MODEL PAPER ""MATHEMATICS"

Intermediate Part-II Examination, 2008 & Onward

Roll No.
In Figures _____
In Words _____

OBJECTIVE

Time: 30 Minutes **Marks: 20**

Note: **Write your Roll No. in the space provided. Over-writing, Cutting, Erasing, Using lead pencil will result in loss of marks.**

Q.No.7. Each question has four possible answers. Choose the correct answer and encircle it.

(i) The perimeter p of a square as a function of its area A is

(a) $p = \sqrt{A}$ (b) $p = 2\sqrt{A}$ (c) $p = 3\sqrt{A}$ (d) $p = 4\sqrt{A}$

(ii) The graph of $\frac{x^2}{25}+\frac{y^2}{16}=1$ is

(a) circle (b) parabola (c) ellipse (d) hyperbola

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

(a) $f''(c) > 0$ (b) $f''(c) < 0$ (c) $f''(c) = 0$ (d) None of these

(iv) The order of $x^3\frac{d^2y}{dx^2}+4\frac{dy}{dx}-5y=0$ is

(a) 1 (b) 2 (c) 3 (d) 4

(v) If $f(x) = \sin x$, them $f'(\cos^{-1}x) =$

(a) x (b) −x (c) cosx (d) sinx

(vi) $\int\frac{dx}{ax+b} =$

(a) $a \ln|ax + b| + c$ (b) $\frac{1}{a}\ln|ax + b| + c$ (c) $-\frac{1}{a}\ln|ax + b| + c$ (d) None of these

(vii) $\int a^x dx =$ .....

(a) $a^x + c$ (b) $\frac{a^x}{\ln a}$ (c) $a^x \ln a + c$ (d) None of these

(viii) $\int\cot x\, dx =$ .....

(a) $\ln|\text{cosec}x| + c$ (b) $\ln|\sin x| + c$ (c) $\ln|\cos x| + c$ (d) None of these

(ix) $\int_0^1\frac{dx}{1+x^2} =$ .....

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$

(x) If $f(tx, ty) = t^n f(x, y)$, then f(x,y) is a homogeneous function of degrec.

(a) n−1 (b) t (c) n (d) None of these

(xi) The distance of the point (−2, 3) from Y−axis is

(a) –2 (b) 2 (c) 3 (d) –3

(xii) The point of concurrency of medians of a triangle is called.

(a) in centre (b) circumcentre (c) e-centre (d) centroid

(xiii) (1, 2) is the solution of

(a) $x + y > 0$ (b) $x + y < 0$ (c) $x + y = 0$ (d) $x - y = 1$

(xiv) The equation $ax^2 + by^2 + 2hxy + 2gx + 2fy + c = 0$ represents a circle of

(a) $a = b, h \neq 0$ (b) $a = b, h = 0$ (c) $a \neq b, h = 0$ (d) $a \neq b, h \neq 0$

(xv) A point on the parabola which is closest to the focus is

(a) vertex (b) directrix (c) focus (d) origin

(xvi) The point (a Cos θ, b Sin θ) lies on

(a) $x^2 + y^2 = a^2$ (b) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (c) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ (d) None of these

(xvii) In hyperbola

(a) $e = 1$ (b) $e < 1$ (c) $e > 1$ (d) $e = 0$

(xviii) The line through the vertex and the focus is called

(a) axis of parabola (b) latus rectum of parabola

(c) chord of parabola (d) None of these

(xix) Which of the following is not a unit vector?

(a) [1, 1, 1] (b) [1, 0, 0] (c) [0, 1, 0] (d) [0, 0, 1]

(xx) If $\underline{a}$ and $\underline{b}$ have same direction then $\underline{a} \cdot \underline{b}$ = ...

(a) ab (b) –ab (c) abSinθ (d) None of these

MODEL PAPER "MATHEMATICS"

Intermediate Part-II Examination, 2008 & Onward

SUBJECTIVE

Time: 2:30 Hours **Marks: 80**

Note: Attempt any TWENTY FIVE (25) questions from Section-I and any THREE questions from Section-II.

SECTION-I

Q.No.1. Write short answers to any TWENTY FIVE of the following questions. $25 \times 2 = 50$

(i) Evalvate $\lim_{x \to 0} \frac{\sqrt{x+a} - \sqrt{a}}{x}$

(ii) If $f(x) = -2x + 8$, find $f^{-1}(x)$

(iii) If $f(x) = \frac{x-1}{x-4}$, $x \neq 4$, then find domain of $f^{-1}(x)$

(iv) What is differentiation?

