Roll No. 2619

Objective
Paper Code:
8193

Intermediate Part Second

MATHEMATICS (Objective) Group – I

Time: 30 Minutes Marks: 20

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	The distance between two points A (– 8 , 3) , B (2 , –1) is:	116	(– 6 , 2)	$2\sqrt{29}$	$\sqrt{58}$
2	The line $2x - y - 4 = 0$ cuts x-axis at point:	(2 , 0)	(0 , – 2)	(0 , – 4)	(4 , 0)
3	The equation of line $\frac{x}{a} + \frac{y}{b} = 1$ is:	Normal form	Intercepts form	Point-slope form	Two-points form
4	The perpendicular distance of a line $12x + 5y - 7 = 0$ from origin is:	$\frac{1}{13}$	$\frac{13}{7}$	$\frac{7}{13}$	13
5	The solution of the inequality $2x + y < 5$ is:	(1 , 2)	(2 , 1)	(2 , 3)	(5 , 0)
6	The center of the circle $(x-1)^2 + (y+3)^2 = 9$ is:	(– 1 , 3)	(– 1 , – 3)	(1 , 3)	(1 , – 3)
7	The vertex of the parabola $y^2 + 16x$ is:	(0 , 0)	(1 , 0)	(0 , 1)	(1 , 1)
8	The end-points of minor axis of an ellipse are called:	Foci	Vertices	Covertices	Center
9	$\hat{k} \times \hat{i} =$:	$2\hat{i}$	$-\hat{i}$	$\hat{j}$	$-\hat{j}$
10	$\|a \times b\|$ calculates the area of:	Triangle	Parallelogram	Tetrahedron	Parallelopiped
11	The function $x^2 + xy + y^2 = 2$ is a / an:	Constant function	Even function	Implicit function	Explicit function
12	If $f(x) = 2x - 8$, then $f^{-1}(x) =$:	$8 - 2x$	$8 + 2x$	$\frac{x+8}{2}$	$\frac{x-8}{2}$
13	$\frac{d}{dx}(f(u)) =$:	$f'(u)$	$f(du)$	$f''(u)\frac{du}{dx}$	$f'(u)du$
14	If $y = \cosh x$, then $\frac{dy}{dx} =$:	$-\sinh y$	$\sinh y$	$-\cosh x$	$\sinh x$
15	$\frac{d}{dx}(\ell n \cos x) =$:	$\tan x$	$\cot x$	$-\tan x$	$-\cot x$
16	$\frac{1}{\sqrt{x^2-1}}$ is derivative of:	$\sinh^{-1} x$	$\cosh^{-1} x$	$\tanh^{-1} x$	$\coth^{-1} x$
17	$\int_0^x 3t^2\,dt =$:	t^3	$\frac{t^3}{3}$	x^3	0
18	$\int \ell nx\,dx =$:	$\frac{1}{x}$	$\frac{(\ell nx)^2}{2}$	$x\ell nx$	$x\ell nx - x + c$
19	$\int (4-x^2)^{-\frac{1}{2}}(-2x)\,dx =$:	$2\sqrt{4-x^2}$	$\frac{1}{2}\sqrt{4-x^2}$	$\ell n(4-x^2)$	$\ell n\sqrt{4-x^2}$
20	$\int e^x(\cos x + \sin x)\,dx =$:	$e^x \cos x$	$e^x \sin x$	$e^x \tan x$	$\ell n(\sin x)$

Intermediate Part Second

Roll No. _____

MATHEMATICS (Subjective) Group – I

Time: 02:30 Hours Marks: 80

SECTION – I

2. **Attempt any EIGHT parts:** 16

(i) Define exponential function.

