MATHS

BOOKS - CAREER POINT

MOCK TEST 2

Part C Maths

1. Two vertices of an equilateral triangle are $(-1, 0)$ and (1, 0), and its third vertex lies above the x-axis. The equation of its circumcircel is ____________

A. $x^2 + y^2 - \frac{2}{\sqrt{3}}x - 1 = 0$

B. $x^2 + y^2 - \frac{2}{\sqrt{3}}y - 1 = 0$

C. $x^2 + y^2 + \frac{2}{\sqrt{3}}y - 1 = 0$

D. None of these

Answer: B

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2. A circle is drawn to pass through the extremities of the latus rectum of the parabola $y^2 = 8x$. It is given that this circle also touches the directrix of the parabola. Find the radius of this circle.

A. $2\sqrt{2}$

B. 4

C. 2

D. 3

Answer: B

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3. A man running around a race course notes that the sum of the distances of two flagposts from him a always 10m and the distance between the flag posts is 8m. Then the area of the path he encloses in square meters is 15π (b) 20π (c) 27π (d) 30π

A. 15π

B. 12π

C. 18π

D. 8π

Answer: A

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4. The line $2x + y = 1$ is tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$. If this line passes through the point of intersection of the nearest directrix and the x-axis, then the eccentricity of the hyperbola is

A. $\frac{3}{2}$

B. 2

C. $\frac{5}{2}$

D. 3

Answer: B

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5. A football match may be either won, drawn or lost by the host country's team. So there are threeways of forecasting the result of any one match, one correct and two incorrect. Find the probability of forecasting at least three correct results for four matches.

A. $\frac{1}{9}$

B. $\frac{2}{9}$

C. $\frac{2}{7}$

D. None

Answer: A

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6. If R = $\left(\sqrt{2}+1\right)^{2n+1}$ and $f = R - [R]$, where [ ] denote the greatest integer function, then [R] equal

A. f + $\frac{1}{\text{f}}$

B. f - $\frac{1}{\text{f}}$

C. $\frac{1}{\text{f}}$-f

D. None

Answer: C

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7. Given three vectors $\vec{a}$, $\vec{b}$ and $\vec{c}$ each two of which are non-collinear. Further if $\left(\vec{a}+\vec{b}\right)$ is collinear with $\vec{c}$, $\left(\vec{b}+\vec{c}\right)$

is collinear with $\overrightarrow{a}$ and $\left|\overrightarrow{a}\right| = \left|\overrightarrow{b}\right| = \left|\overrightarrow{c}\right| = \sqrt{2}$. Then the value of $\overrightarrow{a}.\overrightarrow{b} = \overrightarrow{b}.\overrightarrow{c} + \overrightarrow{c}.\overrightarrow{a} =$

A. 3

B. -3

C. 0

D. cannot be evaluated

Answer: B

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8. Four couples (husband and wife) decide to form a committee of four members. The number of different committees that can be formed in which no couple finds a place is

A. 10

B. 12

C. 16

D. None of these

Answer: C

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9. The value of x satisfying the equation $\sin x + \frac{1}{\sin x} = \frac{7}{2\sqrt{3}}$ is given by -

A. 10°

B. 30°

C. 45°

D. 60°

Answer: D

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10. Q. Two students while solving a quadratic equation in x, one copied the constant term incorrectly and got the roots as 3 and 2. The other copied the constant term and coefficient of x^2 as -6 and 1 respectively. The correct roots are :

A. 3, -2

B. $-3, 2$

C. $-6, \ -1$

D. $6, \ -1$

Answer: D

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11. If z is a complex number, then the minimum value of $|z|+|z-1|$ is -

A. 1

B. 0

C. $1/2$

D. None of these

Answer: A

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12. x+y+z=15 if 9, x, y, z, a are in A.P. while $\frac{1}{X}+\frac{1}{Y}+\frac{1}{Z}=\frac{5}{3}$ if $9, X, Y, Z, a$ are in H.P., then the value of a will be -

A. 1

B. 2

C. 3

D. 9

Answer: A

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13. $\lim_{h \to 0} \frac{1}{h} \int_x^{x+h} \frac{dz}{z + \sqrt{z^2 + 1}}$ is equal to -

A. 0

B. $\frac{1}{x + \sqrt{x^2 + 1}}$

C. $\frac{1}{\sqrt{x^2 + 1}}$

D. None of these

Answer: B

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14. If the area bounded by the curve y=f(x), x-axis and the ordinates x=1 and x=b is (b-1) $\sin(3b+4)$, then-

A. f(x)=cos(3x+4)+3(x-1)sin(3x+4)

B. f(x)=sin(3x+4)+3(x-1)cos(3x+4)

C. f(x)=sin(3x+4)-3(x-1)cos(3x+4)

D. None of these

Answer: B

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15. If f(x) = e^x, then $\lim_{x \to 0} (f(x))^{\frac{1}{\{f(x)\}}}$ (where { } denotes the fractional part of x) is equal to -

