



# MATHS

# **BOOKS - NTA MOCK TESTS**

# NTA JEE MOCK TEST 54



1. The value of 
$$I=\lim_{n
ightarrow\infty}\ \Sigma_{r=1}^nrac{r}{n^2+n+r}$$
 is equal to

A. 
$$\frac{1}{3}$$
  
B.  $\frac{1}{2}$   
C.  $\frac{\pi}{2}$   
D.  $\frac{\pi}{3}$ 

#### Answer: B

2. Find the coordinates of the point P on the line x+y=-13, nearest to the circle  $x^2 + y^2 + 4x + 6y - 5 = 0$ . A. (-15, 2)B. (-5, -6)C. (-6, -7)

D. (-7, -6)

#### Answer: C

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3. If  $\alpha, \beta$  and  $\gamma$  are the roots of the equation  $x^3 - 13x^2 + 15x + 189 = 0$  and one root exceeds the other by 2, then the value of  $|\alpha| + |\beta| + |\gamma|$  is equal to

B. 17

C. 13

D. 19

#### Answer: D

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4. The arithmetic mean of two positive numbers a and b exceeds their geometric mean by 2 and the harmonic mean is one - fifth of the greater of a and b, such that  $\alpha = a + b$  and  $\beta = |a - b|$ , then the value of  $\alpha + \beta^2$  is equal to

A. 96

B. 234

C. 74

D. 84

### Answer: C



6. Which of the following is not a statement ?

A. Every set is a finite set

B. 18 is multiple of 6

C. Prime numbers are irrational numbers

D. None of these

#### Answer: D

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7. If 
$$an^{-1}$$
.  $\frac{1}{2x+1} + an^{-1}$ .  $\frac{1}{4x+1} = \cot^{-1}\left(\frac{x^2}{2}\right)$ , then the number

of all possible values of x is/are

A. 1

B. 2

C. 3

D. 0

#### Answer: B

8. The function  $f(x)=\lim_{n o\infty}\ \cos^{2n}(\pi x)+[x]$  is (where, [.] denotes the greatest integer function and  $n\in N$ )

A. continuous at x=1 but discontinuous at  $x=rac{3}{2}$ 

B. continuous at x=1 and  $x=rac{3}{2}$ 

C. discontinuous at x = 1 and  $x = rac{3}{2}$ 

D. discontinuous at x=1 but continuous at  $x=rac{3}{2}$ 

#### Answer: D

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9. The length of the longest interval in which the function  $y=\sin 2x-2\sin x$  increases for  $x\in [0,\pi]$  is

A. 
$$\frac{\pi}{2}$$

B. 
$$\frac{\pi}{3}$$
  
C.  $\frac{2\pi}{3}$   
D.  $\frac{\pi}{6}$ 

#### Answer: B

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10. The value of the integral 
$$I=\int_{0}^{100\pi}rac{dx}{1+e^{\sin x}}$$
 is equal to

A.  $100\pi$ 

 $\mathrm{B.}\:50\pi$ 

 $\mathsf{C.}\,25\pi$ 

D.  $10\pi$ 

Answer: B

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11. The coefficient of 
$$x^9$$
 in expansion of  $\left(x^3+rac{1}{2^{\log\sqrt{2}\left(rac{x^3}{2}
ight)}}
ight)^{11}$  is equal

to

A.-5

B. 330

C. 520

D.  $5 + \log_{\sqrt{2}} 3$ 

#### Answer: B



12. The order of the differential equation of the family of curves  $y=k_12^{k_2x}+k_33^{x+k_4}$  is (where,  $k_1,\,k_2,\,k_3,\,k_4$  are arbitrary constants)

A. 4

B. 5

C. 3

D. 6

#### Answer: C

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**13.** The sum of the intercepts on the coordinate axes made by a line passing through the point (a, b) and the common point of  $\frac{x}{a} + \frac{y}{b} = 1$  and  $\frac{x}{b} + \frac{y}{a} = 1$  is **Watch Video Solution** 

