Q 1

GUESS PAPERS

MODEL PAPER - 1

MATHS - 1B

Time : 3 Hours | Max.Marks : 75

SECTION-A

I. Answer ALL of the following VSAQ: $10 \times 2 = 20$

		Ans-Page Index
1.	Find the value of x, if the slope of the line passing through (2,5), (x,3) is 2.	[☞P 81(88.1)]
2.	Transform $\sqrt{3}x+y=4$ into (i) slope intercept form and (ii) intercept form.	[☞P 82(90.2)]
3.	Find vertex 'C' of ΔABC if its centroid is the origin and vertices A,B are (1,1,1),(−2,4,1)	[☞P 85(97.1)]
4.	Write the equation of the plane $4x-4y+2z+5=0$ in the intercept form.	[☞P 87(101)]
5.	Evaluate $\lim_{x\to 3} \frac{x^2-8x+15}{x^2-9}$ [☞P 89(110)]	
6.	Evaluate $\lim_{x\to 0} \frac{a^x-1}{b^x-1}$	[☞P 92(125)]
7.	Find the derivative of $y=\frac{2x+3}{4x+5}$	[☞P 96(148.1)]
8.	Find the derivative of $x=a\cos^3 t$, $y=a\sin^3 t$.	[☞P 100(161)]
9.	Find Δy and dy for the function $y=x^2+x$, when $x=10$, $\Delta x=0.1$	[☞P 102(172.1)]
10.	State Rolle's mean value theorem	[☞P 105(178.1)]

SECTION-B

II. Answer any FIVE of the following SAQ: $5 \times 4 = 20$

11.	Find the locus of the third vertex of a right angled triangle,the ends of whose hypotenuse are (4,0) and (0,4)	[☞P 55(42.1)]
12.	Find the transformed equation of $x^2+y^2+2x-4y+1=0$ when the origin is shifted to (−1,2)	[☞P 59(49.1)]
13.	Find the value of k, if the lines $2x-3y+k=0, 3x-4y-13=0, 8x-11y-33=0$ are concurrent.	[☞P 63(55.1)]
14.	Is f defined by $f(x)=\begin{cases}\frac{\sin 2x}{x} & \text{if } x\neq 0\\ 1 & \text{if } x=0\end{cases}$ continuous at 0?	[☞P 67(62.1)]
15.	Find the derivatives of tan2x using first principle.	[☞P 71 (71.1)]
16.	Show that curves $6x^2-5x+2y=0, 4x^2+8y^2=3$ touch each other at (1/2,1/2).	[☞P 75(78.2)]
17.	A stone is dropped into a quiet lake and ripples move in circles at the speed of 5 cm/sec. At the instant when the radius of circular ripple is 8cm, how fast is the enclosed area increases?	[☞P 78(85.1)]

SECTION-C

III. Answer any FIVE of the following LAQ: $5 \times 7 = 35$

18.	Find the circumcentre of the triangle with vertices (1,3), (−3,5), (5,−1)	[☞P 16(1.1)]
19.	P.T the equation of pair of angular bisectors of $ax^2+2hxy+by^2=0$ is $h(x^2-y^2)-(a-b)xy=0$	[☞P 21(6)]
20.	Find the angle between the lines joining the origin to the points of intersection of the curve $x^2+2xy+y^2+2x+2y-5=0$ and the line $3x-y+1=0$.	[☞P 26(12)]
21.	Find the angle between the lines whose Dc's are related by $l+m+n=0$ & $l^2+m^2-n^2=0$	[☞P 29(16.1)]
22.	If $\sqrt{1-x^2}+\sqrt{1-y^2}=a(x-y)$ then prove that $\frac{dy}{dx}=\frac{\sqrt{1-y^2}}{\sqrt{1-x^2}}$	[☞P 34(21)]
23.	If the tangent at a point on the curve $x^{2/3}+y^{2/3}=a^{2/3}$ intersects the coordinate axes in A,B then show that the length AB is a constant.	[☞P 40(26)]
24.	Find two positive integers x and y such that $x+y=60$ and xy^3 is maximum.	[☞P 49(36)]

