



## MATHS

### BOOKS - NTA MOCK TESTS

#### JEE MOCK TEST 18

#### Mathematics

1. The function

$$f(x) = \tan x + \frac{1}{x}, \forall x \in \left(0, \frac{\pi}{2}\right) \text{ has}$$

A. one local maximum

B. one local minimum

C. one local maximum and one minimum

D. no local maximum of minimum

**Answer: B**



**Watch Video Solution**

2. The possible values of  $n$  for which the equation

$$nx^2 + (2n - 1)x + (n - 1) = 0 \text{ has roots of}$$

opposite sign is/are by

A. no value of  $n$

B. all values of  $n$

C.  $-1 < n < 0$

D.  $0 < n < 1$

**Answer: D**



**Watch Video Solution**

3. The value of the integral

$$I = \int_1^2 t^{[\{t\}] + t} (1 + \ln t) dt \text{ is equal to (}$$

$[\cdot]$  and  $\{\cdot\}$  denotes the greatest integer and

fractional part function respectively)

4. The solution of the differential equation

$$x dy + \frac{y}{x} dx = \frac{dx}{x} \text{ is (where, } c \text{ is an arbitrary}$$

constant)

A.  $y = 1 + ce^{1/x}$

B.  $y = ce^{1/x}$

C.  $y = ce^{1/x} - 1$

D.  $xy = 1 - ce^{1/x}$

**Answer: A**

5. In an experiment with 9 observation on  $x$ , the following results are available  $\Sigma x^2 = 360$  and  $\Sigma x = 34$ . One observation that was 8, was found to be wrong and was replaced by the correct value 10, then the corrected variance is

A.  $\frac{250}{9}$

B. 28

C.  $\frac{240}{9}$

D. 26

**Answer: B**



**Watch Video Solution**

6. If two parabolas  $y^2 = 4a(x - k)$  and  $x^2 = 4a(y - k)$  have only one common point P, then the equation of normal to  $y^2 = 4a(x - k)$  at P is

A.  $y + x = 4a$

B.  $y + x = 2a$

C.  $y + x = 4$

D.  $y + x = 2$

**Answer: A**



**Watch Video Solution**

7. If  $a$ ,  $b$  &  $3c$  are in arithmetic progression and  $a$ ,  $b$  &  $4c$  are in geometric progression, then the possible value of  $\frac{a}{b}$  are

A.  $\left\{ \frac{2}{3}, 2 \right\}$

B.  $\left\{ \frac{3}{2}, \frac{1}{2} \right\}$

C.  $\left\{ \frac{2}{3}, \frac{3}{2} \right\}$

D.  $\left\{ \frac{1}{2}, 2 \right\}$

**Answer: B**



**Watch Video Solution**

8. The number of terms in the expansion of  $\left(5^{\frac{1}{6}} + 7^{\frac{1}{9}}\right)^{1824}$  which are integers is

A. 100

B. 101

C. 102

D. 103



**Answer: C**



**Watch Video Solution**

**9.** The number of ways in which 10 balls can be selected from 10 identical green balls, 10 identical blue balls and 9 identical red balls are

A. 63

B. 64

C. 65

D. 66

**Answer: C**



**Watch Video Solution**

**10.** Consider the function

$$f(x) = \cos^{-1}([2^x]) + \sin^{-1}([2^x] - 1), \text{ then}$$

(where  $[.]$  represents the greatest integer part function)

A. Domain of  $f(x)$  is  $x \in (-\infty, 0]$

B. Range of  $f(x)$  is singleton

C.  $f(x)$  is an even function

D.  $f(x)$  is an odd function

**Answer: B**



**Watch Video Solution**

11. If  $A$  &  $B$  are two sets such that  $n(A \times B) = 60$  &  $n(A) = 12$  also  $n(A \cap B) = K$ , then the sum of maximum & minimum possible value of  $K$  is

A. 17

B. 12

C. 5

D. 7

**Answer: C**



**Watch Video Solution**

12. The value of  $\lim_{x \rightarrow 0^-} \frac{2^{1/x} + 2^{3/x}}{3(2^{1/x}) + 5(2^{3/x})}$  is

A.  $1/3$

B.  $1/5$

C. 1

D.  $1/4$

**Answer: A**



**Watch Video Solution**

13. If  $f(x) = x^3 + 3x + 1$  and  $g(x)$  is the inverse function of  $f(x)$ , then the value of  $g'(5)$  is equal to

A. 3

B.  $\frac{1}{3}$

C.  $(1)/(6)'$

D. 6

**Answer: C**



**Watch Video Solution**

**14.** The contrapositive of the statement: "If the weather is fine then my friends will come and we go for a picnic".

A. The weather is fine but my friends will not come or we do not go for a picnic.

- B. If my friends do not come or we do not go for picnic then weather will not be find.
- C. If the weather is not fine then my friends will not come or we do not go for a picnic.
- D. The weather is not fine but my friends will come and we go for a picnic.

