



# MATHS

## BOOKS - VGS PUBLICATION-BRILLIANT

### MODEL PAPER 5

#### Section A Very Short Answer Type Questions

1. Find the equation of the straight line passing through the point  $(-2, 4)$  and making intercepts whose sum is zero.



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2. Find the value of  $k$  if the straight lines  $6x - 10y + 3 = 0$  and  $kx - 5y + 8 = 0$  are parallel.



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3. Show that the points  $(5,4,2)$ ,  $(6,2,-1)$  and  $(8,-2,-7)$  are collinear.



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4. Find the equation of the plane passing through the point (1,1,1) and parallel to the plane  $x + 2y + 3z - 7 = 0$



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5. Evaluate  $\lim_{x \rightarrow 0} \frac{\sqrt{1+x} - 1}{x}$



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6. Check the continuity of the function 'f' defined by

$$f(x) = \begin{cases} \frac{\sin 2x}{x} & \text{if } x \neq 0 \\ 1 & \text{if } x = 0 \end{cases} \text{ at } x=0$$



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7. If  $f(x) = \log (\sec x + \tan x)$ , then find  $f'(x)$ .



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8. If  $y = e^t + \cos t$ ,  $x = \log t + \sin t$  then find

$$\frac{dy}{dx}.$$



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9. If  $y = x^2 + x$ ,  $x = 10$ ,  $\Delta x = 0.1$ , then find

$\Delta y$  and  $dy$



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10. Three unbiased coins are tossed. What is the probability of getting at most two heads?



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## Section B Short Answer Type Questions

1.  $A(5,3)$  and  $B(3,-2)$  are 2 fixed points. Find the equation of locus of  $P$ , so that the area of  $\triangle PAB$  is 9sq. Units.



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2. 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 curve.



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3. Find the value of  $p$ , if the lines  $3x + 4y = 5$  ,  $2x + 3y = 4$  ,  $px + 4y = 6$  are concurrent.



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4. Find :  $\lim_{x \rightarrow 0} \frac{\cos ax - \cos bx}{x^2}$



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5. Find the derivative of  $\tan 2x$  from the first principle.



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6. 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?



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7. Show that at any point  $(x,y)$  on the curve  $y = b^{\frac{x}{a}}$ , the length of the subtangent is a constant and the length of the subnormal is  $\frac{y^2}{a}$ .



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## Section C Long Answer Type Questions

1. Find the circumcentre of the triangle whose vertices are (1,3) (-3,5) and (5,-1).



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2. Show that the product of the perpendicular from  $(\alpha, \beta)$  to the pair of lines

$$S \equiv ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$$

is  $\frac{|a\alpha^2 + 2h\alpha\beta + 2g\alpha + 2f\beta + c|}{\sqrt{(a-b)^2 + 4h^2}}$  Hence or

otherwise find the product of the perpendicular from the origin



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3. Write down the equation of the pair of straight lines joining the origin to the points of intersection of the  $6x - y + 8 = 0$  with the pair of straight lines  $3x^2 + 4xy - 4y^2 - 11x + 2y + 6 = 0$ . Show that the lines so obtained make equal angles with the coordinate axes.



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4. Find the angle between the lines whose direction cosines satisfy the equations :

$$3l + m + 5n = 0 \text{ and}$$

$$6mn - 2nl + 5lm = 0.$$



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5. If the tangent at any point on the curve

$$x^{\frac{2}{3}} + y^{\frac{2}{3}} = a^{\frac{2}{3}} \text{ intersects the co-ordinate axes}$$

at A and B, then show that the length AB is a constant.



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6. A window is in the shape of a rectangle surmounted by a semi circle. If the perimeter of the window is 20 ft, find the maximum area:



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