Examrace

Mathematics Objective Questions for Competitive ExamsPaper 21

Q-1. In a triangle ABC, cosec A (sin B cos C + cos B sin C) equals

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

(b) $\frac{a}{c}$

(c) 1

(d) 0

Q-2. If $y = \frac{1}{x-2}, x \neq 2$ for what value, if any, of x is $y^2 = -2y^3$?

(a) -4

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

(c) 0

(d) no value

Q-3. The principle value of $\sin^{-1} \sin \frac{2\pi}{3}$ is

(a) $-\frac{3\pi}{3}$

(b) $\frac{2\pi}{3}$

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

(d) $\frac{4\pi}{3}$

Q-4. if the angles of a triangles are in the ratio 1: 23: , then the sides are in the ratio

(a) $1 : \sqrt{3} : 2$

(b) $\sqrt{3} : 1 : 2$

(c) $\sqrt{3} : \sqrt{2} : 1$

(d) $1 : \sqrt{3} : \sqrt{2}$

Q-5. The equation 2 sin x + cos x = 3 has

(a) Only one solution

(b) No solution

(c) Infinitely many solution

(d) Finitely many solution

Q-6 . If $f(x) = 3X + \frac{2}{5X} - 3$, then

(a) $F^{-1}(X) = f(X)$

(b) $F^{-1}(X) = -f(X)$

(c) $F(f(X)) = -X$

(d) $F - 1(X) = -\frac{1}{19}$

Q-7. The function $f(X) = x^3$ is increasing in

(a) (0,∞) 1

(b) (−∞,0)

(c) (−∞,∞)

(d) $(-\infty,1) \cup (1,\infty)$

Q-8. If $\sin X + \cos X = a$, then $|\sin X - \cos X|$ equals

(a) $\sqrt{2} - a^2$

(b) $\sqrt{2} + a^2$

(c) $\sqrt{2^2} - 2$

(d) None of these

Q-9 In $\left(0, \frac{\pi}{2}\right)$, the function $f(x) = \frac{x}{\sin x}$ is

(a) An increasing function

(b) A decreasing function

(c) A constant function

(d) None of these

Q-10. Let $f(x) = x^3 + \frac{3}{2}x^2 + 3x + 3$, then f (x) is

(a) An even function

(b) An odd function

(c) An increasing function

(d) A decreasing function

Q-11. If $\tan\theta = \frac{m}{n}, 0 < \theta < \pi$, then $\sin\theta$ is equal to

(a) $\frac{m}{\sqrt{m^2}} + n^2$

(b) $-\frac{m}{\sqrt{m^2}} + n^2$

(c) $|m|\sqrt{m^2} + n^2$

(d) None of these

Q-12. The values of $\cos 52^o + \cos 68^o + \cos 172^o$ is equal to

(a) 0

(b) 2

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

(d) None of these

Q-13. If $y = a \sin mx + b \cos mx$, then $\frac{d^2y}{dx^2}$ is equal to

(a) $M^2 y$

(b) $-m^2 y$

(c) My

(d) None of these

Q-14. If $f(x) = e^x g(x), g(0) = 2, g'(0) = 1$, then $f(0)$ is

(a) 1

(b) 3

(c) 2

(d) 0

Q-15. The value of $\int_1^3 \frac{\cos(\log x)}{x}$ dx is equal to

(a) sin (log 3)

(b) cos (log 3)

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

(d) 1

Q-16. $\int \sqrt{x^2+a^2}$ dx is equal to

(a) $\frac{x}{2}\sqrt{x^2+a^2} - \frac{a^2}{2}\log\left(x+\sqrt{x^2+a^2}\right)$

(b) $\frac{x}{2}\sqrt{x^2+a^2} - \frac{a^2}{2}\sin^{-2}\left(\frac{x}{a}\right)$

(c) $\frac{x}{2}\sqrt{x^2+a^2} + \frac{a^2}{2}\log\left(x+\sqrt{x^2+a^2}\right)$

(d) None of these

Q-17. Differential coefficient of a function $f(g(x))$ with respect to the function g (x) is

