



## MATHS

### BOOKS - CAREER POINT

### MOCK TEST 6

#### Part C Maths

1. The set of all the possible values of the parameter 'a' so that the function,

$f(x) = x^3 - 3(7 - x)x^2 - 3(9 - a^2)x + 2$ , assume local minimum value at some  $x \in (-\infty, 0)$  is -

A.  $R$

B.  $(0, \infty)$

C.  $(-\infty, 0)$

D.  $\phi$

**Answer: D**



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2.  $x + y - \ln(x + y) = 2x + 5$  has a vertical tangent at the point  $(\alpha, \beta)$

then  $\alpha + \beta$  is equal to

A.  $-1$

B.  $1$

C.  $2$

D.  $-2$

**Answer: B**



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3. If  $A = \text{null set}$ , then the no. of elements in  $P(P(P(A)))$  where  $P(A)$  denotes the power set of  $A$  is -

- A. 1
- B. 2
- C. 4
- D. 0

**Answer: C**



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4. Let  $R$  be the relation defined on set of all complex numbers  $C$  as  $z_1 R z_2 \Leftrightarrow |z_1| = |z_2|$  then ' $R$ ' is -

- A. Reflexive
- B. Symmetric
- C. Transitive

D. Equivalence relation

**Answer: D**



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5. Slope of line  $z\bar{a} + \bar{z}a + b = 0, b \in R$  is -

A.  $\frac{-Re(a)}{Im(a)}$

B.  $\frac{-Im(a)}{Re(a)}$

C.  $\frac{Re(a)}{Im(a)}$

D. None of these

**Answer: A**



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6. If any tangent to the ellipse  $\frac{x^2}{16} + \frac{y^2}{9} = 1$  intercepts equal lengths  $l$  on the both axis, then  $l =$

A. 3

B. 5

C.  $\sqrt{5}$

D. None of these

**Answer: B**



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7.  $f' \frac{dx}{(x+6)^{8/7}(x-8)^{6/7}}$  is equal to

A.  $\left(\frac{x+6}{x-8}\right)^{\frac{1}{7}} + e$

B.  $\left(\frac{x-8}{x+6}\right)^{\frac{1}{7}} + e$

C.  $\frac{1}{2} \left(\frac{x-8}{x+6}\right)^{\frac{1}{7}} + e$

D. None of these

**Answer: C**

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8.  $\int_0^4 [x[x + [x + [x]]]] dx$  is equal to where  $[.]$  is greatest integer functioning

A. 4

B. 12

C. 24

D. None of these

**Answer: C**

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9. The number of ways of factoring 91,000 into two factors  $m$  &  $n$  such that  $m > 1, n > 1$  and  $\text{gcd}(m, n) = 1$  is

A. 70

B. 15

C. 32

D. None of these

**Answer: D**



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10. Given six line segments of length 2, 3, 4, 5, 6, 7 units, the number of triangles that can be formed by these segments is -

A.  ${}^6C_3 - 7$

B.  ${}^6C_3 - 6$

C.  ${}^6C_3 - 5$

D.  ${}^6C_3 - 4$

**Answer: A**



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11. The number of zeros at the end of  $99^{100} - 1$  is -

A. 1

B. 2

C. 3

D. 4

**Answer: D**



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12. If  $A$  is a square matrix of order 3 such that  $|A| = 3$ , then find the value of  $|adj(adj A)|$ .

A. 625

B. 125

C. 3025

D. None of these

**Answer: A**



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13. Let  $f(x) = \begin{vmatrix} 2 \cos^2 x & \sin 2x & -\sin x \\ \sin 2x & 2 \sin^2 x & \cos x \\ \sin x & -\cos x & 0 \end{vmatrix}$ . Then the value of

$\int_0^{x/2} [f(x) + f'(x)] dx$  is

A.  $\pi$

B.  $\pi/2$

C.  $2\pi$

D. None of these

**Answer: A**



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14. In a three-dimensional coordinate system,  $P$ ,  $Q$ , and  $R$  are images of a point  $A(a, b, c)$  in the  $x - y$ ,  $y - z$  and  $z - x$  planes, respectively. If  $G$  is the centroid of triangle  $PQR$ , then area of triangle  $AOG$  is ( $O$  is the origin) a. 0 b.  $a^2 + b^2 + c^2$  c.  $\frac{2}{3}(a^2 + b^2 + c^2)$  d. none of these

A. 0

B.  $a^2 + b^2 + c^2$

C.  $\frac{2}{3}(a^2 + b^2 + c^2)$

D. None of these

**Answer: A**



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15. Let  $\vec{a}$  be a unit vector and  $\vec{b}$  a non-zero vector not parallel to  $\vec{a}$ . The angles of the triangle, two of whose sides are represented by  $\sqrt{3}(\vec{a} \times \vec{b})$  and  $(\vec{b} - (\vec{a} \cdot \vec{b})\vec{a})$  are

A.  $30^\circ, 90^\circ, 60^\circ$

B.  $45^\circ, 45^\circ, 90^\circ$

C.  $60^\circ, 60^\circ, 60^\circ$

D. None of these

**Answer: A**



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16. The sides of a triangle have the combined equation  $x^2 - 3y^2 - 2xy + 8y - 4 = 0$ . The third side, which is variable, always passes through the point  $(-5, -1)$ . Find the range of values of the

slope of the third line such that the origin is an interior point of the triangle.

