

**SAMPLE QUESTION PAPER**

**INSTITUTE NAME & LOGO**

**JEE-MAIN EXAM YEAR**

**Maths : Full Portion Paper**

Test Number	Test Booklet No.
Write/Check this Code on your Answer Sheet	Write this number on your Answer Sheet
<p align="center"><b>: IMPORTANT INSTRUCTIONS :</b></p> <p>02. Immediately fill in the particulars on this page of the Test Booklet with <b>Blue/Black Ball point Pen</b>. Use of pencil is strictly prohibited</p> <p>03. The Answer Sheet is kept inside this Test Booklet. When you are directed to open the Test Booklet, take out the Answer Sheet and fill in the particulars carefully.</p> <p>04. The test is of <b>60 Min.</b> duration</p> <p>05. The Test Booklet consists of <b>25</b> questions. The maximum marks are <b>100</b>. All the Ques. consists of <b>FOUR (4)</b> marks each.</p> <p>06. <b>Maths 25 Ques. (100 Marks)</b></p> <p>07. Candidates will be awarded marks as stated above in Instruction No.5 for correct response of each question. <b>ONE (1)</b> marks will be deducted for indicating incorrect response of each question. <b>No deduction</b> from the total score will be made <b>if no response</b> is indicated for an item in the Answer Sheet.</p> <p>08. Use <b>Blue/Black Ball Point Pen only</b> for writing particulars/markings responses on <b>Side-1</b> and <b>Side-2</b> of the Answer Sheet. <b>Use of pencil is strictly prohibited.</b></p> <p>09. No candidate is allowed to carry any textual material, printed or written, bits of papers, pager, mobile phone, any electronic device, etc., except the Admit Card inside the examination hall/room.</p> <p>10. Rough work is to be done on the space provided for this purpose in the Test Booklet only. This space is given at the bottom of each page of the booklet.</p> <p>11. On completion of the test, the candidate must hand over the Answer Sheet to the Invigilator on duty in the Room/Hall. <b>However, the candidates are allowed to take away this Test Booklet with them.</b></p> <p>12. The CODE for this Booklet is A. Make Sure that the CODE printed on <b>Side-2</b> of the Answer Sheet is the same as that on this booklet. In case of discrepancy, the candidate should immediately report the matter to the Invigilator for replacement of both the Test Booklet and the Answer Sheet.</p> <p>13. Do not fold or make any stray marks on the Answer Sheet.</p> <p>14. No part of the Test Booklet and Answer Sheet shall be detached under any circumstances.</p>	

Name of the Candidate : \_\_\_\_\_

Roll Number : In figures :

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In words : \_\_\_\_\_

Examination Centre Number :

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Name of Examination Centre (in Capital letters) : \_\_\_\_\_

Candidate's Signature : \_\_\_\_\_

Invigilator's Signature : \_\_\_\_\_

## SAMPLE QUESTION PAPER

# INSTITUTE NAME & LOGO

### JEE-MAIN EXAM YEAR

Time : 60 Min

Maths : Full Portion Paper

Marks : 100

51) If  $\tan^{-1} x + 2\cot^{-1} x = \frac{2\pi}{3}$ , then  $x =$

- 1)  $\sqrt{2}$                       2)  $\sqrt{3}$   
3) 3                          4)  $\frac{\sqrt{3}-1}{\sqrt{3}+1}$

52)  $10^n + 3(4^{n+2}) + 5$  is divisible by ( $n \in \mathbb{N}$ )

- 1) 17                          2) 9  
3) 5                          4) 7

53) Lines OA and OB are drawn from O with direction cosines proportional to (1, -2, -1) and (3, -2, 3) respectively. What are the direction ratios of the normal to the plane AOB?

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

54)  $\int_0^{\pi/2} \sqrt{\cos \theta} \sin^3 \theta \, d\theta =$

- 1)  $-\frac{8}{21}$                           2)  $-\frac{20}{21}$   
3)  $\frac{8}{21}$                           4)  $\frac{20}{21}$

55) Which of the following is a statement?

- 1) Two plus two is four  
2) Switch on the fan  
3) Do your homework  
4) Open the door

56) If the first term of an A.P. be 10, last term is 50 and the sum of all the terms is 300, then the number of terms are

- 1) 15                          2) 10  
3) 8                          4) 5

57) An automobile driver travels from plane to a hill station 120 km distant at an average speed of 30 km per hour. He then makes the return trip at an average speed of 25 km per hour. He covers another 120 km distance on plane at an average speed of 50 km per hour. His average speed over the entire distance of 360 km will be

- 1)  $\frac{3}{\frac{1}{30} + \frac{1}{25} + \frac{1}{50}}$  km/hr  
2)  $\frac{30+25+50}{3}$  km/hr  
3)  $(30, 25, 50)^{\frac{1}{3}}$   
4) None of these

58) The locus of the centre of a circle which touches externally the circle  $x^2 + y^2 - 6x - 6y + 14 = 0$  and also touches the y-axis, is given by the equation

- 1)  $y^2 - 10x - 6y + 14 = 0$   
2)  $y^2 - 6x - 10y + 14 = 0$   
3)  $x^2 - 10x - 6y + 14 = 0$   
4)  $x^2 - 6x - 10y + 14 = 0$

