Mathematics Objective Questions for NET, IAS, State-SET (KSET, WBSET, MPSET, etc.), GATE, CUET, Olympiads etc. Paper 19

Q-1. If 1. ω, ω^2 are the cube root of unity, then $\dfrac{a + b\omega + c\omega^2 + d\omega^2}{c + d\omega + a\omega + b\omega^2}$ is equal to

(a) 1

(b) $\omega^2 v$

(c) $_o$

(d) none of these

Q-2. $\sqrt{2 + \sqrt{3}} + \sqrt{2 - \sqrt{3}}$ is equal to

(a) $\sqrt{3}$

(b) $\dfrac{\sqrt{3}}{\sqrt{2}}$

(c) $\dfrac{\sqrt{2}}{\sqrt{3}}$

(d) $\sqrt{6}$

Q-3. The expression $\dfrac{\sqrt{3} - 1}{2\sqrt{2} - \sqrt{3} - 1}$ is equal to

(a) $\sqrt{2} + \sqrt{3} + \sqrt{4} + \sqrt{6}$

(b) $\sqrt{6} + \sqrt{4} + \sqrt{3} + \sqrt{2}$

(c) $\sqrt{6} + \sqrt{4} + \sqrt{3} + \sqrt{2}$

(d) none of these

Q-4. if $Z_1 = 3 + 4i$ and $Z_2 = 4 - 3i$, then

(a) $|Z_1| > |Z_2|$

(b) $|Z_2| > |Z_1|$

(c) $|Z_2| = |Z_1|$

(d) $\mathrm{Amp}(Z_1) = \mathrm{Amp}(Z_2)$

Q-5. The number of real solution of $x^2 - |x| - 2 = 0$ is

(a) 1

(b) 2

(c) 3

(d) 4

Q-6. If the roots of the equation, $8x^2 - 6x + a = 0$ are of the form $\alpha \text{ and } \alpha^2$, then value of   is

(a) 1, -27

(b) -1,27

(c) -1, -27

(d) 1,27

Q-7. If the root of the equation $ax^2 + bx + c = 0$ are negative of each other, then

(a) $c = 0$

(b) $b = c = 0$

(c) $b = 0$

(d) $b = 0, c \neq 0$

Q-8. $11^3 + 12^3 + 13^3 + \ldots + 20^3$ is

(a) an odd integer devisable by 5

(b) an even integer

(c) multiple of 10

(d) an odd integer but not a multiple of 5

Q-9. If a, b, c, d, are in G. P. , then $\frac{a}{c}$ equals

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

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

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

(d) $\frac{d}{b}$

Q-10. If pth term of an AP is q and qth term is P, then its rth term is

(a) $p - q + r$

(b) $p - q - r$

(c) $p + q - r$

(d) $p + q + r$

Q-11. If $^{x+5}P_{n+1} = \dfrac{11(n-1)^{n+3}}{2} P_n$ then the value of x is

(a) 2 or 6

(b) 2 or 11

(c) 7 or 11

(d) 6 or 7

Q-12. The value of expression

$$^{47}C_4 + \sum_{\sqrt{1}}^{5} {}^{52-i}C_3$$

is equal to

(a) $^{47}C_4$

(b) $^{52}C_5$

(c) $^{52}C_4$

(d) $^{52}C_3$

Q-13. A box contain two white balls, three black balls and four red balls. The number of ways in which three balls can be drawn from the box so that one of the balls is black is

(a) 84

(b) 74

(c) 64

(d) 20

Q-14. A coin with tail on both sides is tossed twice. The probability of getting a "head" is

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

(b)

(c) 0

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

Q-15. The chance that an event "occur" or does not occur is

(a) 0

(b) 1

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

(d) none of these

Q-16. If $\left(1 + x - 2x^2\right)^6 = 1 + a_1, x + a_2 x^2 + \ldots + a_{12} x^{12}$, then $a_2 + a_4 + a_6 \ldots + a_{12}$ is equal to

(a) 30

(b) 31

(c) 32

(d) 0

Q-17. If 2nd, 3rd, and 4th terms is the expansion of $(x + a)^n$ are 240,720 and 1080 respectively, then the value of r is