GUESS PAPERS

Q 2 MODEL PAPER - 2

Time : 3 Hours

MATHS - 1B

Max.Marks : 75

I. Answer ALL of the following VSAQ: SECTION-A $10 \times 2 = 20$ | Ans-Page Index

1. Find the equation of line passing through (−4,5) and cutting off equal intercepts on the axes. [☞P 81(89.1)]
2. Find the equation of the line parallel to $2x+3y+7=0$ and passing through (5, 4) [☞P 83(92.1)]
3. Find the fourth vertex of the parallelogram whose consecutive vertices are (2,4,−1), (3,6,−1) and (4,5,1) [☞P 85(98)]
4. Find the intercepts of the plane $4x+3y-2z+2=0$ on the coordinate axes. [☞P 87(102)]
5. Evaluate $\lim_{x\to 0}\frac{e^{3x}-1}{x}=3$ [☞P 92(127)]
6. Evaluate $\lim_{x\to\infty}\frac{x^2+5x+2}{2x^2-5x+1}$ [☞P 93(132)]
7. Find the derivative of $f(x)=xe^x\sin x$ [☞P 86(146.1)]
8. Find the derivatjve of $y=e^{a\sin^{-1}x}$ [☞P 97(151.2)]
9. If the increase in the side of a square is 4% then find the approximate percentage of increase in the area of the square. [☞P 103(174.1)]
10. Verify Lagrange's mean value theorem for the function x^2-1 on [2,3] [☞P 105(180.1)]

II. Answer any FIVE of the following SAQ: SECTION-B $5 \times 4 = 20$

11. A(1,2),B(2,−3) and C(−2, 3) are three points. If P is a point such that $PA^2+PB^2=2PC^2$, then show that the equation to the locus of P is $7x-7y+4=0$ [☞P 56(44)]
12. When the origin is shifted to the point (2,3), the transformed equation of a curve is $x^2+3xy-2y^2+17x-7y-11=0$. Find the original equation of the curve. [☞P 59(50)]
13. Transform the equation $\frac{x}{a}+\frac{y}{b}=1$ into normal form. If the perpendicular distance of the straight line from the Origin is p then deduce that $\frac{1}{p^2}=\frac{1}{a^2}+\frac{1}{b^2}$ [☞P 66(61)]
14. Show that $f(x)=\begin{cases}\frac{\cos ax-\cos bx}{x^2} & \text{if } x\neq 0\\ \frac{1}{2}(b^2-a^2) & \text{if } x=0\end{cases}$, is continuous at 0. [☞P 68(65)]
15. Find the derivatives of sin2x using first principle. [☞P 70 (70.1)]
16. Find the length of subtangent and subnormal at a point on the curve $y=b\sin(x/a)$. [☞P 76(79)]
17. The volume of a cube is increasing at a rate of 9 cubic centimeters per second. How fast is the surface area increasing when the length of the edge is 10 centimeters? [☞P 79(86.1)]

III. Answer any FIVE of the following LAQ: SECTION-C $5 \times 7 = 35$

18. Find the orthocentre of the triangle formed by the vertices (5,−2), (−1,2), (1,4) [☞P 17(2.1)]
19. Prove that area of triangle formed by $ax^2+2hxy+by^2=0$, $lx+my+n=0$ is $\frac{n^2\sqrt{h^2-ab}}{|am^2-2hlm+bl^2|}$ [☞P 22(7)]
20. Show that the lines joining the origin to the points of intersection of the curve $x^2-xy+y^2+3x+3y-2=0$ and the straight line $x-y-\sqrt{2}=0$ are mutually perpendicular. [☞P 27(13.2)]
21. Find the angle between whose Dc's satisfy the equations $3l+m+5n=0$ and $6mn-2nl+5lm=0$. [☞P 29(16.2)]
22. If $y=\tan^{-1}\left(\frac{\sqrt{1+x^2}+\sqrt{1-x^2}}{\sqrt{1+x^2}-\sqrt{1-x^2}}\right)$ then find $\frac{dy}{dx}$ [☞P 35(22)]
23. Show that the tangent at $P(x_1,y_1)$ on the curve $\sqrt{x}+\sqrt{y}=\sqrt{a}$ is $xx_1^{-\frac{1}{2}}+yy_1^{-\frac{1}{2}}=a^{\frac{1}{2}}$ [☞P 41(27)]
24. Find the maximum area of the rectangle that can be formed with fixed perimeter 20. [☞P 49(37)]