59) The equation

$4x^2 + 12xy + 9y^2 + 2gx + 2fy + c = 0$  will represent two real parallel straight lines, if

- 1)  $g = 2, f = 3, c$  is any number.  
2)  $g = 4, f = 9, c = 0$   
3)  $g = 2, f = 3, c = 1$   
4)  $g = 4, f = 9, c > 1$

60) If a set has  $2n+1$  elements, then the number of subsets of this set containing more than  $n$  elements equals to:

- 1)  $2^{2n}$                           2)  $2^{n+1}$   
3)  $2^n$                           4)  $2^{n-1}$

61) What is the value of  $\lim_{x \rightarrow 0} \frac{\sqrt{2} - \sqrt{1 + \cos x}}{\sin^2 x}$ ?

- 1)  $\frac{1}{8\sqrt{2}}$                           2)  $\frac{1}{2\sqrt{2}}$   
3)  $\frac{1}{4\sqrt{2}}$                           4)  $-\frac{1}{4\sqrt{2}}$

62) Two dice are thrown. The probability that the sum of numbers appearing is more than 10, is

- 1)  $\frac{1}{6}$                           2)  $\frac{1}{12}$   
3)  $\frac{1}{18}$                           4) None of these

63) If  $\overrightarrow{AO} + \overrightarrow{OB} = \overrightarrow{BO} + \overrightarrow{OC}$ , then A, B, C form

- 1) right angled triangle.  
2) equilateral triangle.  
3) line.  
4) isosceles triangle.

64) The equation of the lines on which the perpendiculars from the origin make  $30^\circ$  angle with x-axis and which form a triangle of area  $\frac{50}{\sqrt{3}}$  with axes, are

- 1)  $\sqrt{3}x + y \pm 10 = 0$                       2)  $x + \sqrt{3}y \pm 10 = 0$   
3)  $x \pm \sqrt{3}y - 10 = 0$                       4) None of these

65) What is the solution of differential equation

$$t = 1 + (ty) \frac{dy}{dt} + \frac{(ty)^2}{2!} \left( \frac{dy}{dt} \right)^2 + \dots \infty ?$$

- 1)  $y = \pm \sqrt{(\log t)^2 + C}$     2)  $y = (\log t)^2 + C$   
3)  $y = \log t + C$     4)  $ty = t^y + C$

66) Find the value of  $\int \frac{e^{2x} - 1}{e^{2x} + 1} dx =$

- 1)  $\log|e^x + e^{-x}| + C$     2)  $\log|e^x - e^{-x}| + C$   
3)  $\log|1 - e^{2x}| + C$     4)  $\log|e^{2x} + 1| + C$

67) The centroid of the triangle formed by joining the feet of the normals drawn from any point to the parabola  $y^2 = 4ax$ , lies on

- 1) tangent at vertex.    2) latus rectum.  
3) directrix.    4) axis.

68)  $\sin\left(\frac{\pi}{10}\right)\sin\left(\frac{3\pi}{10}\right) =$

- 1)  $-1/2$     2)  $1/4$   
3)  $1/2$     4)  $1$

69) The larger of  $99^{50} + 100^{50}$  and  $101^{50}$  is

- 1)  $101^{50}$   
2)  $99^{50} + 100^{50}$   
3) Both are equal  
4) None of these

70) General solution of  $\tan 5\theta = \cot 2\theta$  is

- 1)  $\theta = \frac{n\pi}{7} + \frac{\pi}{3}, n \in \mathbb{Z}$     2)  $\theta = \frac{n\pi}{7} + \frac{\pi}{2}$   
3)  $\theta = \frac{n\pi}{7} + \frac{\pi}{5}$     4)  $\theta = \frac{n\pi}{7} + \frac{\pi}{14}$

71) Find the value of  $m$ , at which the sum  $\sum_{i=0}^m \binom{10}{i} \binom{20}{m-i}$ , (where  $\binom{p}{q} = 0$  if  $p < q$ ), is maximum.

72) If  $z_1, z_2$  are two complex number satisfying

$$\left| \frac{z_1 - 3z_2}{3 - z_1 z_2} \right| = 1, |z_1| \neq 3, \text{ then } |z_2| = ?$$

73) If  $A = \begin{bmatrix} 1 & -1 & 1 \\ 0 & 2 & -3 \\ 2 & 1 & 0 \end{bmatrix}$ ,  $B = (\text{adj}A)$  and  $C = 5A$ , then evaluate  $\frac{|\text{adj}B|}{|C|}$ .

74) Find the sum of the non-real roots of  $(x^2 + x - 2)(x^2 + x - 3) = 12$ .

75) A class has 175 students. The following table shows the number of students studying one or more of the following subjects. Maths(M), Phys. (P), Chem. (C)

$$n(M) = 100, n(P) = 70, n(C) = 46.$$

$$n(M \cap P) = 30, n(M \cap C) = 28, n(P \cap C) = 23, n(M \cap P \cap C) = 18.$$

Are there students who have not offered any of Chemistry, Physics or Mathematics?