(v) Find $\frac{dy}{dx}$ if $y = \cosh(2x)$

(vi) What is the geometrical interpretation of a derivative?

(vii) Find the extreme values of $f(x) = x^2 - x - 2$

(viii) Find $\frac{dy}{dx}$ if $y = \sin^{-1}\left(\frac{x}{a}\right)$

(ix) What is the integration?

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

(xi) Evaluate $\int \ln x dx$

(xii) Evaluate $\int \tan^2 x \, dx$

(xiii) Evaluate $\int \sec^4 x \, dx$

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

(xv) Evaluate $\int \frac{dx}{\sqrt{x+a} + \sqrt{x}}$

(xvi) Solve the differential equ. $xdy + ydx = 0$

(xvii) Evaluate $\int_{-1}^{6} |x - 3| \, dx$

(xviii) Find the area bocended by cos function from $x = -\frac{\pi}{2}$ to $x = \frac{\pi}{2}$

(xix) Define inclination and slope of a line.

(xx) Find h such that points A (–1, h), B(3,2) and C (7, 3) are collinear.

(xxi) Find the measure of the angle between the lines represented by $x^2 - xy - 6y^2 = 0$

(xxii) Find the distance of the point (6, –1) from the line $6x - 4y + 9 = 0$

(xxiii) What is an objective function?

(xxiv) What is an inequality?

(xxv) What is a feasible region?

(xxvi) Find the slope of the tangent to parabola $y^2 = 4ax$ at the point $(at^2, 2at)$

(xxvii) Find the centre and foci of the ellipse $\frac{x^2}{9}+\frac{y^2}{16}=1$

(xxviii) Check the position of the point (5, 6) w.r.t. the circle $2x^2 + 2y^2 + 12x - 8y + 1 = 0$

(xxix) What are the characteristics of the general equation of a circle?

(xxx) Find the equ. of hyperbola if foci are $(\pm 5, 0)$ and vertex is (3, 0)

(xxxi) Transform the equation $x^2 + 6x - 8y + 17 = 0$ referred to $0'$ (–3, 1) as origin, axes remaining parallel to the old axes.

(xxxii) Prove that the length of latus rectum of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is $\frac{2b^2}{a}$

(xxxiii) What is a position vector?

(xxxiv) If the vectors $2\underline{i} + 4\underline{j} - 7\underline{k}$ and $2\underline{i} + 6\underline{j} + x\underline{k}$ are perpendicular to each other, find the value of x.

(xxxv) If $\underline{a} + \underline{b} + \underline{c} = \underline{0}$, prove that $\underline{a} \times \underline{b} = \underline{b} \times \underline{c} = \underline{c} \times \underline{a}$

(xxxvi) Find the value of α so that $\underline{u} = \alpha\underline{i} + \underline{j}$, $\underline{v} = \underline{i} + \underline{j} + 3\underline{k}$ and $\underline{w} = 2\underline{i} + \underline{j} - \underline{k}$ are coplaner

(xxxvii) Find the direction cosines of the vector $\underline{v} = 2\underline{i} - \underline{j} + 2\underline{k}$

SECTION-II

Note: Attempt any THREE questions. **$10 \times 3 = 30$**

Q.2(a) If θ is measured in readians, prove that $\lim_{\theta \to 0} \frac{Sin\theta}{\theta} = 1$

(b) **Show that** $x^2\frac{dy^2}{dx^2}+x\frac{dy}{dx}+y=0$ if $y = a\cos(\ln x) + b\sin(\ln x)$

Q.3(a) Evalate $\int\sqrt{a^2+x^2}\,dx$

(b) Find the area bounded by the curve $y = x^3 - 4x$ and the X-axis

Q.4(a) Find the equation of a st line through the intersection of the lines $x-y-4 = 0$ and $7x+y+20 = 0$ and perpendicular to the line $6x+y-14 = 0$

(b) Find the maximum and minimum values of $f(x, y) = 4x + 5y$ under the constraints $2x - 3y \le 6$, $2x + y \ge 2$ and $2x + 3y \le 12$, $x \ge 0$, $y \ge 0$.

Q.5(a) Define parabola and derive the equ. of parabola in standard form.

(b) Analyze the equ. $4x^2 + 9y^2 = 36$

Q.6(a) Show that the line segment joining the mid. Pts. Of the sides of a quadrilateral taken in order form a parallelogram.

(b) Find the volume of the tetrahedron with vertices A(0, 1, 2), B(3, 2, 1), C(1, 2, 1) & D(5, 5, 6)