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BISE – Model Paper 2009 unofficial
Mathematics II (Objective), Time Allowed: 30 Min.
Marks: 20 , Available online @ http://www.mathcity.org/fsc

OBJECTIVE

Q. 7: Some possible answers to each statement are given below. Tick (P) mark the correct answer.

i) A function in which the variable appears as exponent is call an

a) Identity function
b) Exponential Function
c) Inverse Function
d) Constant Function

ii) If $\frac{x^3 - x}{x^3 + 1}$ then $f(x)$ is

a) Odd Function
b) Even Function
c) Neither Function
d) None of these

iii) $\lim_{x \to 0} \frac{a^x - 1}{x} =$

a) log a
b) $\log_{10}$ x
c) $\log_{10}$ a
d) None of these

iv) If $f(x) = x^{1/3}$ then $f'(8) =$

a) $1/2$
b) $2/3$
c) $1/3$
d) 3

v) If $y = e^{ax}$, then $\frac{dy}{dx} =$

a) $1/e^x$
b) ae^x
c) e^{ax}
d) $\frac{1}{a}e^{ax}$

vi) If $c \in D_f$ and $f'(c) = 0$

a) Stationary point
b) Critical Point
c) Relative extreme
d) None of these

vii) $\int Secx.dx =$ …….

a) ln | Sec$x$ + Cot$x$ | + c
b) ln |Tan$x$ +Cosec$x$ | + c
c) ln | Sec$x$ + Tan$x$ | + c
d) ln | Sin$x$ + Cot$x$ | +c

viii) $\int x.\ln x.dx =$ …….

a) $x^2[\ln x - x] + c$
b) $\frac{1}{2}[x^2 \ln x + \frac{x^2}{2}] + c$
c) $\frac{1}{2}x^2[\ln x - \frac{1}{2}] + c$
d) None of these

ix) $\int_0^1 \frac{dx}{\sqrt{1-x^2}} =$ …….

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

x) If $y = 0$ then the point P (x , y) is on

a) Origin b) y-axis

c) x-axis d) 4^{th} quadrant

xi) IF (2 , 4), (4 , 6) & (3 , 5) are the vertices of a triangle then its centroid is

a) $\left(\frac{10}{4}, \frac{14}{3}\right)$ b) (3 , 5)

c) $\left(\frac{8}{3}, \frac{11}{3}\right)$ d) (3 , 4)

xii) If $b = 0$ then $ax + by + c = 0$ shows that line is

a) Parallel to x-axis b) Parallel to y-axis

c) Perpendicular to y-axis d) None of these

xiii) The lines represented by $ax^2 + 2hxy + by^2 = 0$

a) $h^2 - ab < 0$ b) $h^2 - ab > 0$

c) $h^2 - ab = 0$ d) $h^2 + ab = 0$

xiv) To find the optional solution evaluate the objective function at

a) All points of feasible region b) Corner points

c) Origin only d) None of these

xv) If C (h , k) is the centre and r is the radius of a circle then equation of the circle is

a) $(x + h)^2 + (y + k)^2 = r^2$ b) $(x - h)^2 + (y - k)^2 = r^2$

c) $(x - h) + (y - k) = r$ d) $(x + h) + (y + k) = r$

xvi) The directrix of the parabola $y^2 = 8x$ is

a) $x+2 = 0$ b) $x - 2 = 0$

c) $y + 2 = 0$ d) $y - 2 = 0$

xvii) If equation of ellipse is $\frac{x^2}{a} + \frac{y^2}{b} = 1$

a) (0 , 0) b) (a , b)

c) (b , a) d) ($-a$, $-b$)

xviii) If the equation of hyperbola is $\frac{x^2}{a} - \frac{y^2}{b} = 1$ then vertices are

a) ($+a$, 0) b) ($+b$, 0)

c) (0, $\pm$ b) d) (0, $\pm$ a)

xix) If the angle α , β , γ are direction angles of a vector then Cosα , Cosβ , Cosγ are called

a) Components b) Direction cosines

c) Both (a) & (b) d) None of these

xx) If $\underline{a}$ & $\underline{b}$ are two non-zero vectors then $\underline{a} \times \underline{b} =$

a) $\underline{a}\underline{b}$ b) ab

c) $-\underline{b} \times \underline{a}$ d) None of these

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BISE – Model Paper 2009 unofficial
Mathematics Paper-II , Time Allowed: 2.30 Hours
Max. Marks: 80 , Available online @ http://www.mathcity.org/fsc

Section – I

Note: *All questions are to be attempted on answer book.*

Q # 1: Write any TWENTY-FIVE short answers of the following questions:

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

(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 $y = \text{Cos}\,h\,(2x)$

(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 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 equation $x.dy+y.dx=0$

(xvii) Evaluate $\int_{-1}^{5}|x-3|.dx$

(xviii) Find the area bounded by Cosine function from x = $-\frac{p}{2}$ to x = $\frac{p}{2}$

(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 (±5 , 0) and vertex is (3 , 0).

(xxxi) Transform the equation $x^2+6x-8y+17=0$ referred to $O'(-3,0)$ 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 values of α so that $\underline{u} = a\,\underline{i} + \underline{j}$, $\underline{v} = \underline{i} + \underline{j} + 3\underline{k}$ and $\underline{w} = 2\underline{i} + \underline{j} - \underline{k}$ are coplanar.

(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.*

Q # 2 (a) If θ is measured in radians, prove that $\lim_{x \to 0} \frac{Sinq}{q} = 1$

(b) Show that $x^2 \frac{dy^2}{dx^2} + x\frac{dy}{dx} + y = 0$. If $y = a\,\text{Cos}(\ln x) + b\,\text{Sin}(\ln x)$

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

(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 equation of parabola in standard form.

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

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

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