

Q1

GUESS PAPERS  
**MODEL PAPER-1**

Time : 3 Hours

**MATHS - 2B**

Max.Marks : 75

- I. Answer ALL of the following VSAQ:

SECTION-A

1. If  $x^2 + y^2 - 4x + 6y + a = 0$  represents a circle with radius 4, find a  $10 \times 2 = 20$
2. Find the equation of the circle passing through the point  $(-2, 14)$  and concentric with  $x^2 + y^2 - 6x - 4y - 12 = 0$
3. S.T the circles  $x^2 + y^2 - 2x - 2y - 7 = 0$ ,  $3x^2 + 3y^2 - 8x + 29y = 0$  are orthogonal.
4. Find the coordinates of point on parabola  $y^2 = 8x$ , whose focal distance is 10.
5. If  $e, e_1$  are the eccentricities of a hyperbola and its conjugate hyperbola, then prove that  $\frac{1}{e^2} + \frac{1}{e_1^2} = 1$
6. Evaluate  $\int \sec^2 x \cdot \csc^2 x dx$
7. Evaluate  $\int e^x (\sin x + \cos x) dx$
8. Evaluate  $\int_0^1 \frac{x^2}{1+x^2} dx$
9. Evaluate  $\int_0^{\pi/2} \sin^5 x \cos^4 x dx$
10. Find the order & degree to the differential equation  $\left[ \frac{d^2 y}{dx^2} - \left( \frac{dy}{dx} \right)^3 \right]^{\frac{6}{5}} = 6y$

Ans-Page  
Index

[Q-P 79(103.1)]

[Q-P 80(109.1)]

[Q-P 82(117.1)]

[Q-P 84(121.1)]

[Q-P 86(130)]

[Q-P 89(145)]

[Q-P 88(139.1)]

[Q-P 92(169)]

[Q-P 94(176)]

[Q-P 95(181)]

SECTION-B

- II. Answer any FIVE of the following SAQ:

 $5 \times 4 = 20$ 

11. Find the pole of the line  $x+y+2=0$  w.r.t the circle  $x^2 + y^2 - 4x + 6y - 12 = 0$ . [Q-P 55(51.1)]
12. Find the radical centre of circles  $x^2 + y^2 + 4x - 7 = 0$ ,  $2x^2 + 2y^2 + 3x + 5y - 9 = 0$ ,  $x^2 + y^2 + y = 0$  [Q-P 56(53.2)]
13. Find the length of major axis, minor axis, latus rectum, eccentricity of the ellipse of  $9x^2 + 16y^2 = 144$  [Q-P 59(58)]
14. Find the equations of the tangents to  $9x^2 + 16y^2 = 144$ , which make equal intercepts on the coordinate axes. [Q-P 61(63)]
15. Find the equations of the tangents to the hyperbola  $3x^2 - 4y^2 = 12$  which are (a) Parallel to and (b) Perpendicular to the line  $y = x - 7$  [Q-P 68(79.2)]

16. Evaluate  $\int_0^{\pi/2} \frac{a \sin x + b \cos x}{\sin x + \cos x} dx$

[P 70(82)]

17. Solve  $(xy^2+x)dx+(yx^2+y)dy=0$

[P 74(92)]

SECTION-C

III. Answer any FIVE of the following LAQ:

$$5 \times 7 = 35$$

18. Find the equation of circle passing through the points A(1,2), B(3,-4), C(5,-6)

[P 16(1.1)]

19. Show that the circles  $x^2+y^2-6x-2y+1=0$  and  $x^2+y^2+2x-8y+13=0$  touch each other. Find the point of contact and common tangent.

[P 21 (5.3)]

20. Derive the standard form of the parabola.

[P 24(9)]

21. Evaluate the reduction formula for  $I_n = \int \sin^n x dx$  and hence find  $\int \sin^4 x dx$

[P 28(16.1)]

22. Evaluate  $\int \frac{2 \cos x + 3 \sin x}{4 \cos x + 5 \sin x} dx$

[P 33(24.2)]

23. Evaluate  $\int_0^{\pi} \frac{x \sin x}{1 + \cos^2 x} dx$

[P 40(32.1)]

24. Solve the differential equation  $(x^2+y^2)dx=2xydy$

[P 46(39.1)]

**I-QUOTES***Simple Maths:*

"2get" and 2give"  
creates many problems.