A. f (1)

B. f (0)

C. f (-∞)

D. Does not exist

Answer: D

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16. Let f(x) = x[x], x ∈ z, [.] is GIF then $f'(x)$ =

A. 2x

B. [x]

C. 2[x]

D. None

Answer: B

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17. If $f(x) = \begin{cases} [x] + [-x] & x \neq 2 \\ \lambda & x = 2 \end{cases}$ then f is continuous at x=2, provided λ is equal to -

A. 1

B. 0

C. -1

D. 2

Answer: B

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18. Let

$f(x) = \{x^3 - x^2 + 10x - 5, x \leq 1 - 2x + (\log)_2(b^2 - 2), x > 1$

Find the values of b for which $f(x)$ has the greatest value at $x = 1$.

A. $1 \leq b \leq 2$

B. $b = \{1, 2\}$

C. $b \in (-\infty, -1)$

D. None of these

Answer: D

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19. The equations of the perpendicular bisector of the sides AB and perpendicular bisector of the sides AB and AC of a $\triangle ABC$ are x-y + 5 = 0 and x + 2y = 0 respectively, if the point Ais (1,-2), then the equation ofthe line BC is

A. 14x+23y=40

B. 14x-23y=40

C. 23x+14y=40

D. 23x-14y=40

Answer: A

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20. If $(1, a), (2, b), (c^2, 3)$ are vertices of a triangle then its centroid is

A. Not be on x axis

B. Not be on y axis

C. lies at origin

D. None of these

Answer: B

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21. A polygon has 25 sides, the lengths of which starting from the smallest side are in A.P. If the perimeter of the polygon is 2100 cm and the length of the largest side 20 times that of the smallest, then the length of the smallest side and the common difference of the A.P. is -

A. 8 cm, 6 $\frac{1}{3}$ cm

B. 6 cm, 6 $\frac{1}{3}$

C. 8 cm, 5 $\frac{1}{3}$ cm

D. None of these

Answer: A

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22. The area bounded by the curves y= x^2-2x-1, e^x+y+1=0 and ordinates x=-1 and x= 1 is-

A. $(3e^2 + 2e - 3) / 3e$

B. $\left(e^2+1\right)/e$

C. $\left(3e^2-2e+3\right)/3$

D. None of these

Answer: A

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23. Let S be the set of real values of parameter λ for which the equation f(x) = $2x^3-3(2+\lambda)x^2+12\lambda$ x has exactly one local maximum and exactly one local minimum. Then S is a subset of

A. $(4, \infty)$

B. $(-3, 3)$

C. $(3, \infty)$

D. None of these

Answer: B

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24. If $f(x) = x^3 + ax^2 + ax + x(\tan\theta + \cot\theta)$ is increasing for all x and if $\theta \in \left(\pi, \frac{3\pi}{2}\right)$ then -

A. $a^2 - 3a - 6 < 0$

B. $a^2 - 3a - 6 > 0$

C. $a^2 - 3a - 6 \leq 0$

D. $a^2 - 3a - 6 \geq 0$

Answer: C

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25. If

$$f(x) = \left\{3 + |x - k|, x \le k; a^2 - 2 + \frac{\sin(x-k)}{x-k}, x > k\right\}$$

has minimum at x =k, then show that $|a| > 2.$

A. a $\in$ R

B. $|a| < 2$

C. $|a| > 2$

D. $1 < |a| < 2$

Answer: C

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26. $\int \frac{x^2 - 1}{(x^2+1)\sqrt{x^4+1}}$ dx is equal to -

A. $\sec^{-1}\left(\frac{x^2+1}{\sqrt{2}x}\right) + c$

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

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

D. None of these

Answer: B

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27. The void relation on a set A is

A. Reflexive

B. Reflexive and symmetric

C. Symmetric and Transitive

D. Reflexive and Transitive

Answer: C

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28. If $0 \leq [x] < 2, \ -1 \leq [y] < 1$ and $1 \leq [z] < 3$, where $[\cdot]$ denotes the greatest integer function, then the maximum value of the determinant

$$\begin{vmatrix} [x]+1 & [y] & [z] \\ [x] & [y]+1 & [z] \\ [x] & [y] & [z]+1 \end{vmatrix}$$ is -

A. 2

B. 4

C. 6

D. 8

Answer: B

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29. The system of equations 6x+5y+λz= 0, 3z-y+4z= 0, x+2y-3z=0 has non-trivial solutions for

A. $\lambda = 0$

B. $\lambda = 1$

C. $\lambda = -5$

D. None of these

Answer: C

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30. The median of following frequency distribution is

Class	fi
$60 - 70$	5
$70 - 80$	15
$80 - 90$	20
$90 - 100$	30
$100 - 110$	20
$110 - 120$	8

A. 92

B. 92.5

C. 93

D. 93.5

Answer: C

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