A.  $2 < m < 5$

B.  $-1 < m < \frac{1}{5}$

C.  $-5 < m < -1$

D.  $-7 < m < -5$

**Answer: B**



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17. If  $(3 + x^{2008} + x^{2009})^{2010} = a_0 + a_1x + a_2x^2 + \dots + a_nx^n$ , then the value of  $a_0 - \frac{1}{2}a_1 - \frac{1}{2}a_2 + a_3 - \frac{1}{2}a_4 - \frac{1}{2}a_5 + a_6 - \dots$  is  $3^{2010}$  b. 1 c.  $2^{2010}$  d. none of these

A.  $3^{2010}$

B. 1

C.  $2^{2010}$

D. None of these

**Answer: C**

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**18.** Given that a right angled trapezium has an inscribed circle. Prove that the length of the right angled leg is the Harmonic mean of the lengths of bases

- A. Harmonic mean of length of bases
- B. Geometric mean of length of bases
- C. Arithmetic mean of length of bases
- D. None of these

**Answer: A**

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19.

Find

$$\frac{dy}{dx} \text{ at } x = -1, \text{ when } (\sin y)^{\sin\left(\frac{\pi}{2}x\right)} + \frac{\sqrt{3}}{2} \sec^{-1}(2x) + 2^x \tan(\log(x+2))$$

A.  $\frac{3}{\pi\sqrt{\pi^2-3}}$

B.  $\frac{-3}{\pi\sqrt{\pi^2-3}}$

C.  $\frac{6}{\pi\sqrt{\pi^2-3}}$

D. None of these

**Answer: A**



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20. If  $e^{\cos x} - e^{-\cos x} = 4$ , then the value of  $\cos x$ , is

A.  $\log(2 + \sqrt{5})$

B.  $-\log(2 + \sqrt{5})$

C.  $\log(-2 + \sqrt{5})$

D. None of these

**Answer: D**



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21. If  $-1 < x < 0$  then  $\sin^{-1} x$  equals-

A.  $\pi - \cos^{-1}(\sqrt{1-x^2})$

B.  $\tan^{-1}\left(\frac{x}{\sqrt{1-x^2}}\right)$

C.  $-\cos^{-1}\left(\frac{\sqrt{1-x^2}}{x}\right)$

D.  $\cos ec^{-1}x$

**Answer: B**



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22. A circle of radius 2 lies in the first quadrant and touches both the axes. Find the equation of the circle with centre at  $(6, 5)$  and touching the above circle externally.

A.  $x^2 + y^2 - 12x - 10y + 52 = 0$

B.  $x^2 + y^2 - 12x - 10y + 12 = 0$

C.  $x^2 + y^2 - 12x - 10y - 52 = 0$

D. None of these

**Answer: A**



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**23.** Consider the set the of hyperbola  $xy = k, k \in R$ . Let  $e_1$  be the eccentricity when  $k = 4$  and  $e_2$  be the eccentricity when  $k = 9$  then  $e_1 - e_2 =$

A.  $-1$

B.  $0$

C.  $2$

D.  $3$



**Answer: B**



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**24.** A man throws a fair coin number of times and gets 2 points for each head and 1 point for each tail the probability that he gets exactly 6 points

is  $\frac{21}{32}$  (2)  $\frac{13}{64}$  (3)  $\frac{43}{64}$  (4)  $\frac{23}{32}$

A.  $\frac{21}{32}$

B.  $\frac{23}{32}$

C.  $\frac{41}{64}$

D.  $\frac{43}{64}$

**Answer: D**



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25. Calculate mean deviation about mean from the following data:  $x_i$  : 3 9

17 23 27  $f_i$  : 8 10 12 9 5

A. 7.15

B. 7.09

C. 8.05

D. None of these

**Answer: B**



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26. The number of ordered 4-tuples  $(x, y, z, w)$  where  $x, y, z, w \in [0, 10]$

which satisfy the inequality

$$2^{\sin^2 x} \times 3^{\cos^2 y} \times 4^{\sin^2 z} \times 5^{\cos^2 w} > 120, \text{ is}$$

A. 0

B. 144

C. 81

D. infinite

**Answer: B**



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27. Let  $A_n$  be the area bounded by the curve  $y = (\tan x)^n$  and the lines  $x = 0$ ,  $y = 0$ , and  $x = \frac{\pi}{4}$ . Prove that for  $n > 2$ ,  $A_n + A_{n-2} = \frac{1}{n-1}$  and deduce  $\frac{1}{(2n+2)}$

A.  $\frac{1}{n+1}$

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

C.  $\frac{1}{n-1}$

D. None of these

**Answer: C**



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28. A curve having the condition that the slope of the tangent at some point is two times the slope of the straight line joining the same point to the origin of coordinates is a/an

- A. Circle
- B. Ellipse
- C. Parabola
- D. Hyperbola

**Answer: C**



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29. The domain of the function

$$y = \sqrt{\log_{10}(\log_{10} x) - \log_{10}(4 - \log_{10} x) - \log_{10} 3}$$
 is

- A.  $(1, 10^4)$

B.  $[10^3, 10^4]$

C.  $[10^3, 10^4]$

D.  $(10^3, 10^4]$

Answer: C

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If  $f(x) = \begin{cases} (1 + |\sin x|)^{\frac{1}{|\sin x|}}, & -\frac{\pi}{6} < x < 0 \\ b, & x = 0 \\ e^{\frac{\tan 2x}{\tan 3x}}, & 0 < x < \frac{\pi}{6} \end{cases}$

30.

is continuous at  $x = 0$ , then

A.  $a = \log_e b, a = \frac{2}{3}$

B.  $b = \log_e a, a = \frac{2}{3}$

C.  $a = \log_e b, b = 2$

D. None of these

**Answer: A**



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