So, just double it ..

"4get" and "4give"  
solves many problems.



GUESS PAPERS

## MODEL PAPER-2

Time : 3 Hours

## MATHS - 2B

Max.Marks : 75

## SECTION-A

1. Answer ALL of the following VSAQ:

10 × 2 = 20

Ans-Page  
Index

- If  $x^2+y^2+2gx+2fy=0$  is a circle with centre  $(-4,-3)$  find  $(g,f)$  & radius.
- Find  $k$  if the length of the tangent from  $(5,4)$  to  $x^2+y^2+2ky=0$  is 1
- Find the equation of the radical axis of the circles  $2x^2+2y^2+3x+6y-5=0$ ,  $3x^2+3y^2-7x+8y-11=0$
- Find the value of  $k$  if the line  $2y=5x+k$  is a tangent to the parabola  $y^2=6x$ .
- If eccentricity of a hyperbola is  $5/4$ , then find eccentricity of its conjugate hyperbola.

[Q-P 79(104.1)]

[Q-P 81(110.1)]

[Q-P 82(118.1)]

[Q-P 84(122)]

[Q-P 86(131)]

6. Evaluate  $\int \frac{1}{1+\cos x} dx$

[Q-P 89(147)]

7. Evaluate  $\int e^x (\sec x + \sec x \tan x) dx$

[Q-P 88(139.2)]

8. Evaluate  $\int_0^4 \frac{x^2}{1+x} dx$

[Q-P 92(170)]

9. Evaluate  $\int_{-\pi/2}^{\pi/2} \sin^2 x \cos^4 x dx$

[Q-P 94(179)]

10. Form the differential equation corresponding to  $y = A \cos 3x + B \sin 3x, (A,B)$ 

[Q-P 96(184)]

## SECTION-B

11. Answer any FIVE of the following SAQ:

5 × 4 = 20

[Q-P 55(52)]

11. Find the value of  $k$  if  $kx+3y-1=0$  and  $2x+y+5=0$  are conjugate with respect to the circle  $x^2+y^2-2x-4y-4=0$ 

[Q-P 56(54.1)]

12. Find the equation and length of the common chord of the two circles  $x^2+y^2+2x+2y+1=0$  and  $x^2+y^2+4x+3y+2=0$ 

[Q-P 59(59)]

13. Find the eccentricity, coordinates of foci, Length of latus rectum and equations of directrices of the ellipse  $9x^2+16y^2-36x+32y-92=0$ .

[Q-P 65(72)]

14. Show that the points of intersection of the perpendicular tangents to an ellipse lie on a circle

[Q-P 69(80)]

15. Prove that the point of intersection of two perpendicular tangents to the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} - 1 = 0$  lies on the circle  $x^2+y^2=a^2-b^2$ .



16. Evaluate  $\int_0^{\pi/2} \frac{dx}{4 + 5 \cos x}$

[P 72(86)]

17. Solve  $\frac{dy}{dx} - x \tan(y - x) = 1$

[P 74(93)]

**SECTION-C**

III. Answer any FIVE of the following LAQ:

5 × 7 = 35

18. If (2,0), (0,1), (4,5), (0,c) are concyclic then find c.

[P 19(4)]

19. Find direct common tangents to circles

[P 22(6)]

$$x^2 + y^2 + 22x - 4y - 100 = 0, x^2 + y^2 - 22x + 4y + 100 = 0$$

20. Find the equation of the parabola passing through the points

[P 25(10)]

(-1,2), (1,-1), (2,1) and having its axis parallel to the x-axis.

