



## MATHS

# **BOOKS - VGS PUBLICATION-BRILLIANT**

# **MODEL PAPER 7**

Section A Very Short Answer Type Questions

1. Find the complex conjugate of (3+4i)(2-3i)

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2. If the Arg 
$$\bar{z}_1$$
 and  $Argz_2 \text{are} \frac{\pi}{5}$  and  $\frac{\pi}{3}$  respectively,find (Arg ( $z_1 + Argz_2$ )





1. If 
$$x+iy=rac{1}{1+\cos heta+i\sin heta}$$
 , show that  $4x^2-1=0$ 

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#### 2. Determine the range of the following expressions.

 $\frac{x+2}{2x^2+3x+6}$ 

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**3.** If the letters of the word EAMCET are permuted in all possible ways and if the words thus formed are arranged in the dictionary order, find

the rank of the word EAMCET.



**4.** Find the number of ways of selecting a cricket team of 11 players from 7 batsmen and 6 bowlers such that there will be atleast 5 bowlers in the team.

5. Resolve 
$$rac{x^2-3}{(x+2)(x^2+1)}$$
 into partial fractions.

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6. If A, B, C are three events associated with a random experiment,

prove that

$$P(A\cup B\cup C)=P(A)+P(B)+P(C)-P(A\cap B)-P(A\cap C)$$

 $P(B\cap C)+P(A\cap B\cap C)$ 

7. If A,B,C are three independent events of an experiment. Such that  $P(A \cap B^C \cap C^C) = \frac{1}{4}$   $P(A^C \cap B \cap C^C) = \frac{1}{8}, P(A^C \cap B^C \cap C^C) = \frac{1}{4}$ 

then find P(A),P(B)and P(C).

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### Section C Long Answer Type Questions

1. If 
$$\cos lpha + \cos eta + \cos \gamma = 0 \sin lpha + \sin eta + \sin \gamma$$
, Prove that  $\cos^2 lpha + \cos^2 eta + \cos^2 \gamma = rac{3}{2} = \sin^2 lpha + \sin^2 eta + \sin^2 \gamma.$ 

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**2.** Solve 
$$x^5 - 5x^4 + 9x^3 - 9x^2 + 5x - 1 = 0$$
.

**3.** Prove that : If n is a positive integer and x is any nonzero real number, then prove that

$$C_0 + C_1 rac{x}{2} + C_2. \ rac{x^2}{3} + C_3. \ rac{x^3}{4} + \ldots \ + C_n. \ rac{x^n}{n+1} = rac{(1+x)^{n+1}-1}{(n+1)x}$$

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**4.** If 
$$x = \frac{1.3}{3.6} + \frac{1.3.5}{3.6.9} + \frac{1.3.5.7}{3.6.9.12} + \dots$$
 then prove that  $9x^2 + 24x = 11.$ 

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**5.** Calculate the variance and standard deviation of the following continuous frequency distribution.

Class	3-40	40-50 7	50-60	60-70	70-80	80-90 3	90-100 2
Frequency	3		12	15	8		

![](_page_6_Picture_7.jpeg)

6. State and prove Baye's theorem.

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7. A random variable X has the following probability distribution.

X- x	0	1	2	3	4	5	6	7
P(X-x)	0	k	2k	2k	3k	$\mathbf{k}^{2}$	2k²	7k² + k

Find (i) k (ii) Mean (iii) P(0 < X < 5)

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Section A Very Short Answer Type Questions

**1.** If the length of the tangent from (5, 4) to

the circle  $x^2 + y^2 + 2ky = 0$  is 1 the n find k.

**2.** Find the pole of ax + by + c = 0 (c 
eq 0)

with respect to  $x^2+y^2=r^2$ 

![](_page_8_Figure_2.jpeg)

3. Find the equation of the radical axis of the following circles.

$$x^2 + y^2 - 2x - 4y - 1 = 0.$$

$$x^2 + y^2 - 4x - 6y + 5 = 0.$$

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**4.** Find the equation of tangent to  $y^2 = 16x$  inclined at an angle  $60^\circ$ 

with its axis also find its point of contact.

5. If the eccentricity of the hyperbola is  $\frac{5}{4}$ , then find the eccentricity of

conjugate hyperbola.

![](_page_9_Figure_2.jpeg)

6. Evaluate the integral

$$\int \!\! rac{\left( 3x+1
ight) ^{2}}{2x}dx,x\in I\subset R/\{0\}$$

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7. Evaluate the integerals.

$$egin{aligned} &\int\!\!\!e^x(\sec x+\sec x, an x)dxonI\subset Rackslash \ &iggl\{(2n+1)rac{\pi}{2}\!:\!n\in Ziggr\}. \end{aligned}$$

8. Evaluate the definite integrals .

$$\int\limits_{0}^{\pi}\sqrt{2+2\cos heta}d heta$$

![](_page_10_Picture_2.jpeg)

$$\int_0^{\frac{\pi}{2}} \sin^6 x \cdot \cos^4 x dx.$$

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**10.** Find the general solution of 
$$x + y \frac{dy}{dx} = 0$$

![](_page_10_Picture_7.jpeg)

Section B Short Answer Type Questions

1. Find the length of the chord intercepted

by the circle  $x^2+y^2-x3y-22=0$  on

the line y = x - 3

![](_page_11_Picture_3.jpeg)

2. If x + y = 3 is the equation of the chord AB of circle  $x^2 + y^2 - 2x + 4y - 8 = 0$ , find the equation of the circle having  $\overline{AB}$  as diameter.

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**3.** find the equation of the ellipse with focus at (1, -1),  $e = \frac{2}{3}$  and directrix as x + y + 2 = 0.

4. The tangent and normal to the ellipse  $x^2 + 4y^2 = 4$  at a point  $P(\theta)$ on it meets the major axis in Q and R respectively. If  $\theta < \theta < \frac{\pi}{2}$  and QR = 2 then show that  $\theta = \cos^{-1}\left(\frac{2}{3}\right)$ .

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5. Find the centre, foci, eccentricity equation of the directrices, length

of the latus rectum of the hyperbola.

$$x^2 - 4y^2 = 4$$

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6. Find the area enclosed between the curves

$$y=x^2+1, y=2x-2$$
 and the ordinates  $x=\ -1$  and x = 2

7. Solve the following differential equations.

$$ig(1+x^2ig)rac{dy}{dx}+y=e^{ an^{-1}x}$$

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Section C Long Answer Type Questions

1. Find the equation of circle passing

through each of the following three points.

(3, 4), (3, 2), (1, 4)

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2. Show that the circles  $x^2 + y^2 - 6x - 2y + 1 = 0, x^2 + y^2 + 2x - 8y + 13 = 0$  touch each other find the point of contact and the equation of the common tangent at their point of contact.

3. Find the equation of the parabola whose axis is parallel to X-axis and

which passes through these points.

(-2,1),(1,2), and (-1,3)

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$$\int\!\!rac{x+1}{x^2+3x+12}\,\mathsf{d}\mathsf{x}$$

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**5.** Evaluate 
$$\int \tan^6 x dx$$
.

## 6. Evaluate the integral

$$\int\limits_{0}^{\pi} \frac{x \sin x}{1 + \cos^2 x} \ \mathsf{d}\mathsf{x}$$

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![](_page_15_Figure_3.jpeg)