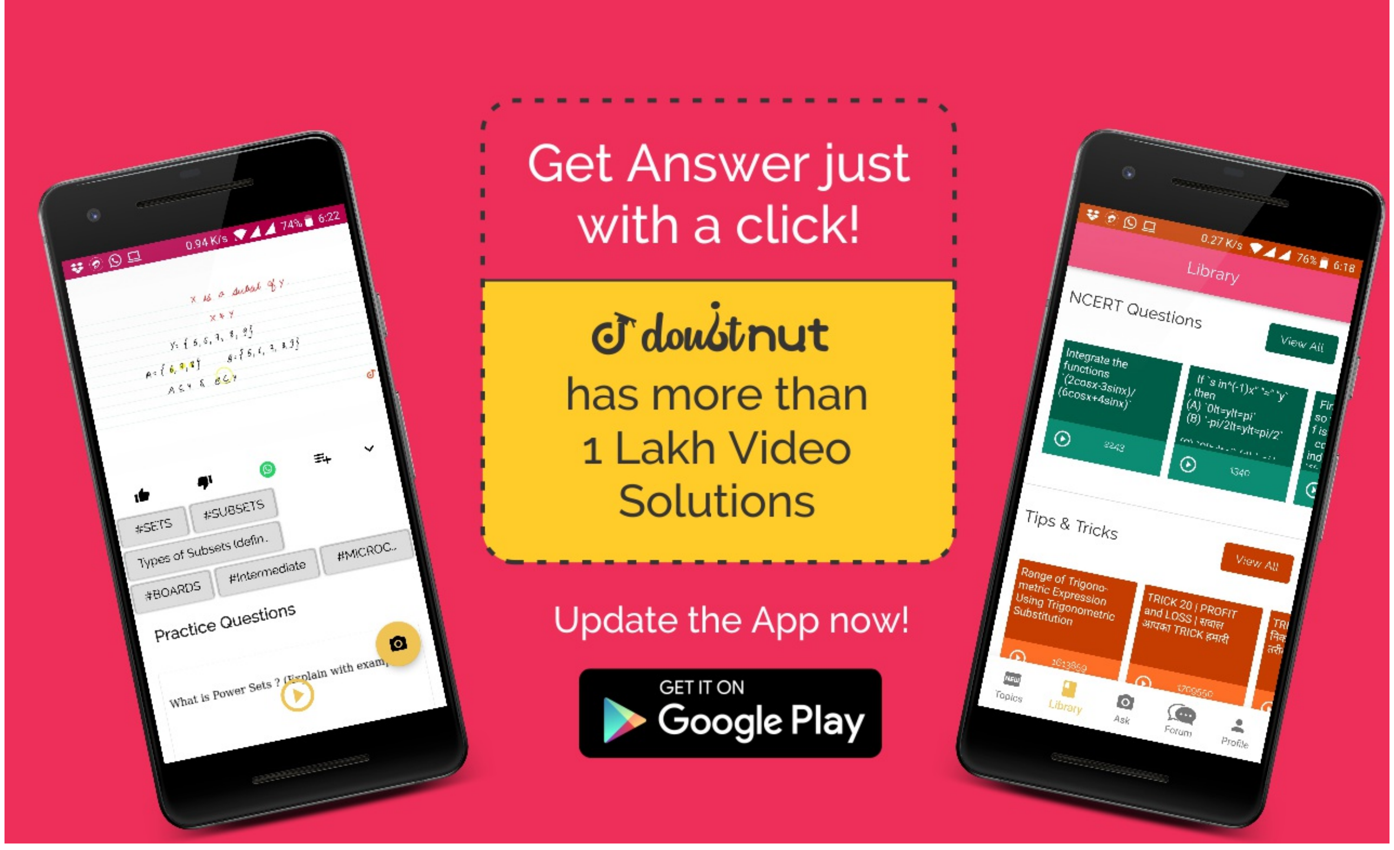
पढ़ना हुआ आसान

JEE MAINS MATHS SOLUTIONS

YEAR 2011

Ques No.	Question
1	**JEE MAINS MATHS SOLUTIONS - 2011** Let α, β be real and z be a complex number. If $z^2 + \alpha z + \beta = 0$ has two distinct roots on the line Re $z = 1$, then it is necessary that : (1) $b \in (0, 1)$ (2) $b \in (-1, 0)$ (3) $\lvert b \rvert = 1$ (4) $b \in (1, \infty)$ Watch Free Video Solution on Doubtnut
2	**JEE MAINS MATHS SOLUTIONS - 2011** The value of $\int_0^1 \frac{8\log(1+x)}{1+x^2} dx$ is: (1) $\pi \log 2$ (2) $\frac{\pi}{8}\log 2$ (3) $\frac{\pi}{2}\log 2$ (4) $\log 2$ Watch Free Video Solution on Doubtnut
3	**JEE MAINS MATHS SOLUTIONS - 2011** $\frac{d^2x}{dy^2}$ equals: (1) $\left(\frac{d^2y}{dx^2}\right)^{-1}$ (2) $-\left(\frac{d^2y}{dx^2}\right)^{-1}\left(\frac{dy}{dx}\right)^{-3}$ (3) $\left(\frac{d^2y}{dx^2}\right)^{-1}\left(\frac{dy}{dx}\right)^{-2}$ (4) $-\left(\frac{d^2y}{dx^2}\right)^{-1}\left(\frac{dy}{dx}\right)^{-3}$ Watch Free Video Solution on Doubtnut



4	**JEE MAINS MATHS SOLUTIONS - 2011** Let I be the purchase value of an equipment and V(t) be the value after it has been used for t years. The value V(t) depreciates at a rate given by differential equation $\left(dV\frac{t}{dt}=\right.$ $-k(T-t)$, where $k>0$ is a constant and T is the total life in years of the equipment. Then the scrap value V(T) of the equipment is : (1) $T^2-\frac{1}{k}$ (2) $I-\frac{kT^2}{2}$ (3) $I-\frac{k(T-t)^2}{2}$ (4) e^{-kT} Watch Free Video Solution on Doubtnut
5	**JEE MAINS MATHS SOLUTIONS - 2011** The coefficient of x7 in the expansion of $\left(1-x-x^2+x^3\right)^6$ is : (1) 144 (2) -132 (3) -144 (4) 132 Watch Free Video Solution on Doubtnut