(ii) $f(x) = 2x + 1$, $g(x) = x^2 - 1$, find $g(f(x))$

(iii) Prove the identity $\cosh^2 x + \sinh^2 x = \cosh 2x$

(iv) Find by definition derivative of $\frac{1}{x-a}$

(v) Differentiate $\frac{(x^2+1)^2}{x^2-1}$ w.r.t. x

(vi) Find $\frac{dy}{dx}$ by making suitable substitution if $y = \sqrt{x + \sqrt{x}}$

(vii) Prove that $\frac{d}{dx}(\cos^{-1} x) = -\frac{1}{\sqrt{1-x^2}}$

(viii) Differentiate $\sin^2 x$ w.r.t. $\cos^4 x$

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

(x) Find y_2 if $y = \sqrt{x} + \frac{1}{\sqrt{x}}$

(xi) Apply the Maclaurin series, prove $e^{2x} = 1 + 2x + 2x^2 + \ldots\ldots$

(xii) Determine the interval in which f is increasing or decreasing if $f(x) = 4 - x^2$, $x \in (-2, 2)$

3. **Attempt any EIGHT parts:** 16

(i) Find δy and dy of function $f(x) = x^2$ when $x = 2$ and $dx = 0.01$

(ii) Using differential find $\frac{dy}{dx}$ if $xy - \ell nx = c$

(iii) Evaluate $\int (x+1)(x-3)\,dx$

(iv) Evaluate $\int \frac{1}{\sqrt{x}\,(\sqrt{x}+1)}\,dx$

(v) Evaluate $\int \frac{1}{1+\cos x}\,dx$, $\left(-\frac{\pi}{2} < x < \frac{\pi}{2}\right)$

(vi) Evaluate $\int \frac{x^2}{4+x^2}\,dx$

(vii) Evaluate $\int x \ell nx\,dx$

(viii) Evaluate $\int x \sin x\,dx$

(ix) Evaluate $\int_{-1}^{3} (x^3 + 3x^2)\,dx$

(x) Evaluate $\int_{0}^{3} \frac{dx}{x^2+9}$

(xi) Define objective function.

(xii) Graph the solution set of linear inequality $2x + y \leq 6$

(Continued P/2)

Roll No. : _____

Objective
Paper Code
8196

Intermediate Part Second

MATHEMATICS (Objective) Group – II

Time: 30 Minutes Marks: 20

Q.No.1 You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill the relevant circle in front of that question number on computerized answer sheet. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero marks in that question. Attempt as many questions as given in objective type question paper and leave other circles blank.

S.#	Questions	A	B	C	D
1	The position vector of any point in xy-plane is:	$x\underline{i} + y\underline{j} + z\underline{k}$	$y\underline{j} + z\underline{k}$	$x\underline{i} + y\underline{j}$	$x\underline{i} + z\underline{k}$
2	$\underline{i} \times \underline{k}$ = :	$-\underline{j}$	1	$\underline{j}$	0
3	The two separate parts of hyperbola are called:	Foci	Vertices	Directrices	Branches
4	The latus rectum of the parabola $y^2 = -4ax$ is:	$x = a$	$x = -a$	$y = a$	$y = -a$
5	Two circles are said to be concentric circles if they have:	Same radius	Different center	Same center	Same diameter
6	(1 , 0) is not the solution of the inequality:	$x - 3y < 0$	$7x + 2y < 8$	$3x + 5y < 7$	$4x - 3y < 9$
7	Intercept form of equation of a line is:	$\frac{x}{a} - \frac{y}{b} = 0$	$\frac{x}{a} + \frac{y}{b} = 0$	$\frac{x}{a} - \frac{y}{b} = 4$	$\frac{x}{a} + \frac{y}{b} = 1$
8	Distance of the point (–2 , 3) from y-axis is:	2	–2	3	–3
9	Slope of the line parallel to x-axis is:	Undefined	1	0	1
10	The lines through origin represented by $ax^2 + 2hxy + by^2 = 0$ are coincident if:	$h^2 = ab$	$h^2 + ab = 0$	$h^2 - ab > 0$	$h^2 - ab < 0$
11	$\int \tan x \sec^2 x \, dx$ = :	$\tan x + c$	$\sec^2 x + c$	$\sec x + c$	$\frac{\tan^2 x}{2} + c$
12	$\int_0^1 \frac{1}{1+x^2} dx$ = :	$\frac{\pi}{3}$	$\frac{\pi}{4}$	$\frac{\pi}{2}$	$\frac{\pi}{6}$
13	$\int e^x \left[\sinh^{-1} x + \frac{1}{\sqrt{1+x^2}} \right] dx$ = :	$e^x \cosh^{-1} x$	$e^x \cos^{-1} x$	$e^x \sinh^{-1} x$	$e^x \sin^{-1} x$
14	$\int x^{-1} dx$ = :	$\ln x + c$	$\frac{x^{-2}}{2}$	$-x^{-2}$	0
15	$\frac{d}{dx}(\tan^{-1} 3x)$ = :	$\frac{1}{1+3x}$	$\frac{3}{1+3x}$	$\frac{1}{1+9x^2}$	$\frac{3}{1+9x^2}$
16	$\frac{d}{dx}(e^{\sin x})$ = :	$\cos x$	$e^{\sin x} \cos x$	$e^{\sin x} \sin x$	$\sin x$
17	If $y = \ln x$ then y_2 = :	$\frac{1}{x}$	$\frac{-1}{x}$	$\frac{-1}{x^2}$	$\frac{1}{x^2}$
18	The notation used for derivative of f(x) by Cauchy is:	Df(x)	f'(x)	$\dot{f}(x)$	$\frac{df}{dx}$
19	$\lim_{n \to +\infty} \left(1 + \frac{1}{n}\right)^{2n}$ = :	e	e^2	e^4	e^6
20	Cosh 2x = :	$\frac{e^{2x} - e^{-2x}}{2}$	$\frac{e^{2x} + e^{-2x}}{2}$	$\frac{e^x + e^{-x}}{2}$	$\frac{e^{2x} - e^{-2x}}{e^{2x} + e^{-2x}}$

