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Mathematics Objective Questions Paper 20

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Q-1. $2 \cos^{-1} x = \cos^{-1} (2x^2 - 1)$ holds true for all

- (a) $|x| \leq 1$
- (b) $0 \leq x \leq 1$
- (c) $|x| < \frac{1}{2}$
- (d) none of these

Q-2. $(\cos A + \cos B)(\cos 2A + \cos 2B)$ is equal to

- (a) $\frac{\cos 4A + \cos 4B}{2(\cos A - \cos B)}$
- (b) $\frac{\cos 4A \pm \cos 4B}{2(\cos A - \cos B)}$
- (c) $\frac{\cos 4A \pm \cos 4B}{4(\cos A - \cos B)}$
- (d) None of these

Q-3. if $f(x) = \log \left(\frac{1+x}{1-x} \right)$, then $f\left(\frac{2x}{1+x}\right)$ is equal to

- (a) $f(x)$
- (b) $2 f(x)$
- (c) $4 f(x)$
- (d) none of these

Q-4. if $f(x) = \frac{|x|}{x}; x \neq 0$; then $|f(x) - f(-x)|$ is equal

- (a) 0
- (b) 2
- (c) 1
- (d) none of these

Q-5. If $80^\circ = \pi$, then $\cos 70^\circ + \cos \theta$ is equal

- (a) 0
- (b) 2
- (c) 1

(d) none of these

Q-6. Which of the following is true?

(a) Domain of $\sin^{-1} x$ is $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

(b) Range of $\cos(\sin^{-1} x + \cos^{-1} x)$ is $\{1\}$

(c) Range of $\cos(\sin^{-1} x + \cos^{-1} x)$ is $[-1, 1]$

(d) Range of $\cos^{-1} x$ is $\left[0, \frac{\pi}{2}\right]$

Q-7. Which of the following function is inverse to itself?

(a) $f(x) = \frac{1-x}{1+x}$

(b) $f(x) = 3^{\log x}$

(c) $f(x) = \frac{1-x^2}{1+x^2}$

(d) $f(x) = 2^{2(x-1)}$

Q-8. The value of $\sec^2(\tan^{-1} 2) + \cos e C^2(\cos^{-1} 3)$ is equal to

(a) 5

(b) 15

(c) 13

(d) none of these

Q-9. Solution of the equation $\cos^{-1}(\sqrt{3}x) + \cos^{-1} x = \frac{\pi}{2}$ is given by

(a) $\pm \frac{1}{2}$

(b) $-\frac{1}{2}$

(c) $\frac{1}{2}$

(d) none of these

Q-10. If $f(x) = \frac{x}{x-1} = \frac{1}{y}$, then $f(y) =$

(a) x

(b) x-1

(c) 1-x

(d) 1+x

Q-11. If $\sin \alpha + \sin \beta + \sin \gamma = 3$, then value of $\cos \alpha + \cos \beta + \cos \gamma =$

(a) 0

(b) 1

(c) 2

(d) 3

Q-12. $\tan(2 \sin^{-1}(\frac{4}{5}))$ is equal to

(a) $\frac{7}{24}$

(b) $\frac{-7}{24}$

(c) $-\frac{24}{7}$

(d) $\frac{24}{7}$

13. $\lim_{x \rightarrow 0} (\frac{\sin x - x}{x}) \cos(\frac{1}{x})$ is equal to

(a) 0

(b) 1

(c) $\frac{1}{2}$

(d) none of these

14. if $f(x) = \begin{cases} \frac{\sin[x]}{[x]}, & [x] \neq 0, \\ 0, & [x] = 0 \end{cases}$ then $\lim_{x \rightarrow 0} f(x)$