6	**JEE MAINS MATHS SOLUTIONS - 2011** For $x\in\left(0,\frac{5\pi}{2}\right)$, define $f(x)=$ $\int_0^x\sqrt{t}\sin tdt$ Then f has : local maximum at π and 2π . local minimum at π and 2π local minimum at π and local maximum at 2π . local maximum at π and local minimum at 2π . Watch Free Video Solution on Doubtnut
	JEE MAINS MATHS SOLUTIONS - 2011 The area of the region enclosed by the curves

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$y = x, x = e, y = \frac{1}{x}$ and the positive x-axis is (1) $\frac{1}{2}$ square units (2) 1 square units (3) $\frac{3}{2}$ square units (4) $\frac{5}{2}$ square units

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The line $L_1 : y - x = 0$ and $L_2 : 2x + y = 0$ intersect the line $L_3 : y + 2 = 0$ at P and Q respectively. The bisector of the acute angle between L_1 and L_2 intersects L_3 at R. Statement-1 : The ratio $PR : RQ$ equals $2\sqrt{2} : \sqrt{5}$ Statement-2 : In any triangle, bisector of an angle divides the triangle into two similar triangles. Statement-1 is true, Statement-2 is true ; Statement-2 is correct explanation for Statement-1 Statement-1 is true, Statement-2 is true ; Statement-2 is not a correct explanation for Statement-1 Statement-1 is true, Statement-2 is false Statement-1 is false, Statement-2 is true

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The value of p and q for which the function

$$f(x) = \left\{ \frac{\sin(p+1)x + \sin x}{x}, \; x < 0 q, \; x = 0 \frac{\sqrt{x + x^2} - \sqrt{x}}{x^{3/2}}, \; x > 0 \right\}$$

is continuous for all x in R, are: (1) $p = \frac{1}{2}, q = -\frac{3}{2}$ (2) $p = \frac{5}{2}, q = -\frac{1}{2}$ (2)

