

Roll No _____

(To be filled in by the candidate)

(Academic Sessions 2014 – 2016 to 2016 – 2018)

MATHEMATICS

218-(INTER PART – II)

Time Allowed : 30 Minutes

Q.PAPER – II (Objective Type)

GROUP – I

Maximum Marks : 20

PAPER CODE = 8195

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	$\frac{d}{dx} \sin^{-1} x = :$ (A) $\frac{1}{\sqrt{1+x^2}}$ (B) $\cos^{-1} x$ (C) $\frac{1}{\sqrt{1-x^2}}$ (D) $\frac{1}{\sqrt{1-x}}$
2	The order of the differential equation $\frac{d^2 y}{dx^2} - \frac{dy}{dx} + 2x = 0$ is : (A) 2 (B) 1 (C) 0 (D) 3
3	$\cosh^2 x - \sinh^2 x = :$ (A) 1 (B) -1 (C) 0 (D) 2
4	$\int \frac{1}{f(x)} \times f'(x) dx = :$ (A) $\ln x + c$ (B) $\ln[f'(x) + c]$ (C) $\frac{1}{f(x)} + c$ (D) $\ln f(x) + c$
5	Let $f(x) = x^2 + \cos x$, then $f(x)$ is : (A) Odd function (B) Constant function (C) Even function (D) Neither even nor odd
6	$\int 3^x dx = :$ (A) $3^x + c$ (B) $3^x \ln 3 + c$ (C) $\frac{3^x}{\ln 3} + c$ (D) $3 \ln 3^x + c$
7	If $f(x)$ has second derivative at "c" such that $f'(c) = 0$ and $f''(c) < 0$ then "c" is a point of : (A) Maxima (B) Minima (C) Zero point (D) Point of inflection
8	If $y = \sqrt{1-x^2}$, $0 < x < 1$ then $\frac{dy}{dx} = :$ (A) $\sqrt{x^2-1}$ (B) $\frac{1}{\sqrt{1-x^2}}$ (C) $\frac{x}{\sqrt{1-x^2}}$ (D) $\frac{-x}{\sqrt{1-x^2}}$
9	$\int_0^{\frac{\pi}{2}} \cos x dx = :$ (A) 0 (B) 1 (C) 2 (D) 3

(Turn Over)

SECTION – I

2. Write short answers to any EIGHT (8) questions :

16

- (i) State sandwich theorem.
- (ii) Express the area “ A ” of a circle as a function of its circumference “ C ”.
- (iii) If $f(x) = \begin{cases} x+2, & x \leq -1 \\ c+2, & x > -1 \end{cases}$, find “ c ” so that $\lim_{x \rightarrow -1} f(x)$ exists
- (iv) Define differentiation.
- (v) Differentiate $\left(\sqrt{x} - \frac{1}{\sqrt{x}} \right)^2$ w.r.t x
- (vi) Find $\frac{dy}{dx}$ if $xy + y^2 = 0$
- (vii) Find $\frac{dy}{dx}$ if $y = x \cos y$
- (viii) Prove that $\frac{d}{dx} (\cos^{-1} x) = \frac{-1}{\sqrt{1-x^2}}$, $x \in (-1, 1)$
- (ix) Find $\frac{dy}{dx}$ if $y = x e^{\sin x}$
- (x) Define power series.
- (xi) Find extreme values for $f(x) = x^2 - x - 2$
- (xii) Find $\frac{dy}{dx}$ if $y = \sin h^{-1} \left(\frac{x}{2} \right)$

3. Write short answers to any EIGHT (8) questions :

16

- (i) Find $\frac{dy}{dx}$ using differentials if $xy - \log_e x = c$
- (ii) Evaluate the integral $\int \frac{x}{x+2} \cdot dx$
- (iii) Evaluate the integral $\int \frac{1}{a^2 - x^2} \cdot dx$
- (iv) Evaluate the integral $\int x \sin x \cos x \, dx$
- (v) Evaluate the integral $\int x^2 e^{ax} \cdot dx$
- (vi) Evaluate the integral $\int e^{3x} \left(\frac{3 \sin x - \cos x}{\sin^2 x} \right) dx$
- (vii) Prove that $\int_a^b f(x) \cdot dx = - \int_b^a f(x) \cdot dx$
- (viii) Evaluate the definite integral $\int_0^3 \frac{dx}{x^2 + 9}$
- (ix) Find the area bounded by cos function from $x = -\frac{\pi}{2}$ to $x = \frac{\pi}{2}$

(Turn Over)

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LHR.

