{\underline{u}.\underline{v}}{\hat{u}}$ (D) $\frac{\underline{u}.\underline{v}}{|\underline{v}|}$

xi. $\left[\hat{i}\ \hat{i}\ \hat{k}\right] =$

(A) 1 (B) 2 (C) 0 (D) -1

xii. $\int \frac{Sec^2 x}{\sqrt{Tanx}}.dx =$

(A) $log_e Tan\, x + c$ (B) $log_e \sqrt{Tan\, x} + c$ (C) $2\sqrt{Tan\, x} + c$ (D) $2\sqrt{Sec\, x} + c$

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xiii. If $\int f(x).dx = \frac{1}{a} Sec^{-1}\frac{x}{a} + c$ then $f(x) =$

(A) $\frac{1}{\sqrt{x^2-a^2}}$ (B) $\frac{1}{x\sqrt{x^2-a^2}}$ (C) $\frac{1}{x\sqrt{x^2+a^2}}$ (D) $\frac{1}{x\sqrt{a^2-x^2}}$

xiv. $\frac{d}{dx}\left(\frac{1}{g(x)}\right) =$

(A) $(g(x))^{-2}.g'(x)$ (B) $-1(g'(x))^{-2}.g(x)$ (C) $(-1(g'(x))^{-2}.g'(x)$ (D) $(-1)(g(x))^{-2}.g'(x)$

xv. If $f'(a-\varepsilon)<0$ *and* $f'(a+\varepsilon)>0$ *then at* $x=a$ *there is*

(A) relative maxima (B) relative minima (C) point of inflection (D) critical point

xvi. $1+1+\frac{1}{\lfloor 2}+\frac{1}{\lfloor 3}+.......+\frac{1}{\lfloor n}+.. =$

(A $Sin\,x$ (B) $Cos\,x$ (C) e^x (D) e

xvii. $l\,n(\frac{1}{x}+\frac{\sqrt{1+x^2}}{|x|}) =$; $x \neq 0$

(A) $Coth^{-1}x$ (B) $Tanh^{-1}x$ (C) $Sech^{-1}x$ (D) $Cosech^{-1}x$

xviii. The range of $f(x) = 2+\sqrt{x-1}$ is

(A) $[-1,\infty)$ (B) $[0,\infty)$ (C) $[2,\infty)$ (D) $(-2,\infty)$

xix. If $\frac{1}{\sqrt{x^2-1}} = f'(x)$ *then* $f(x) =$

(A) $Cos^{-1}x$ (B) $Sinh^{-1}x$ (C) $Cosh^{-1}x$ (D) $Cosech^{-1}x$

xx. $\int Cot^{-1}\sqrt{\frac{1+Cos\,x}{1-Cos\,x}}.dx$

(A) $\frac{x^2}{2}+c$ (B) $\frac{x^2}{4}+c$ (C) $\frac{x^4}{2}+c$ (D) $\frac{x}{4}+c$

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Roll No. ________________ Annual 2018

Mathematics

Paper : II

(INTER PART II CLASS 12th)

SUBJECTIVE

Time : 2 : 30 Hours

Marks : 80

Note :- **Section I is compulsory. Attempt any three Questions from section II.**

Section = I

2. Write short answers to any Eight parts. (8x 2 = 16)

i. $f(x)=\dfrac{x}{x^2-4}$, find the domain and range of f (x).

ii. Prove the identities $Cosh^2x - Sinh^2x = 1$.

iii. Find $fog(x)$ if $f(x)=\dfrac{1}{\sqrt{x-1}}$, $g(x)=\dfrac{1}{x^2}$, $x \neq 1$

iv. Define derivative of a function.

v. If $y=\sqrt{x+2}$ find dy/dx from first principle.

vi. Differentiate $\dfrac{x^2+1}{x^2-3}$ w.r to "x".

vii. Differentiate w. r. to "x" $(x-5)(3-x)$

viii. Find dy/dx if $x = at^2$ and $y = 2at$.

ix. Find dy/dx if $3x+4y+7=0$

x. Prove that $\dfrac{d}{dx}(Sin^{-1}x)=\dfrac{1}{\sqrt{1-x^2}}, x\in(-1,1)$.