$p = -\frac{3}{2}, q = \frac{1}{2}$ (4) $p = \frac{1}{2}, q = \frac{3}{2}$

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If the angle between the line $x = \frac{y-1}{2} = \frac{z-3}{\lambda}$

and the plane $x + 2y + 3z = 4$ .is $\cos^{-1}\left(\sqrt{\frac{5}{14}}\right)$, then λ equals: (1) $\frac{2}{3}$ (2) $\frac{3}{2}$ (3) $\frac{2}{5}$ (3) $\frac{5}{3}$

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The domain of the function $f(x) = \frac{1}{\sqrt{|x| - x}}$ is: (1) $(-\infty, \infty)$ (2) $(0, \infty$ (3) $(-\infty, 0)$ (4) $(-\infty, \infty)$-$\{0\}$

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The shortest distance between line y-$x = 1$ and curve $x = y^2$ is : (1) $\frac{\sqrt{3}}{4}$ (2) $\frac{3\sqrt{2}}{8}$ (3) $\frac{8}{3\sqrt{2}}$ (4) $\frac{4}{\sqrt{3}}$

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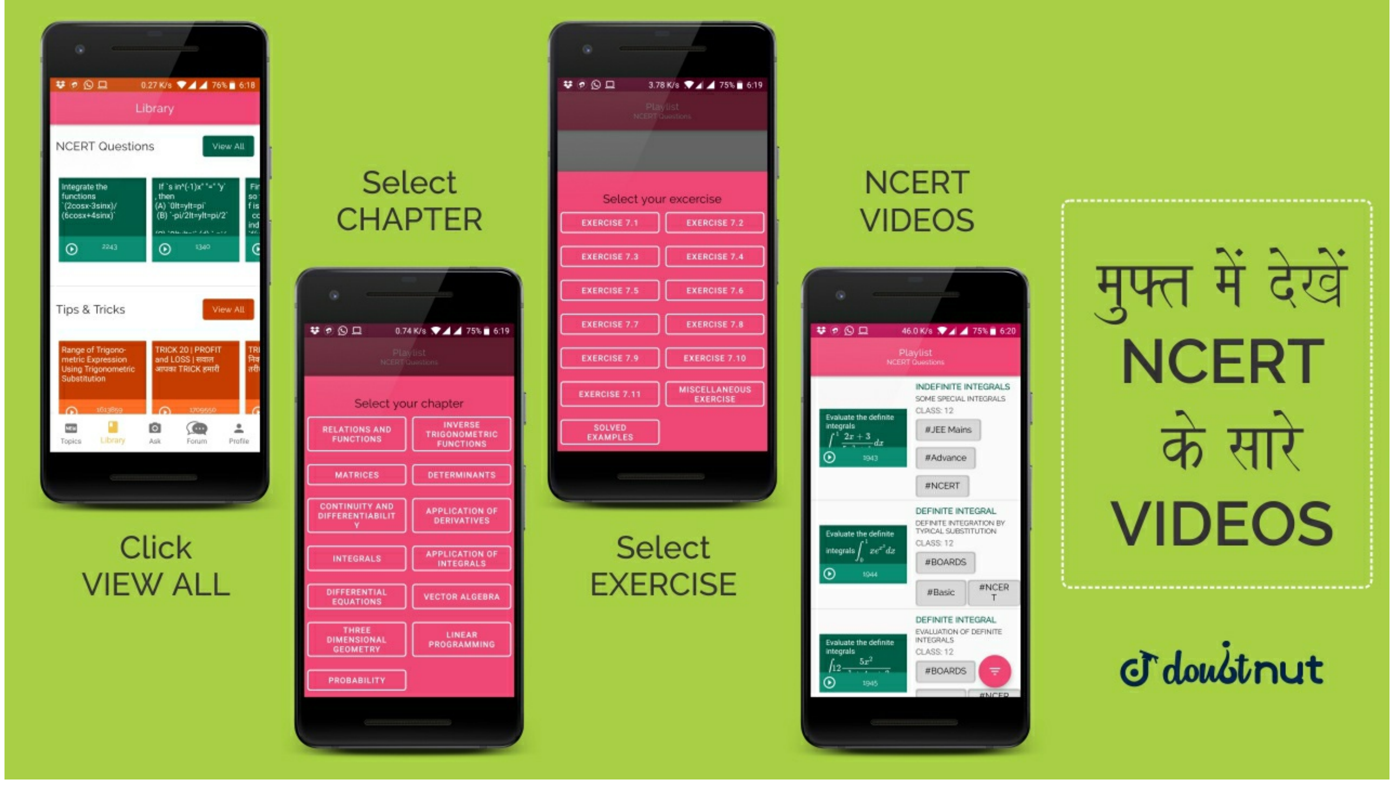
13	**JEE MAINS MATHS SOLUTIONS - 2011** A man saves Rs. 200 in each of the first three months of his service. In each of the subsequent months his saving increases by Rs. 40 more than the saving of immediately previous month. His total saving from the start of service will be Rs. 11040 after : (1) 18months (2) 19months (3) 20months (4) 21months Watch Free Video Solution on Doubtnut
14	**JEE MAINS MATHS SOLUTIONS - 2011** If $\omega(\neq 1)$ is a cube root of unity, and $(1+\omega)^7 = A + B\omega$. Then (A, B) equals (1) (0, 1) (2) (1, 1) (3) (1, 0) (4) $(-1, 1)$ Watch Free Video Solution on Doubtnut
15	**JEE MAINS MATHS SOLUTIONS - 2011** If $a = \frac{1}{\sqrt{10}}\left(3\hat{i} + \hat{k}\right) \text{and} \vec{b} = \frac{1}{7}\left(2\hat{i} + 3\hat{j} - 6\hat{k}\right)$, then the value of $\left(2\vec{a} - \vec{b}\right)\left(\vec{a} \times \vec{b}\right) \times \left(\vec{a} + 2\vec{b}\right)$ is: (1) -5 (2) -3 (3) 5 (4) 3 Watch Free Video Solution on Doubtnut



