Roll No. of Candidate 2019 GRW

Mathematics **(INTER PART II)-419-(III)** **PAPER: II** **GROUP: I**

Time: 30 Minutes **Code: 8195** **Marks: 20**

OBJECTIVE

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. Use marker or pen to fill the circles. Cutting or filling of two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1- 1- If A(–3, 6) and B(3, 2), then slope of AB is

(A) $\frac{3}{2}$ (B) $\frac{-2}{3}$ (C) $\frac{1}{3}$ (D) $\frac{-3}{2}$

2- $\int_a^b 3t^2\,dt =$

(A) $a^3 - b^3$ (B) $a^3 + b^3$ (C) $b^3 - a^3$ (D) $\frac{b^3+a^3}{3}$

3- If $\overrightarrow{OA} = \vec{a}$, $\overrightarrow{OB} = \vec{b}$, then $\overrightarrow{AB}$ =

(A) $\vec{a} - \vec{b}$ (B) $\vec{a} + \vec{b}$ (C) $\vec{b} - \vec{a}$ (D) $\vec{a} \cdot \vec{b}$

4- Minimum value of the function $f(x) = x^2 + 2x - 3$ is at $x =$

(A) –3 (B) 1 (C) 0 (D) –1

5- The range of $f(x) = x^2$ is

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

6- $\left|\cos\alpha\,\underline{i} + \sin\alpha\,\underline{j} + 0\underline{k}\right| =$

(A) 0 (B) –1 (C) 2 (D) 1

7- The length of tangent from (0, 1) to the circle $x^2 + y^2 + 6x - 3y + 3 = 0$ is

(A) 2 (B) 3 (C) 4 (D) 1

8- (1, –3) is in the solution of region

(A) $x + y > 0$ (B) $x + y < 0$ (C) $x + y = 0$ (D) $x - y = 0$

9- $\frac{d}{dx}(\sinh 2x) =$

(A) 2 cosh 2x (B) 2 sinh 2x (C) –2 cosh 2x (D) –2 sinh 2x

10- Centre of the circle $5x^2 + 5y^2 + 14x + 12y - 10 = 0$ is

(A) $\left(\frac{-7}{5}, \frac{-6}{5}\right)$ (B) $\left(\frac{7}{5}, \frac{6}{5}\right)$ (C) (7, 6) (D) (7, –6)

(Turn over)

GRW

Mathematics (INTER PART II)-419 **PAPER: II** **GROUP: I**

Time: 2:30 hours **Marks: 80**

SUBJECTIVE

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

SECTION I

2. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Determine whether $f(x) = x\sqrt{x^2+5}$ is even or odd.

ii- For the real valued function $f(x) = \frac{2x+1}{x-1}$ find $f^{-1}(x)$ and $f^{-1}(-1)$

iii- If $f(x) = \begin{cases} x-1, & x < 3 \\ 2x+1, & 3 \le x \end{cases}$ Find $\lim_{x \to 3^-} f(x)$ and $\lim_{x \to 3^+} f(x)$.

iv- Find the derivative of $f(x) = c$ by first principle.

v- Differentiate $y = \frac{a+x}{a-x}$ w.r.t, x

vi- Find $\frac{dy}{dx}$ if $y = e^{x^2+1}$

vii- Determine the values of x, for which $f(x) = x^2 + 2x - 3$ is extreme.

viii- Show that $\frac{d}{dx}(\cot^{-1}x) = \frac{-1}{1+x^2}$

ix- If $y = \sin^{-1}\frac{x}{a}$ then $\frac{dy}{dx} = \frac{1}{\sqrt{a^2-x^2}}$

x- Define a stationary point.

xi- Define even function and give an example.

xii- Find $\frac{dy}{dx}$ if $y = \tanh(x^2)$.

3. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Use differentials, find $\frac{dy}{dx}$ if $x^2 + 2y^2 = 4$

ii- Evaluate $\int \cos 3x \cdot \sin 2x \, dx$

iii- Evaluate $\int \frac{\sin\theta}{1+\cos^2\theta} \, d\theta$

iv- Integrate $\tan^{-1} x$ w. r. t 'x'

v- Evaluate $\int e^x(\cos x + \sin x) \, dx$

vi- Evaluate $\int_{-1}^{2} (x + |x|) \, dx$

vii- Find area between x-axis and curve $y = 4x - x^2$

viii- Solve differential equation $xdy + y(x-1)\,dx = 0$

ix- Define order of differential equation.

x- Evaluate $\int \frac{(1-\sqrt{x})^2}{\sqrt{x}} \, dx$

xi- Define corner point.