(a) $F'(g(x))$

(b) $F'\left(g(x)\,g'(x)\right)$

(c) $F'\left(\frac{g(x)}{g'(x)}\right)$

(d) None of these

Q-18. If $\lim_{x\to 0}\phi(x) = a^3, a \neq 0$, then $\lim_{x\to 0}\phi\left(\frac{x}{a}\right)$ is

(a) a^2

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

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

(d) a^3

Q-19. The degree of the differential equation $\left(\frac{d^2y}{dx^2}\right) + \left(\frac{dy}{dx}\right)^2 - xy = 0$ is

(a) 1

(b) 2

(c) 3

(4) 4

Q-20. The unit vector perpendicular to each of vectors $\hat{i} + 2\hat{j} + 3\hat{k}$ and $-3\hat{i} - 2\hat{j} - \hat{k}$ is

(a) $\frac{1}{6\sqrt{5}}\left(8\hat{i} - 10\hat{j} + 4\hat{k}\right)$

(b) $8\hat{j} - 10\hat{j} + 4\hat{k}$

(c) $8\hat{j} + 10\hat{j} + 4\hat{k}$

(d) None of these

Q-21. If G is the centurion of a triangle ABC and O is any point, then $\overline{\mathrm{OA}} + \overline{\mathrm{OB}} + \mathrm{OC}$ is equals to

(a) $\overline{\mathrm{OG}}$

(b) $3O\overline{G}$

(c) $\overline{O}$

(d) None of these

Q-22. The order and degree of the differential equation $\frac{d^2y}{\mathrm{dx}^2} = y + \left(\frac{\mathrm{dy}}{\mathrm{dx}}\right)^4$ are respectively.

(a) 2,4

(b) 4,1

(c) 4,2

(d) 2,2

Q-23. $\int_0^x l \cos X \, 1 \, \mathrm{dx} =$

(a) 1

(b) 2

(c) 0

(d) 3

Q-24. The length of projection of the vector $3\hat{i} - \hat{j} - 2\hat{k}$ on the $\hat{i} - 2\hat{j} - 3\hat{k}$ is

(a) $\frac{1}{16}$

(b) $\sqrt{14}$

(c) $\frac{14}{\sqrt{2}}$

(d) None of these

Q-25. If $\int_0^{\frac{\pi}{2}} \frac{d\theta}{9\sin^2\theta + 4\cos^2\theta} K\pi$, then $K =$

(a) $\frac{1}{16}$

(b) $\frac{1}{12}$

(c) $\frac{1}{8}$

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

Q-26. The area bounded by the curve $x = \text{at}^2$, $y = 2\,\text{at}$ and $X-$ axis is $(1 \leqslant t \leqslant 3)$

(a) $26a^2$

(b) $8\,a^2$

(c) $26\frac{a^2}{3}$

(d) $104\frac{a^2}{3}$

Q-27. Vector projection of a vector $\vec{a}$ on another vector $\vec{b}$ is

(a) $\vec{a}.\vec{b}$

(b) $\left(\vec{a}.\vec{b}\right)\hat{b}$

(c) $\left(\vec{a}.\vec{b}\right)\vec{b}$

(d) $\frac{\left(\vec{a}.\vec{b}\right)}{\left|\vec{b}\right|}\hat{b}$

Q-28. If $\vec{a}$ and $\vec{b}$ are two vectors, then $\left(\vec{a} \times \vec{b}\right)^2 + \left(\vec{a}\,.\,\vec{b}\right)^2$ is equal to

(a) $\left|\overrightarrow{a}\right|^2 \left|\overrightarrow{b}\right|^2$

(b) $\lambda \left|\overrightarrow{a}\right|^2 \left|\overrightarrow{b}\right|^2$, where $|\lambda|$ 1