**Answer: B**



**Watch Video Solution**

15. Lines  $L_1$  &  $L_2$  are rotating in an anticlockwise direction about the points  $A(-2, 0)$  and  $B(2, 0)$  respectively in such a way that the speed of angle of rotation of line  $L_2$  is double as that of  $L_1$ . Initially equations of both lines are  $y = 0$ . If the angle of rotation of line  $L_2$  varies between 0 to  $\frac{\pi}{2}$ , then the locus of point of intersection P of lines  $L_1$  &  $L_2$  is part of a circle whose radius is equal to

A. 2 units

B. 4 units



C. 6 units

D. 8 units

**Answer: B**



**Watch Video Solution**

**16.** The value of the integral

$$\int e^{3 \sin^{-1} x} \left( \frac{1}{\sqrt{1-x^2}} + e^{3 \cos^{-1} x} \right) dx \text{ is equal to}$$

(where,  $c$  is an arbitrary constant)

A.  $\frac{e^{3\sqrt{\sin^{-1} x}}}{3} + xe^{\frac{3\pi}{2}} + c$

B.  $e^{\sqrt{\sin^{-1} x}} + e^{\pi/2} + c$

C.  $\frac{e^{3 \sin^{-1} x}}{3} + x e^{\frac{3\pi}{2}} + c$

D.  $e^{\frac{\pi}{2}} + e^x \left( \frac{\pi}{2} \right) + c$

**Answer: C**



**Watch Video Solution**

17. If the locus of the foot of the perpendicular drawn from centre upon any tangent to the ellipse  $\frac{x^2}{40} + \frac{y^2}{10} = 1$  is  $(x^2 + y^2)^2 = ax^2 + by^2$ , then  $(a - b)$  is equal to

A. 10

B. 20

C. 25

D. 30

**Answer: D**



**Watch Video Solution**

**18.** Let  $M = \begin{bmatrix} a & b & c \\ d & e & f \\ 1 & 1 & 1 \end{bmatrix}$  and  $N = \frac{M^2}{2}$ . If

$$(a - b)^2 + (d - e)^2 = 36,$$

$$(b - c)^2 + (e - f)^2 = 64,$$

$(a - c)^2 + (d - f)^2 = 100$ , then value of  $|N|$  is equal to

A. 1152

B. 48

C. 144

D. 288

**Answer: D**



**Watch Video Solution**

19. A small pack of cards consists of 5 green cards 4 blue cards and 3 black cards. The pack is shuffled through and first three cards are turned face up. The probability that there is exactly one card of each colour is :

A.  $\frac{9}{55}$

B.  $\frac{4}{11}$

C.  $\frac{3}{11}$

D.  $\frac{8}{55}$

**Answer: C**



20. Let  $\vec{a}$ ,  $\vec{b}$ ,  $\vec{c}$  be three vectors of magnitude 3, 4, 5 respectively, satisfying

$$\left| \begin{bmatrix} \vec{a} & \vec{b} & \vec{c} \end{bmatrix} \right| = 60. \quad \text{If}$$

$$\left( \vec{a} + 2\vec{b} + 3\vec{c} \right) \cdot \left( (\vec{a} \times \vec{c}) \times \vec{b} + \vec{b} \right) = \lambda$$

then  $\lambda$  is equal to

A. 16

B. 32

C. 20

D. 40

**Answer: B**



**Watch Video Solution**

21. Let  $Z = re^{i\theta}$  ( $r > 0$  and  $\pi < \theta < 3\pi$ ) is a root of the equation

$$Z^8 - Z^7 + Z^6 - Z^5 + Z^4 - Z^3 + Z^2 - Z + 1 = 0$$

.  
the sum of all values of  $\theta$  is  $k\pi$ . Then  $k$  is equal to



**Watch Video Solution**

22. If  $I_n = \int_0^{n\pi} \max (|\sin x|, |\sin^{-1}(\sin x)|) dx$ ,  
the  $I_2 + I_4$  has the value  $\frac{\lambda\pi^2}{2}$ , where  $\lambda$  is



[Watch Video Solution](#)

23. If  $x \in [0, 2\pi]$  then the number of solution of  
the equation  $81^{\sin^2 x} + 81^{\cos^2 x} = 30$



[Watch Video Solution](#)



24.

If

$$f(x) = \begin{cases} \frac{\sin 2x}{cx} + \frac{x}{(\sqrt{x+a^2}-a)} & x \neq 0, (a < 0) \\ b & x = 0, (b \neq 0) \end{cases}$$

and  $f(x)$  is continuous at  $x = 0$ , then the value of  $bc$  is equal to



[Watch Video Solution](#)

25. A harbour lies in a direction  $60^\circ$  south - west from a fort and at a distance 30 km from it .A ship sets from the harbour at noon and sails due east at 10 km / hour .The ship will be 70 km from the fort at



**Watch Video Solution**