Q 3

GUESS PAPERS

MODEL PAPER - 3

MATHS - 1B

Time : 3 Hours | Max.Marks : 75

SECTION-A

I. Answer ALL of the following VSAQ: $10 \times 2 = 20$

1. Find the equation of line perpendicular to $5x-3y+1=0$ and passing through $(4,-3)$ [☞P 83(92.2)]
2. Find a, if the area of the triangle formed by $x=0, y=0, 3x+4y=a$ is 6 sq.units. [☞P 83(93.2)]
3. Find the ratio in which the XZ-plane divides line joining A(−2,3,4), B(1,2,3) [☞P 86(99.1)]
4. Find the equation of the plane which makes intercepts 1,2,4 on x,y,z-axes [☞P 87(103)]
5. Evaluate $\lim_{x\to 0} \frac{e^{\sin x}-1}{x}$ [☞P 93(129)]
6. Evaluate $\lim_{x\to\infty} \frac{11x^3-3x+4}{13x^3-5x^2-7}$ [☞P 94(133)]
7. Find the derivative of $f(x) = \sin(\log x)$ [☞P 97(149.1)]
8. Find the derivative of $2x^2-3xy+y^2+x+2y-8=0$ [☞P 99(160)]
9. If $y=x^2+3x+6$ then find Δy and dy when $x=10$, $\Delta x=0.01$. [☞P 102(172.2)]
10. State Lagrange's mean value theorem [☞P 105(178.2)]

SECTION-B

II. Answer any FIVE of the following SAQ: $5 \times 4 = 20$

11. Find the equation of locus of a point P, if A=(2,3), B=(2,−3) and PA+PB=8. [☞P 57(45.1)]
12. Find the transformed equation of $x^2+2\sqrt{3}xy-y^2=2a^2$, when the axes are rotated through an angle $\pi/6$ [☞P 60(51.1)]
13. Find the equation of the straight line parallel to $3x+4y=7$ and passing through the point of intersection of the lines $x-2y-3=0$ and $x+3y-6=0$. [☞P 64(56.1)]
14. Is f given by $f(x)=\begin{cases}\frac{x^2-9}{x^2-2x-3} & \text{if } 0<x<5 \text{ and } x\neq 3\\ 1.5 & \text{if } x=3\end{cases}$, continuous at the point 3. [☞P 67(62.2)]
15. If $x^y=e^{x-y}$ then show that $\frac{dy}{dx}=\frac{\log x}{(1+\log x)^2}$ [☞P 109(195)]
16. Find the length of sub tangent, sub normal at t on the curve $x=a(\cos t+t\sin t), y=a(\sin t-t\cos t)$ [☞P 42(28)]
17. A particle is moving along a line according $s=f(t)=8t+t^3$. [☞P 78(84.1)]
    Find (i) the velocity at time t=2 sec (ii) the initial velocity (iii) acceleration at t=2sec.

SECTION-C

III. Answer any FIVE of the following LAQ: $5 \times 7 = 35$

18. Find the circumcentre of the triangle whose sides are $x+y+2=0, 5x-y-2=0, x-2y+5=0$ [☞P 19(4)]
19. P.T the product of perpendiculars from (α,β) to $ax^2+2hxy+by^2=0$ is $\frac{|a\alpha^2+2h\alpha\beta+b\beta^2|}{\sqrt{(a-b)^2+4h^2}}$ [☞P 23(8)]
20. Show that the lines joining the origin with the points of intersection of the curve $7x^2-4xy+8y^2+2x-4y-8=0$ with the line $3x-y=2$ are mutually perpendicular. [☞P 27(13.1)]
21. Find the Dc's of two lines which are connected by the relations $l+m+n=0$, $mn-2nl-2lm=0$ [☞P 30(17.2)]
22. Find derivative of $x^{\tan x}+\sin x^{\cos x}$. [☞P 36(23.1)]
23. Find the angle between the curves $xy=2$ and $x^2+4y=0$ [☞P 44(30.1)]
24. From a rectangular sheet of dimensions 30cm × 80cm, four equal squares of sides x cm are removed at the corners, and the sides are then turned up so as to form an open rectangular box. What is the value of x, so that volume of the box is the greatest? [☞P 51(39)]