(a) is equal to 1

(b) is equal to 0

(c) is equal to -1

(d) does not exist

15. $\int (((((e^e)^e)^e)^e)^e)((e^o)^x)e^x$ is equal to

(a) $\frac{1}{2}(((G^2)^e)^o)^x$

(b) $((e^o)^e)^x$

(c) $((e^o)^e)^{2x}$

(d) $\frac{1}{2}(((\theta^e)^o)^x)$

16. if $f(x) = |x - 1|$, then

(a) $f(x^2) = (f(x))^2$

(b) $f(x + y) = f(x) + f(y)$

(c) $f(|x|) = |f(x)|$

(d) $f(x)$ is not derivable at $a = 1$

17. $\lim_{n \rightarrow \infty}$

$$\sum_{\frac{n-1}{n^2}}^n r$$

Is equal to

(a) $\frac{1}{2}$

(b) $\frac{1}{3}$

(c) $\frac{1}{4}$

(d) none of these

18. The value of $\int_1^2 \frac{1}{x^2} e^{-1/(x^2)} dx$ is

(a) $\frac{1}{\sqrt{e}} + \frac{1}{e}$

(b) $\frac{1}{e} - \frac{1}{\sqrt{e}}$

(c) $\frac{1}{\sqrt{e}} - \frac{1}{e}$

(d) 0

19. $\int \frac{x+1}{(x+2)^2} e^x dx$ is equal to

(a) $\frac{-e^2}{(x+2)^2}$

(b) $\frac{e^2}{x+2}$

(d) None of these

20. $\lim_{x \rightarrow 0} \frac{1}{2}$

(a) Is equal to 0

(b) Tends to ∞ (c) Tends to $-\infty$

(d) Does not exit

21. $\lim_{x \rightarrow 0} x [x]$ is equal to

(a) 0 or 1

(b) 0 or -1

(c) 0

(d) none of these

22. $\int \sin x \sin 2x dx$ is equal to

(a) $\frac{2}{3}$

(b) $\frac{1}{3}$

(c) $\frac{\pi}{3}$

(d) none of these

23. $\int_{\pi/12}^{\pi/2} \frac{1}{\cos 2x} dx =$

(a) $\log 3$

(b) $\frac{1}{2}$

(c) $\frac{1}{3} \log 2$

(d) none of these

24. If $f(x)$ be any function which assumes only positive values and $f'(x)$ exists, then $f'(x)$ is equal to

(a) $f(x) \frac{d}{dx} (e^{f(x)})$

(b) $f(x) \frac{d}{dx} \{ \log(f(x)) \}$

(c) $f(x) \frac{d}{dx} \{ e^{\log f(x)} \}$

(d) none of these

Q-25. $\lim_{x \rightarrow 0} \frac{(1+x)^n - 1}{x}$ is equal to

(a) 1

(b) n

(c) n-1

(d) none of these

Q-26. $\int_{\log x} dx$ is equal to

(a) $\frac{1}{2} (\log x)^2$

(b) $\frac{1}{x}$

(c) $x \log x - x$

(d) none of these

Q-27. $\hat{i} \cdot (\hat{j} \times \hat{k}) + \hat{j} \cdot (\hat{k} \times \hat{i}) + \hat{k} \cdot (\hat{i} \times \hat{j})$ is

(a) 18

(b) 0

(c) -18

(d) none of these

Q-28. If the vectors $2\hat{j} + 3\hat{j} - 4\hat{k}$ and $a\hat{j} + \hat{j} - b\hat{j} + c\hat{k}$ are at right angles, then a, b, c can have values

(a) $a = 2, b = 3, c = -4$

(b) $a = 4, b = 4, c = 5$

(c) $a = 4, b = 4, c = -5$

(d) $a = 4, b = -4, c = -5$

Q-29. C_1 and C_2 are the centers of the two circle whose radius are r_1 and r_2 . The two circle touch each other internally if

- (a) $|C_1 C_2| = r_1 + r_2$
- (b) $|C_1 C_2| = |r_1 - r_2|$
- (c) $|C_1 C_2| = r_1 - r_2$
- (d) $|C_1 C_2| = r_2 - r_1$

Q-30. The length of perpendicular from the origin upload the line $\frac{x}{a} + \frac{y}{b} = 1$ is