xi. Differentiate Sin^3x w.r.to Cos^2x

xii. Find $f'(x)$ if $f(x)=e^{\sqrt{x-1}}$

3. Write short answers to any Eight parts. (8 x 2 = 16)

i. Find δy and dy if $y = x^2 + 2x$ when x changes from 2 to 1.8.

ii. Evaluate $\int\left(\sqrt{x}-\dfrac{1}{\sqrt{x}}\right)^2 dx$, $x>0$

iii. Evaluate $\int\dfrac{ax+b}{ax^2+2bx+c}dx$.

iv. Evaluate $\int\dfrac{x^2}{4+x^2}dx$

v. Evaluate $\int\dfrac{1}{(1+x^2)\,Tan^{-1}x}dx$

vi. Evaluate $\int x\, ln\, x\, dx$

vii. Evaluate $\int\dfrac{xe^x}{(1+x)^2}dx$

viii. Evaluate $\int_0^{\pi/4} Secx(Secx+\tan x)dx$

ix. Find the area bounded by the curve $y = x^3 + 2x^2$ and $x-axis$.

x. Solve $ydx + xdy = 0$

xi. Define a corner point or vertex of solution region.

xii. Graph the inequality $x + 2y < 6$.

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4. Write short answers to any Nine parts. **(9 x 2 = 18)**

i. Find h such that the points A (h , 1) , B (2 , 7) and C (- 6 , -7) are vertices of a right triangle with right angle at vertex A.

ii. Find the point three-fifth of the way along the line segment from A (-5 , 8) to B (5 , 3).

iii. Find the equation of the line through (-4, - 6) and perpendicular to a line having slope $\frac{-3}{2}$.

iv. Find the area of the region bounded by the triangle with vertices (a , b+ c) , (a , b - c) and (- a , c).

v. Show that lines $4x-3y-8=0$, $3x-4y-6=0$ and $x-y-2=0$ are concurrent.

vi. Find the direction cosines of vector $\underline{v}=4\underline{i}-5\underline{j}$

vii. Calculate the projection of the vector $\underline{a}=\underline{i}-\underline{k}$ along vector $\underline{b}=\underline{j}+\underline{k}$.

viii. Find area of parallelogram whose vertices are P (0 , 0 , 0) , Q (-1 , 2 , 4) , R (2 , -1,4) ,S (1 , 1 , 8).

ix. Find value of "α" so that $\alpha\underline{i}+\underline{j}$, $\underline{i}+\underline{j}+3\underline{k}$ and $2\underline{i}+\underline{j}-2\underline{k}$ are coplaner.

x. Find vertex and directrix of the parabola, $x^2=4(y-1)$.

xi. Find equation of the parabola with focus (2 ,2) and directrix x = -2.

xii. Find equation of ellipse with foci (± 3 , 0) and minor axis of length 10.

xiii. Find the foci and vertices of the ellipse $25x^2+9y^2=225$.

Section = II

Note : Attempt any three questions **(10 x 3 = 30)**

5. (a) Find m and n so that the given function " f " is continuous at $x=3$

$$f(x)=\begin{cases} mx & if \quad x<3 \\ n & if \quad x=3 \\ -2x+9 & if \quad x>3 \end{cases}$$

(b) If $y=(Cos^{-1}x)^2$, *prove that* $(1-x^2)\,y_2-xy_1-2=0$

6. (a) Evaluate the indefinite integral using partial fraction $\int\frac{2x^3-3x^2-x-7}{2x^2-3x-2}\,dx$

(b) Find a joint equation of the lines through the origin and perpendicular to the lines represented by

$$x^2-2xy\tan\alpha-y^2=0$$

7. (a) Find the area between the $x-axis$ and the curve $y=\sqrt{2ax-x^2}$ *when* $a>0$.

(b) Minimize $z=3x+y$; subject to the constraints $3x+5y\geq 15$; $x+6y\geq 9$, $x\geq 0$, $y\geq 0$.

8. (a) Write an equation of the circle that passes through the given points $A(-7,7)$, $B(5,-1)$, $C(10,0)$

(b) Prove that in any triangle $\triangle ABC$, $C=a\cos B+b\cos A$.

9. (a) Find the centre , foci , eccentricity vertices and equations of directrices of $\frac{y^2}{16}-\frac{x^2}{9}=1$

(b) Find a unit vector perpendicular to the plane containing $\underline{a}$ *and* $\underline{b}$. Also find the "sine" of the angle between them.