Intermediate Part Second Roll No. _____

MATHEMATICS (Subjective) Group – II

Time: 02:30 Hours Marks: 80

SECTION – I

2. **Attempt any EIGHT parts:** 16

(i) Define implicit function.

(ii) Prove the identity $\operatorname{sech}^2 x = 1 - \tanh^2 x$

(iii) Find $\lim\limits_{n \to 0} \dfrac{e^x - 1}{e^x + 1}$, $x > 0$

(iv) If $y = x^4 + 2x^2 + 2$, prove that $\dfrac{dy}{dx} = 4x\sqrt{y-1}$

(v) Differentiate w.r.t. x if $y = \dfrac{2x-3}{2x+1}$

(vi) Differentiate $x^2 - \dfrac{1}{x^2}$ w.r.t. x^4

(vii) Prove that $\dfrac{d}{dx}(\sin^{-1} x) = \dfrac{1}{\sqrt{1-x^2}}$

(viii) Find $\dfrac{dy}{dx}$ if $y = x \cos y$

(ix) Differentiate $y = a^{\sqrt{x}}$

(x) Find $\dfrac{dy}{dx}$ if $y = \ell n (\tanh x)$

(xi) Define point of inflexion of a function.

(xii) Determine $f(x) = \sin x$ is increasing or decreasing in the interval $\left(0 , \dfrac{\pi}{2}\right)$.

3. **Attempt any EIGHT parts:** 16

(i) Find δy and dy in $y = \sqrt{x}$, when x changes from 4 to 4.41

(ii) Evaluate $\int \sin^2 x \, dx$

(iii) Integrate by substitution $\int \dfrac{x}{\sqrt{4+x^2}} dx$

(iv) Find the integral $\int \dfrac{\sqrt{2}}{\sin x + \cos x} dx$

(v) Evaluate the integral by parts $\int \ell nx \, dx$

(vi) Find indefinite integral $\int \dfrac{1}{\sqrt{a^2 - x^2}} dx$ by substitution

(vii) Evaluate $\int \dfrac{2a}{x^2 - a^2} dx$, $x > a$ by partial fraction

(viii) What is the definition of definite integral?

(ix) Calculate the integral $\int_{-1}^{5} |x - 3| \, dx$

(x) Define order of a differential equation.

(xi) What do you know about half planes?

(xii) Graph the linear inequality $2x + 3 \geq 0$

(Continued P/2)