(a) 20

(b) 15

(c) 10

(d) 1.5

Q-18. if the first three terms in the expansion of $(x + a)^a$ are 729,7290, and 30375 respectively, then the value of n is

(a) a

(b) 6

(c) 8

(d) none of these

Q-19. if a, b, c, are in A. P. , then $\begin{vmatrix} x+1 & x+2 & x+a \\ x+2 & x+3 & x+b \\ x+3 & x+4 & x+c \end{vmatrix}$ is equal to

(a) 0

(b) x^2

(c) 3

(d) none of these

Q-20. $\begin{vmatrix} 1 & 1 & 1 \\ {}^nC_1 & {}^{n+1}C_1 & {}^{n+2}C_1 \\ {}^nC_1 & {}^{n+1}C_2 & {}^{n+2}C_2 \end{vmatrix} =$

(a) 0

(b) 1

(c) -1

(d) none of these

Q-21. if $f(x) = \begin{vmatrix} 2\cos x & 1 & 0 \\ 1 & 2\cos x & 1 \\ 0 & 1 & 2\cos x \end{vmatrix}$ then $f\left(\dfrac{\pi}{3}\right) =$

(a) 0

(b) 1

(c) -1

(d) none of these

Q-22. The determinant $= \begin{vmatrix} -a+b+c & -2a & -2a \\ -2b & -b+c+a & -2b \\ -2c & -2c & -c+a+b \end{vmatrix}$ is

(a) 0

(b) a perfect square

(c) a perfect cube

(d) none of these

Q-23. if $\tan A = \dfrac{1}{2}$ and $\tan B = \dfrac{1}{3}$, then a value of $A + B$ is

(a) 135°

(b) 45°

(c) 315°

(d) none of these

Q-24. The maximum value of $\sin\left(x + \dfrac{\pi}{6}\right) + \cos\left(x + \dfrac{pi}{6}\right)$ in the interval $\left[0, \dfrac{\pi}{2}\right]$ is attained

at x =

(a) $\dfrac{\pi}{6}$

(b) $\dfrac{\pi}{3}$

(c) $\dfrac{\pi}{12}$

(d) $\dfrac{\pi}{2}$

Q-25. $\dfrac{1 - \tan^2 \frac{\pi}{8}}{1 + \tan^2 \frac{\pi}{8}}$ is equal to

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

(b) 2

(c) 0

(d) $\dfrac{1}{2}$

Q-26. The value of $\cos e\dfrac{\pi}{5}\cos\dfrac{\pi}{5}\cos\dfrac{4\pi}{5}\cos\dfrac{\pi}{5}$ is

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

(b)

(c) $-\dfrac{1}{8}$

(d) $-\dfrac{1}{16}$

Q-27. Value of $\tan 81^o - \tan 63^o - \tan 27^o + \tan 9^o$ is equal to

(a) 1

(b) 2

(c) 3

(d) 4

Q-28. The range of the function $f(x) = \dfrac{1}{\sqrt{3x - 4}}$ is

(a) R

(b) $[0, \infty]$

(c) $[\ 0, \infty\ ) - \{1\}$

(d) none of these

Q-29. Range of the function $f(x) = \sqrt{x^2 + x + 1}$ is

(a) $[\ 0, \infty\ )$

(b) $[\ \sqrt{\frac{3}{2}}, \infty\ )$

(c) $(-\ \frac{\sqrt{3}}{2}, \infty\ )$

(d) none of these

Q-30. Range of the function $f(x) = \sqrt{\frac{x}{1+x}}$ is

(a) $(0, \infty)$

(b) $[\ 0, \infty\ )$

(c) $[0, \infty) - \{1\}$

(d) none of these

Q-31. Domain of the function $\sin^{-1}(2x+1)$ is

(a) $[-1, O]$

(b) $[-1, 1]$

(c) $[0, 1]$

(d) none of these

Q-32. The function $2x^3 - 3x - 12 + 4$ has

(a) Two maxima

(b) Two minima

(c) One maximum and one minimum

(d) Two maxima and no minima

Q-33. If $y = \frac{x}{2}\sqrt{x^2+1} + \frac{1}{2}\log\left(x + \sqrt{x^2+1}\right)$, then $\frac{dy}{dx}$ equal to