- (a) $\frac{ab}{\sqrt{a^2 + b^2}}$
- (b) $\frac{-ab}{\sqrt{a^2 + b^2}}$
- (c) $\frac{|ab|}{\sqrt{a^2 + b^2}}$
- (d) none of these

Q-31. If cross product of two non-zero vectors is zero, then the vectors are

- (a) Collinear
- (b) Co-directional
- (c) Co-initial
- (d) Co-terminus

Q-32. The number of vectors of unit length perpendicular to vectors of unit length perpendicular to vectors $\hat{u} = \hat{i} + \hat{j}$ and $\hat{v} = \hat{j} + \hat{k}$, is

- (a) one
- (b) three
- (c) two
- (d) infinite

Q-33. The line passing through (0,1) and perpendicular to the line $x-2y + 11 = 0$ is

- (a) $2x - y + 1 = 0$
- (b) $2x - y + 3 = 0$
- (c) $2x + y - 1 = 0$
- (d) $2x + y - 2 = 0$

Q-34. The perpendicular distance of the origin from the line $3x + 4y + 1 = 0$ is

- (a) -1
- (b)
- (c) $-\frac{1}{5}$
- (d) $\frac{1}{5}$

Q-35. If θ is the angle between two unit vectors \vec{a} and \vec{b} , then $\cos \theta$ is equal to

- (a) $\vec{a} + \vec{b}$
- (b) $\vec{a} - \vec{b}$
- (c) $\vec{a} \cdot \vec{b}$
- (d) $|\vec{a} \times \vec{b}|$

Q-36. If $\vec{a}, \vec{b}, \vec{c}$ are three vectors, then $[\vec{a}, \vec{b}, \vec{c}]$ is not equal to

- (a) $[\vec{a}, \vec{c}, \vec{b}]$
- (b) $[\vec{c}, \vec{a}, \vec{b}]$
- (c) $-[\vec{a}, \vec{c}, \vec{b}]$
- (d) none of these

Q-37. The acute angle between the lines $x - y = 0$ and $y = 0$ is

- (a) 30°
- (b) 45°
- (c) 60°
- (d) 75°

Q-38. The vertices of a triangle are $(0,3)$, $(-3,0)$ and $(3,0)$. The orthocenter of the triangle is

- (a) $(0,0)$
- (b) $(0,3)$
- (c) $(3,0)$
- (d) $(-3,0)$

Q-39. The equation $(\hat{r} - (\hat{i} + \hat{j})) \cdot (\hat{r} - (\hat{j} + \hat{k})) = 0$ represents

- (a) pair of unites
- (b) a pair of planes
- (c) a spheres
- (d) none of these

Q-40. The spheres $x^2 + y^2 + z^2 + x + y + z - 1 = 0$ and $x^2 + y^2 + z^2 + x + y + z - 5 = 0$

- (a) Intersect in a plane
- (b) Intersect in five points
- (c) Do not intersect
- (d) None of these

Q-41. If a line passes through $(2,2)$ and is perpendicular to the line $3x + y = 3$, its y-intercept is

- (a) -4

(b) $\frac{4}{3}$

(c) $-\frac{4}{3}$

(d) none of these

Q-42. The lines $x + (k - 1)y + 1 = 0$ and $2x + k^2y - 1 = 0$ are at right angles if

(a) $k = 1$

(b) $k > 1$

(c) $k = -1$

(d) $|k| = 0$

Q-43. The distance of the point (x, y, z) from the xy - plane is

(a) x

(b) y

(c) z

(d) $|z|$

Q-44. The line $\frac{x-1}{1} = \frac{y-1}{2} = \frac{z-3}{1}$ and $\frac{z-2}{0} = \frac{y-3}{0} = \frac{z-3}{0}$ are

(a) Parallel

(b) Coincident

(c) Skew

(d) Perpendicular

Q-45. The G. M of the numbers $3, 3^2, 3^3 \dots 3^n$ is

(a) $3^{2/n}$

(b) $3^{(n-1)/2}$

(c) $3^{\left(\frac{n}{2}\right)}$

(d) $3^{(n+1)/2}$