GUESS PAPERS

Q 4 MODEL PAPER - 4

Time : 3 Hours

MATHS - 1B

Max.Marks : 75

Ans-Page Index

SECTION-A

I. Answer ALL of the following VSAQ: $10 \times 2 = 20$

1. Find the equation of line passing through the point (–2,4) and making intercepts, whose sum is zero. [☞P 81(89.2)]
2. Find the distance between the parallel lines $5x-3y-4=0$, $10x-6y-9=0$ [☞P 84(95.1)]
3. Show that the points (1,2,3), (7, 0, 1), (–2, 3, 4) are collinear [☞P 86(100.2)]
4. Find a traid of d.c's of the normal to the plane $x+2y+2z-4=0$ [☞P 87(105)]
5. Evaluate $\lim_{x\to 0}\frac{e^x-1}{\sqrt{1+x}-1}$ [☞P 90(115)]
6. Evaluate $\lim_{x\to 0}\frac{\cos ax-\cos bx}{x^2}$ [☞P 76(89)]
7. Find the derivative of $y=e^{\sin^{-1}x}$ [☞P 97(151.1)]
8. Find the derivative of 7^{x^3+3x} [☞P 99(157)]
9. If the increase in the side of a square is 2% then find the approximate percentage of increase in the area of the square. [☞P 103(174.2)]
10. Verify Rolle's theorem for the function x^2-1 on $[-1,1]$ [☞P 105(179.2)]

SECTION-B

II. Answer any FIVE of the following SAQ: $5 \times 4 = 20$

11. A(5,3), B(3,–2) are 2 fixed points. Find the equation of the locus of P, so that the area of triangle PAB is 9 sq.units [☞P 56(43.1)]
12. Find the transformed equation of $3x^2+10xy+3y^2=9$ when the axes are rotated through an angle $\pi/4$ [☞P 60(51.2)]
13. Find the points on $3x-4y-1=0$ which are at a distance of 5 units from the point (3,2) [☞P 65(59)]
14. If f is given by $f(x)=\begin{cases} k^2x-k & \text{if } x\geq 1 \\ 2 & \text{if } x<1 \end{cases}$ is a continuous function on R, then find k. [☞P 67(63)]
15. Differentiate $\tan^{-1}\frac{2x}{1-x^2}$ w.r.t $\sin^{-1}\frac{2x}{1+x^2}$ [☞P 110(191)]
16. Find the equations of the tangent and the normal to the curve $xy=10$ at (2,5) [☞P 74(77.1)]
17. A balloon which always remains spherical when inflated by pumping in 900 cc of gas per sec. Find the rate at which the radius of balloon increases when the radius in 15 cm. [☞P 79(87)]

SECTION-C

III. Answer any FIVE of the following LAQ: $5 \times 7 = 35$

18. If Q(h,k) is the image of the point $P(x_1,y_1)$ with respect to the straight line $ax+by+c=0$ then prove that $(h-x_1) : a=(k-y_1):b=-2(ax_1+by_1+c) : (a^2+b^2)$. [☞P 20(5.2)]
19. If $ax^2+2hxy+by^2+2gx+2fy+c=0$ represents two parallel lines then prove that [☞P 23(9)]

    (a) $h^2=ab$ (b) $af^2=bg^2$ (c) the distance between the parallel lines is $2\sqrt{\frac{g^2-ac}{a(a+b)}}$
20. Find the value of k, if the lines joining the origin with the points of intersection of the curve $2x^2-2xy+3y^2+2x-y-1=0$ & the line $x+2y=k$ are mutually perpendicular. [☞P 28(14)]
21. Find the Dc's of 2 lines which are connected be the relations $l-5m+3n=0, 7l^2+5m^2-3n^2=0$ [☞P 30(17.1)]
22. If $y=x\sqrt{a^2+x^2}+a^2\log\left(x+\sqrt{a^2+x^2}\right)$, then show that $\frac{dy}{dx}=2\sqrt{a^2+x^2}$ [☞P 39(25)]
23. Find the angle between the curves $y^2=4x$ and $4x^2+y^2=32$ [☞P 45(31)]
24. If the curved surface of right circular cylinder inscribed in a sphere of radius r is maximum, show that the height of the cylinder is $\sqrt{2}r$. [☞P 50(38)]