21. Evaluate the reduction formula for  $I_n = \int \cos^n x dx$  and hence find  $\int \cos^4 x dx$

[P 28(16.2)]

22. Evaluate  $\int \frac{dx}{3 \cos x + 4 \sin x + 6}$

[P 32(23)]

23. Evaluate  $\int_0^{\pi} \frac{x \sin^3 x}{1 + \cos^2 x} dx$

[P 40(32.2)]

24. Solve  $(x^2y - 2xy^2)dx = (x^3 - 3x^2y)dy$

[P 48(41.1)]





GUESS PAPERS

# MODEL PAPER-3

Time : 3 Hours

## MATHS - 2B

Max.Marks : 75

1. Answer ALL of the following VSAQ:

- Find the Parametric equations of the circle  $x^2 + y^2 - 6x + 4y - 12 = 0$
- Find k if the points (1,3), (2,k) are conjugate w.r.to circle  $x^2 + y^2 = 35$ .
- Find the angle between  $x^2 + y^2 - 12x - 6y + 41 = 0$  and  $x^2 + y^2 + 4x + 6y - 59 = 0$
- If (1/2, 2) is one extremity of a focal chord of the parabola  $y^2 = 8x$ . Find the coordinates of the other extremity.
- Find the value of k if  $3x - 4y + k = 0$  is a tangent to the hyperbola  $x^2 - 4y^2 = 5$ .

10 × 2 = 20

- Evaluate  $\int \frac{\sin(\log x)}{x} dx$  [P 89(149.1)]
- Evaluate  $\int e^x (\tan x + \log \sec x) dx$  [P 88(140.1)]
- Evaluate  $\int_0^2 |1-x| dx$  [P 93(173.1)]
- Evaluate  $\int_0^{2\pi} \sin^2 x \cos^4 x dx$  [P 94(180.2)]

- Find the order and degree of the D.E  $x^{1/2} \left( \frac{d^2 y}{dx^2} \right)^{1/3} + x \frac{dy}{dx} + y = 0$

11. Answer any FIVE of the following SAQ:

5 × 4 = 20

- Find the length of the chord intercepted by the circle  $x^2 + y^2 - x + 3y - 22 = 0$  on  $y = x - 3$
- If  $x + y = 3$  is the equation of the chord AB of the circle  $x^2 + y^2 - 2x + 4y - 8 = 0$ , find the equation of circle having AB as diameter.
- Find the equations of the tangents to the ellipse  $2x^2 + y^2 = 8$  which are (i) parallel to  $x - 2y - 4 = 0$  (ii) perpendicular to  $x + y + 2 = 0$  (iii) make an angle  $45^\circ$  with x-axis.
- Find the equation of tangent and normal to the ellipse  $9x^2 + 16y^2 = 144$  at the end of the latus rectum in the first quadrant.
- Find the centre, eccentricity, foci, length of latus rectum and equations of the directrices of the Hyperbola  $x^2 - 4y^2 = 4$

- Evaluate  $\int_0^{\pi/2} \frac{\cos^{5/2} x}{\sin^{5/2} x + \cos^{5/2} x} dx$  [P 70(83)]
- Solve  $\frac{dy}{dx} + y \tan x = \cos^3 x$  [P 74(94)]

### SECTION-C

III. Answer any FIVE of the following LAQ:

5 × 7 = 35

- Find the equation of the circle passing through (4,1), (6,5) and having the centre on the line  $4x + 3y - 24 = 0$  [P 20(5.1)]
- Find the equation to the pair of transverse common tangents to the circles  $x^2 + y^2 - 4x - 10y + 28 = 0$  and  $x^2 + y^2 + 4x - 6y + 4 = 0$  [P 23(7)]
- If  $y_1, y_2, y_3$  are the y-coordinates of the vertices of the triangle inscribed in the parabola  $y^2 = 4ax$  then show that area of the triangle is  $\frac{1}{8a} |(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)|$  sq. units. [P 27(14)]
- Evaluate  $\int \tan^n x dx$  and hence evaluate  $\int \tan^5 x dx, \int \tan^6 x dx$  [P 29(17.1)]
- Evaluate  $\int \frac{x+1}{x^2+3x+12} dx$  [P 36(28)]
- Evaluate  $\int_0^{\pi/2} \frac{\sin^2 x}{\cos x + \sin x} dx$  [P 42(34)]
- Solve  $\frac{dy}{dx} = \frac{x-y+3}{2x-2y+5}$  [P 50(44.2)]