xii- Graph the feasible region of $3x - 2y \ge 6$

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GRW

Roll No. of Candidate _____

Mathematics | **(INTER PART II)-419-(I)** | **PAPER: II** | **GROUP:II**
Time: 30 Minutes | **Code: 8192** | **Marks: 20**
OBJECTIVE

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. Use marker or pen to fill the circles. Cutting or filling of two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1- 1- If $f(x)=\frac{1}{x^2}$ $(x \neq 0)$, then $fof(x)$ is

(A) x^4 (B) x^2 (C) 1 (D) $\frac{1}{x^4}$

2- $\lim_{n \to \infty} \left(1+\frac{1}{n}\right)^{2n} =$

(A) e (B) e^2 (C) e^n (D) zero

3- If $y=\frac{1}{x^2}$ then $\frac{dy}{dx}$ at $x=-1$

(A) 3 (B) $\frac{1}{3}$ (C) 2 (D) $\frac{1}{2}$

4- $\frac{d}{dx}(\ell n\, 2x) =$

(A) $\frac{1}{2x}$ (B) $\frac{1}{x}$ (C) $-\frac{1}{2x}$ (D) 2x

5- If $f'(c)=0$ then $f(x)$ has relative maximum value at $x = c$ if

(A) $f''(c)<0$ (B) $f''(c)>0$ (C) $f''(c)=0$ (D) $f'''(c)=0$

6- $y = \sin 3x$ then y_2 is

(A) $9\cos x$ (B) $-9\sin 3x$ (C) $9\sin 3x$ (D) $-9\cos 3x$

7- $\int \cot x\, dx =$

(A) $\text{cosec}^2 x + c$ (B) $-\text{cosec}^2 x + c$ (C) $\ell n \sin x + c$ (D) $\ell n \cos x + c$

8- $\int_0^{\pi} \sec x \tan x\, dx =$

(A) 0 (B) 1 (C) –1 (D) –2

9- Order of the differential equation $x\frac{d^2y}{dx^2}+\frac{dy}{dx}+2x=0$ is

(A) 0 (B) 1 (C) 2 (D) 3

10- $\int \tan^2 x\, dx$ is equal to

(A) $\tan x + x + c$ (B) $\tan x - x + c$ (C) $2\tan x + c$ (D) $2\tan x + x + c$

(Turn over)

Mathematics (INTER PART II)-419 PAPER: II GROUP:II
Time: 2:30 hours Marks: 80

SUBJECTIVE

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

SECTION I

2. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Define implicit function.

ii- If $f(x) = 2x + 1$ and $g(x) = \frac{3}{x-1}$, $x \neq 1$, find $fog(x)$.

iii- Evaluate $\lim\limits_{x \to -1} \frac{x^3 - x}{x+1}$ by using algebraic technique.

iv- Find $\frac{dy}{dx}$ if $y = (x-5)(3-x)$

v- Find $\frac{dy}{dx}$ if $xy + y^2 = 2$

vi- Differentiate $\sin x$ w. r. t. $\cot x$

vii- Find $\frac{dy}{dx}$ if $y = \frac{x}{\ell n x}$

viii- Define the stationary point.

ix- Find $\frac{dy}{dx}$ if $y = e^{-2x} \sin 2x$

x- Differentiate $\cot^{-1}\frac{x}{a}$ w. r. t x

xi- Find y_2 if $y = \sqrt{x} + \frac{1}{\sqrt{x}}$

xii- Find the extreme values for $f(x) = 5x^2 - 6x + 2$

3. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Using differentials find $\frac{dx}{dy}$ if $x^2 + 2y^2 = 16$

ii- Define first order differential equation.

iii- Evaluate $\int \tan^2 x \, dx$

iv- Evaluate $\int \frac{\sqrt{2}}{\sin x + \cos x} \, dx$

v- Evaluate $\int \sin^{-1} x \, dx$

vi- Evaluate $\int \frac{e^x(1+x)}{(2+x)^2} \, dx$

vii- Evaluate $\int_{\frac{\pi}{6}}^{\frac{\pi}{3}} \cos t \, dt$

viii- Find the area between x-axis and curve $y = \sin 2x$ from $x = 0$ to $x = \frac{\pi}{3}$

ix- Solve the differential equation $\frac{x^2+1}{y+1} = \frac{x}{y}\frac{dy}{dx}$ $(x, y > 0)$

x- Evaluate $\int x^2 \ell n x \, dx$

xi- Define problem constraints.

xii- Graph the solution set of linear inequality $3y - 4 \leq 0$ in xy-plane.

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