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MATHEMATICS

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Q.PAPER – II (Objective Type)

GROUP – II

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PAPER CODE = 8194

Note : Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1-1	System of linear inequalities involved in the problem is called : (A) Coefficients (B) Solution (C) Problem constraints (D) Boundaries
2	Horizontal line through (7 , - 9) is : (A) $x = 7$ (B) $x = - 9$ (C) $y = 7$ (D) $y = - 9$
3	If $\vec{v}$ is any vector then vector of magnitude 5 opposite to $\vec{v}$ is : (A) $5\vec{v}$ (B) $-5\vec{v}$ (C) $5\frac{\vec{v}}{ \vec{v} }$ (D) $-5\frac{\vec{v}}{ \vec{v} }$
4	Joint equation of two lines is $ax^2 + 2hxy + by^2 = 0$, if θ is angle between them, then $\tan \theta =$: (A) $\frac{2\sqrt{h^2 + ab}}{a + b}$ (B) $\frac{2\sqrt{h^2 - ab}}{a + b}$ (C) $\frac{\sqrt{h^2 + ab}}{a + b}$ (D) $\frac{\sqrt{h^2 - ab}}{a + b}$
5	Projection of vector $\vec{u}$ on vector $\vec{v}$ is : (A) $\frac{\vec{u} \cdot \vec{v}}{ \vec{v} }$ (B) $\frac{\vec{u} \cdot \vec{v}}{ \vec{u} }$ (C) $\frac{\vec{u} \times \vec{v}}{ \vec{v} }$ (D) $\frac{\vec{u} \times \vec{v}}{ \vec{u} }$
6	Equation of line bisecting II and IV quadrant : (A) $y = x$ (B) $y = -x$ (C) $y = \frac{1}{x}$ (D) $x + y = 1$
7	Set of all points equidistant from a fixed point form : (A) Ellipse (B) Parabola (C) Hyperbola (D) Circle
8	For ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$, ($a > b$) then eccentricity $e =$: (A) $\frac{\sqrt{a^2 - b^2}}{a}$ (B) $\frac{\sqrt{a^2 + b^2}}{a}$ (C) $\frac{\sqrt{b^2 - a^2}}{a}$ (D) $\frac{\sqrt{b^2 - a^2}}{b}$
9	Distance of (x_1, y_1) from line $ax + by + c = 0$ is : (A) $\frac{ ax_1 + by_1 + c }{\sqrt{a^2 + b^2}}$ (B) $\frac{ ax_1 + by_1 - c }{\sqrt{a^2 + b^2}}$ (C) $\frac{ ax_1 + by_1 + c }{\sqrt{a + b}}$ (D) $\frac{ ax_1 + by_1 - c }{\sqrt{a + b}}$

(Turn Over)

SECTION – I

2. Write short answers to any EIGHT (8) questions :

16

- (i) Prove that $\cosh^2 x + \sinh^2 x = \cosh 2x$
- (ii) Determine whether function $f(x) = \frac{x^3 - x}{x^2 + 1}$ is even or odd.
- (iii) Evaluate $\lim_{x \rightarrow 0} \frac{\sec x - \cos x}{x}$
- (iv) Find $\frac{dy}{dx}$ if $y = \frac{a+x}{a-x}$
- (v) Find $\frac{dy}{dx}$ if $x^2 - 4xy - 5y = 0$
- (vi) Differentiate $x^2 - \frac{1}{x^2}$ w.r.t x^4
- (vii) Differentiate $\sin^{-1} \sqrt{1-x^2}$ w.r.t x
- (viii) Find $\frac{dy}{dx}$ if $y = \ln(x + \sqrt{x^2 + 1})$
- (ix) Find $\frac{dy}{dx}$ if $y = e^{-2x} \sin 2x$
- (x) Find $\frac{d^2 y}{dx^2}$ if $y^3 + 3ax^2 + x^3 = 0$
- (xi) Find y_2 if $y = \cos^3 x$
- (xii) Find $\frac{dy}{dx}$ if $y = \ln \left(\frac{x^2 - 1}{x^2 + 1} \right)^{\frac{1}{2}}$

3. Write short answers to any EIGHT (8) questions :

16

- (i) Find δy and dy : $y = \sqrt{x}$, when x changes from 4 to 4.41
- (ii) Evaluate $\int \frac{e^{2x} + e^x}{e^x} dx$
- (iii) Evaluate $\int (a - 2x)^{\frac{3}{2}} dx$
- (iv) Evaluate $\int \frac{x+b}{(x^2 + 2bx + c)^{\frac{1}{2}}} dx$
- (v) Evaluate $\int xe^x dx$
- (vi) Evaluate $\int e^x \left(\frac{1}{x} + \ln x \right) dx$
- (vii) Evaluate $\int_{-1}^3 (x^3 + 3x^2) dx$
- (viii) Evaluate $\int_0^{\pi/3} \cos^2 \theta \sin \theta d\theta$