GUESS PAPERS

## MODEL PAPER-4

Time : 3 Hours

MATHS - 2B

Max.Marks : 75

## SECTION-A

I. Answer ALL of the following VSAQ:

 $10 \times 2 = 20$ 

- Find the equation of the circle with (4,2), (1,5) as ends of a diameter.
- Find the power of the point P(-1,1) w.r.to the circle  $x^2+y^2-6x+4y-12=0$ .
- Find k if  $x^2+y^2-5x-14y-34=0$ ,  $x^2+y^2+2x+4y+k=0$  are orthogonal.
- Find the equation of tangent to the parabola  $y^2=16x$ , inclined at  $60^\circ$  to the X-axis.
- Find the angle between the asymptotes of the hyperbola  $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$
- Evaluate  $\int \frac{x^8}{1+x^{18}} dx$
- Evaluate  $\int e^x \left( \frac{1+x \log x}{x} \right) dx$
- Evaluate  $\int_0^4 |2-x| dx$
- Evaluate  $\int_0^{\pi/2} \sin^6 x \cos^4 x dx$
- Find the general solution of  $\frac{dy}{dx} = e^{x+y}$

[Q.P 99(199)]

[Q.P 81(111)]

[Q.P 82(116.1)]

[Q.P 84(124)]

[Q.P 86(132)]

[Q.P 88(141)]

[Q.P 94(177)]

[Q.P 96(188)]

## SECTION-B

II. Answer any FIVE of the following SAQ:

 $5 \times 4 = 20$ 

- Find the mid point of the chord intercepted by  $x^2+y^2-2x-10y+1=0$  on the line  $x-2y+7=0$ . Also find the length of the chord.
- Find the equation of the circle which passes through the origin and intersects the circles  $x^2+y^2-4x+6y+10=0$ ,  $x^2+y^2+12y+6=0$  orthogonally.
- Find the equation of the ellipse in the standard form whose distance between foci is 2 and the length of latus rectum is  $15/2$ .
- Find the equation of ellipse, if focus=(1,-1),  $e = 2/3$  and directrix is  $x+y+2=0$ .
- Find the centre, eccentricity, foci, length of latus rectum and equations of the directrices of the Hyperbola  $16y^2-9x^2=144$ .
- Find  $\int_{-a}^a x^2(a^2-x^2)^{3/2} dx$
- Solve  $(1+x^2) \frac{dy}{dx} + y = e^{\tan^{-1}x}$

[Q.P 52(46)]

[Q.P 58(57.1)]

[Q.P 62(64)]

[Q.P 63(67)]

[Q.P 68(78.2)]

[Q.P 75(98)]

## SECTION-C

III. Answer any FIVE of the following LAQ:

 $5 \times 7 = 35$ 

- Show that the points (1, 1), (-6, 0), (-2, 2) and (-2, -8) are concyclic.
- Show that the circles  $x^2+y^2-6x-9y+13=0$ ,  $x^2+y^2-2x-16y=0$  touch each other. Find the point of contact and the equation of the common tangent at that point.
- P.T the area of the triangle formed by the tangents at  $(x_1, y_1)$ ,  $(x_2, y_2)$ ,  $(x_3, y_3)$  to the parabola  $y^2 = 4ax$  is  $\frac{1}{16a} |(y_1 - y_2)(y_2 - y_3)(y_3 - y_1)|$  sq. units.
- Obtain reduction formula for  $I_n = \int \cot^n x dx$  and hence find  $\int \cot^4 x dx$
- Evaluate  $\int \frac{2x+5}{\sqrt{x^2-2x+10}} dx$
- S.T  $\int_0^{\pi/2} \frac{x}{\sin x + \cos x} dx = \frac{\pi}{2\sqrt{2}} \log(\sqrt{2}+1)$
- Solve the D.E  $(2x+y+1) dx + (4x+2y-1) dy = 0$

[Q.P 18(3)]

[Q.P 21(5.4)]

[Q.P 27(15)]

[Q.P 29(17.2)]

[Q.P 43(35)]

[Q.P 50(44.1)]