(a) $2\sqrt{x^2+1}$

(b) $\sqrt{x^2+1}$

(c) $\dfrac{1}{\sqrt{x^2+1}}$

(d) none of these

Q-34. $\lim\limits_{x \to 0} 2^{\left(-2\left(\frac{1}{x-1}\right)\right)}$ is equal to

(a) 0

(b) 1

(c) does not exit

(d) none of these

Q-35. Let $f(x) = \{\begin{array}{ll} x & \text{if } x \in \theta \\ 1 - x & \text{if } x \in (R - \theta) \end{array}$ then

(a) f if only right continuous at $x = \dfrac{1}{2}$

(b) f is only left continuous at $x = \dfrac{1}{2}$

(c) f is continuous at $x = \dfrac{1}{2}$

(d) f is not continuous at $x = \dfrac{1}{2}$

Q-36. $\displaystyle\int_a^b \dfrac{|x|}{x}\,dx =$

(a) b-a

(b) a-b

(c) a + b

(d) | b|-| a|

Q-37. $\displaystyle\int_{-1}^{\sqrt{3}} \dfrac{1}{1 + x^2}$ is equal to

(a) $\dfrac{\pi}{12}$

(b) $\dfrac{\pi}{6}$

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

(d) $\dfrac{\pi}{3}$

Q-38. The general solution of differential equation $\dfrac{dy}{dx} = \dfrac{y}{x}$ is

(a) $y = \dfrac{k}{x}, k$ constant

(b) $y = k \log x$

(c) $y = kx$

(d) $\log y = kx$

Q-39. $\displaystyle\int \dfrac{1}{f(x)}\,dx = \log f(x)^2 + c,$ then $f(x)$ is equal to

(a) $2x + a$

(b) $\dfrac{x}{2} + \alpha$

(c) $x + \alpha$

(d) $x^2 + \alpha$

Q-40. The general solution of the differential equation $\dfrac{d^2 y}{dx^2} = e^{-2x}$ is

(a) $y = \dfrac{1}{4}e^{-2x} + c$

(b) $y = e^{-2x} + cx + d$

(c) $y = \dfrac{1}{4}e^{-2x} + cx + d$

(d) $y = \dfrac{1}{4}e^{-2x} + cx^2 + d$

Q-41. $\lim\limits_{x \to x} \left[\dfrac{x}{x^2 + 1} + \dfrac{x}{x^2 + 2^2} + \dfrac{x}{x^2 + 3^2} \cdots \dfrac{x}{x^2 + m} \right]$ is equal to

(a) $\dfrac{\pi}{4}$

(b) log 2

(c) 0

(d) 1

Q-42. The volume of parallelepiped whose continuous edges are $-12i + \alpha \widehat{k}, 3j - \widehat{k}, 2i + \hat{j} - 15\widehat{k}$ is 546, then   in equal to

(a) 3

(b) -3

(c) 2

(d) -2

Q-43. The vectors $2i - m\hat{j} + 3m\widehat{k}$ and $(1 + m)i - 2m\hat{j} + \widehat{k}$

(a) all real m

(b) $m < -2 \text{ or } m > -\dfrac{1}{2}$

(c) $m = -\dfrac{1}{2}$

(d) $m \in \left[-2, -\dfrac{1}{2} \right]$

Q-44. If $\bar{a}, \bar{b}, \bar{c}$ are any three non-coplanar vectors, then $\dfrac{\bar{a}.\left(\bar{b} \times \bar{c} \right)}{(\bar{c} \times \bar{a}).\bar{b}} + \dfrac{\bar{b}.(\bar{a} \times \bar{c})}{\bar{c}.\left(\bar{a} \times \bar{b} \right)}$ is equal to

(a) 2

(b) 0

(c) 1

(d) none of these

Q-45. The magnitude length of the projection of the vectors $\hat{i} + 2\hat{j} + \widehat{k}$ on the vector $4i - 4j + 7\widehat{k}$ is

(a) 3

(b) $\dfrac{3}{\sqrt{6}}$

(c) $\dfrac{\sqrt{6}}{3}$

(4) $\dfrac{1}{2}$