(c) $\left|\overrightarrow{a}\right|^2 + \left|\overrightarrow{b}\right|^2$

(d) None of these

Q-29. The parabola $y^2 = 4$ ax and the circle $x^2 + y^2 - 2$ax $= 0$ touch each other at the point

(a) (0,0)

(b) (a, 0)

(c) (0, a)

(d) None of these

Q-30. Length of the common chord of the parabolas $y^2 = x$ and $x^2 = y$ is

(a) 1

(b) $\sqrt{2}$

(c) $4\sqrt{2}$

(d) None of these

Q-31. The points (0,2, 0) , $\left(\sqrt{3}, 1,0\right)$ and $\left(\sqrt{3}, \frac{1,2\sqrt{2}}{\sqrt{3}}\right)$ are the vertices of

(a) A scalene triangle

(b) An equilateral triangle

(c) As isosceles triangle degree equation in

(d) None of these

Q-32. The locus of a first degree equation in x, y and x is a

(a) Straight line

(b) Plane

(c) Sphere

(d) None of these

Q-33. The point of contract of $3x + 4y + 7 = 0$ and $x^2 + y^2 - 4x - 6y - 12 = 0$ is

(a) (1,1)

(b) (-1,1)

(c) (1, -1)

(d) (-1, -1)

Q-34. Three points A, B and C are collinear if the area of triangle ABC is

(a) Greater than zero

(b) Less than zero

(c) Zero

(d) None of these

Q-35. Area of Δ ABC whose vertices are $A\,(-1,2,3)$, $B\,(1,1,1)$ and C (2, -1,3) is

(a) 9

(b) 0

(c) $\frac{9}{2}$

(d) None of these

Q-36. If the four points (3, -2,1) , (2, -3, -4) , (-1,1, 2) and (4,5, λ) are coplanar, then λ is equal to

(a) 0

(b) $-\frac{17}{146}$

(c) $-\frac{146}{17}$

(d) None of these

Q-37. The locus of a point, whose abscissa and ordinate are always equal is

(a) $X + y = 0$

(b) $X - y = 0$

(c) $X - y = 1$

(d) $X + y + 1 = 0$

Q-38. The equation $\left|\vec{a}\right|^2 - \vec{r}.\left(2\vec{i} + 4\vec{j} + 2\vec{k}\right) - 10 = 0$ represents a

(a) Plane

(b) Sphere of radius 4

(c) Sphere of radius 3

(d) None of these

Q-39. The number of sphere of a given radius which touch the coordinate planes is

(a) 8

(b) 4

(c) 2

(d) 1

Q-40. Area of a triangle is 5 units, its two vertices are (2,1) and (3, -2) . Third vertex is on the line y = x + 3. The coordinates of that vertex are

(a) $\left(\frac{\frac{7}{2,13}}{2}\right)$

(b) (8,14)

(c) $\left(\frac{8}{3}, \frac{5}{3}\right)$

(d) $\left(\frac{7}{3}, \frac{9}{7}\right)$

Q-41. The projection of a line segment on the coordinates are 1,2, 4 and 3 respectively.

The length of the line segment is

(a) 19

(b) 16

(c) 13

(d) 15

Q-42. The co-ordinates of the intersection of the line $x - \frac{6}{-1} = y - \frac{1}{0} = z + \frac{3}{4}$ and the plane $x + y - z = 3$ are

(a) (2,1,0)

(b) $(7, -1, -7)$

(c) $(1,2, -6)$

(d) $(5, -1, -1)$

Q-43. If cov (x, y) = 0, then the two lines of the regression are

(a) Parallel

(b) Coincident

(c) At right angles

(d) None of these

Q-44. If the lines of regression are at right angles, then $p(x, y)$ is equal to

(a) 1

(b) -1

(c) 10 r -1

(d) 0

Q-45. Two unlike parallel forces P and Q (P $\neq Q$) act distinct points of a rigid body. The magnitude of their resultant is

(a) P-Q

(b) Q-P

(c) IP-Q1

(d) None of these