14. The area (in sq. units) bounded by  $y=4x-x^2$  and y=xis

A. 
$$\frac{2}{3}$$
  
B.  $\frac{7}{2}$   
C.  $\frac{9}{2}$ 

$$\mathsf{D}.\,\frac{5}{2}$$

### Answer: C

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15. If the lines  $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}, \frac{x-k}{3} = \frac{y-3}{-1} = \frac{z-4}{h}$ and  $rac{2x+1}{3} = rac{y-1}{1} = rac{z-2}{1}$  are concurrent, then the value of 2h-3k is equal to A. 3 B. 2 C. - 4D. 4 Answer: D

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16. The probability distribution of a random variable (X) is

$$P(X) = egin{cases} rac{x}{12} & : & X = 1, 2, 3, 4, 5, 6 \ 0 & : & ext{otherwise} \end{cases}$$

is

Then, the conditional probability

$$P\left(\frac{\frac{3}{2} < X < \frac{7}{2}}{X > 2}\right)$$
  
A.  $\frac{5}{6}$   
B.  $\frac{5}{18}$   
C.  $\frac{1}{6}$   
D.  $\frac{7}{12}$ 

#### Answer: C

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**17.** Let  $\overrightarrow{x}$  and  $\overrightarrow{y}$  are 2 non - zero and non - collinear vectors, then the largest value of k such that the non - zero vectors  $(k^2 - 5k + 6)\overrightarrow{x} + (k - 3)\overrightarrow{y}$  and  $2\overrightarrow{x} + 5\overrightarrow{y}$  are collinear is

A. 3

B. 6 C.  $\frac{12}{5}$ 

D. – 1

Answer: C

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**18.** A skew - symmetric matrix of order n has the maximum number of distinct elements equal to 73, then the order of the matrix is

A. 7

B. 8

C. 9

D. 10

#### Answer: B

19. For a complex number Z, the equation of the line of common chord of

the circles |Z-3|=2 and |Z|=2 is

- A.  $Z+\overline{Z}=3$
- B.  $Z-\overline{Z}=3$
- C.  $\overline{Z}\,-Z=3$
- D.  $Z+\overline{Z}+3=0$

#### Answer: A

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20. If the integral  $I = \int e^{\sin x} (\cos x. x^2 + 2x) dx = e^{f(x)} g(x) + C$ (where, C is the constant of integration), then the number of solution(s) of f(x) = g(x) is/are

A. 0	
B. 2	
C. 4	
D. 6	

#### Answer: B

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**21.** If  $(0, 3 + \sqrt{5})$  is a point on the ellipse whose foci and (2, 3) and (-2, 3), then the length of the semi - major axis is

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**22.** A straight is a five card hand containing consecutive values. If m is equal to the number of ways in which all the five cards, in a straight, are not from the same suit, then the value of  $\frac{m}{1500}$  is equal to (Consider the value of J as 11, Q as 12, K as 13 and Ace as 14)

**23.** Let  $A = [a_{ij}]_{3 \times 3}$  be a matrix such that  $a_{ij} = \frac{i+2j}{2}$  where  $i, j \in [1, 3]$  and  $i, j \in N$ . If  $C_{ij}$  be a cofactor of  $a_{ij}$ , then the value of  $a_{11}C_{21} + a_{12}C_{22} + a_{13}C_{23} + a_{21}C_{31} + a_{22}C_{32} + a_{33}C_{33} + a_{31}C_{11} + a_{32}C_{12}$  is equal to

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**24.** Let the focus (S) of a parabola divides its one of the focal chords PQ in the ratio 2:1. If the tangent at Q cuts the directrix at R such that RQ = 6, then the distance (in units) of the focus from the tangent at P is



25. An equilateral triangle's sides increase at the rate of 2cm/sec. If the area of its incircle increases at a rate of  $kcm^2/\sec$  (when the length of



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