16	**JEE MAINS MATHS SOLUTIONS - 2011** If $\frac{dy}{dx} = y + 3$ $> 0 \text{and} y(0) = 2,$ $then y(\ln 2)$ is equal to : (1) 7 (2) 5 (3) 13 (4) -2 Watch Free Video Solution on Doubtnut
17	**JEE MAINS MATHS SOLUTIONS - 2011** Equation of the ellipse whose axes are the axes of coordinates and which passes through the point $(-3, 1)$ and has eccentricity $\sqrt{\frac{2}{5}}$ is: (1) $3x^2 + 5y^2 - 32 = 0$ (2) $5x^2 + 3y^2 - 48 = 0$ (3) $3x^2 + 5y^2 - 15 = 0$ (4) $5x^2 + 3y^2 - 32 = 0$ Watch Free Video Solution on Doubtnut
18	**JEE MAINS MATHS SOLUTIONS - 2011** If the mean deviation about the median of the numbers a, 2a, ..., 50a is 50, then |a| equals : (1) 2 (2) 3 (3) 4 (4) 5 Watch Free Video Solution on Doubtnut
19	**JEE MAINS MATHS SOLUTIONS - 2011** $(\lim)_{x \to 2} \left(\frac{\sqrt{1 - \cos\{2(x-2)\}}}{x-2} \right)$

(1) does not exist (2) equals $\sqrt{2}$ (3) equals $-\sqrt{2}$ (4) equals $\frac{1}{\sqrt{2}}$

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Statement-1 : The number of ways of distributing 10 identical balls in 4 distinct boxes such that no box is empty is $\hat{} \ 9C_3$. Statement-2 : The number of ways of choosing any 3 places from 9 different places is $\hat{} \ 9C_3$. Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1. Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation for Statement-1. Statement-1 is true, Statement-2 is false. Statement-1 is false, Statement-2 is true.

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Let R be the set of real numbers. Statement-1 :
$A = \{(x, y) \in R$
$\times R : y - x$
is an integer} is an equivalence relation on R. Statement-2 :
$B = \{(x, y) \in R$
$\times R : x = \alpha y$

for some rational number a} is an equivalence relation on R. Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1. Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation for Statement-1. Statement-1 is true, Statement-2 is false. Statement-1 is false, Statement-2 is true.

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Consider 5 independent Bernoulli.s trials each with probability of success p. If the probability of at least one failure is greater than or equal to $\frac{31}{32}$, then p lies in the

	interval : (1) $\left(\frac{1}{2}, \frac{3}{4}\right]$ (2) $\left(\frac{3}{4}, \frac{11}{12}\right]$ (3) $\left[0, \frac{1}{2}\right]$ (4) $\left(\frac{11}{12}, 1\right]$ Watch Free Video Solution on Doubtnut
23	**JEE MAINS MATHS SOLUTIONS - 2011** The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2(c > 0)$ touch each other if : (1) $2\|a\| = c$ (2) $\|a\| = c$ (3) $a = 2c$ (4) $\|a\| = 2c$ Watch Free Video Solution on Doubtnut
24	**JEE MAINS MATHS SOLUTIONS - 2011** Let A and B be two symmetric matrices of order 3. Statement-1 : A(BA) and (AB)A are symmetric matrices. Statement-2 : AB is symmetric matrix if matrix multiplication of A with B is commutative. Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1. Statement-1 is true, Statement-2 is true; Statement-2 is true; Statement-2 is not a correct explanation for Statement-1. Statement-1 is true, Statement-2 is false. Statement-1 is false, Statement-2 is true. Watch Free Video Solution on Doubtnut
25	**JEE MAINS MATHS SOLUTIONS - 2011** If C and D are two events such that $C \subset DandP(D)$ $\neq 0$, then the correct statement among the following is : (1) $P(C \mid D) = P(C)$ (2) $P(C \mid D) \geq P(C)$ (3) $P(C \mid D) < P(C)$ (4) $P(C \mid D)$ $= \left(P\frac{D}{P(C)}\right.$ Watch Free Video Solution on Doubtnut

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The vectors $\vec{a}$ and $\vec{b}$ are not perpendicular and $\vec{c}$ and $\vec{d}$ are two vectors satisfying :

$\vec{b} \times \vec{c} = \vec{b} \times \vec{d}$,

$\vec{a} \cdot \vec{d} = 0$

. Then the vector $\vec{d}$ is equal to : (1) $\vec{b} - \left(\frac{\vec{b} \cdot \vec{c}}{\vec{a} \cdot \vec{d}}\right)\vec{c}$ (2) $\vec{c} + \left(\frac{\vec{a} \cdot \vec{c}}{\vec{a} \cdot \vec{b}}\right)\vec{b}$ (3) $\vec{b} + \left(\frac{\vec{b} \cdot \vec{c}}{\vec{a} \cdot \vec{b}}\right)\vec{c}$ (4) $\vec{c} - \left(\frac{\vec{a} \cdot \vec{c}}{\vec{a} \cdot \vec{b}}\right)\vec{b}$

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Statement-1 : The point A(1, 0, 7) is the mirror image of the point B(1, 6, 3) in the line : $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$

Statement-2 : The line : $\frac{x}{1} = \frac{y-1}{2} = \frac{z-2}{3}$ bisects the line segment joining A(1, 0, 7) and B(1, 6, 3).

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28	**JEE MAINS MATHS SOLUTIONS - 2011** If $A = \sin^2 x + \cos^4 x$, then for all real x : (1) $\frac{3}{4} \leq A \leq 1$ (2) $\frac{13}{16} \leq A \leq 1$ (3) $1 \leq A \leq 2$ (4) $\frac{3}{4} \leq A \leq \frac{13}{16}$ Watch Free Video Solution on Doubtnut
29	**JEE MAINS MATHS SOLUTIONS - 2011** The number of values of k for which the linear equations $4x + ky + 2z = 0$ $kx + 4y + z = 0$ $2x + 2y + z = 0$ posses a non-zero solution is : (1) 3 (2) 2 (3) 1 (4) zero Watch Free Video Solution on Doubtnut