

Mathematics

These are 38 questions out of 40. Remaining questions will be updated soon.

1. $\tan^{-1} \sqrt{\frac{1-\cos x}{1+\cos x}} = ?$

- (1) x (2) $\frac{x}{2}$ (3) $2x$ (4) None

Ans: [2]

2. Let PQ be a tower, 'P' be the top point 'Q' be the bottom point. Let 'A' & 'B' two points on ground such that A, B & Q are in a straight horizontal line. Given, $AB = 240$ meters. Also tangents of elevation of A & B from point 'P' are $\frac{5}{12}$ & $\frac{3}{4}$. Find the distance "BQ".

- (1) 250 (2) 300 (3) 240 (4) 12

Ans: [2]

3. $\lim_{n \rightarrow \infty} \frac{1+2+3+\dots+n}{n^2} = ?$

- (1) 1 (2) 0 (3) $\frac{1}{2}$ (4) $\frac{3}{4}$

Ans: [3]

4. Let three numbers be in G.P. with common ratio $r > 1$, such that of first of third number are multiplied by 4 and 2 number is multiplied by 5 then the three numbers are in A.P., what is the value of common ratio 'r' ?

- (1) 1/2 (2) 1 (3) 2 (4) 4

Ans: [3]

5. If $\vec{a} = \hat{j} + \frac{1}{\sqrt{3}}\hat{k}$ and $\vec{b} = \frac{1}{\sqrt{3}}\hat{j} + \hat{k}$, then

- (1) \vec{a} & \vec{b} are parallel (2) both are perpendicular to each other
 (3) both are inclined at 60° (4) both are inclined at 30°

Ans: [4]

6. $y = \frac{C}{(x^2 + 1)}$, then $\frac{dy}{dx}$?

- (1) $\frac{2xy}{x^2 + 1}$ (2) $-\frac{xy}{1 + x^2}$ (3) $\frac{xy}{2(x^2 + 1)}$ (4) $\frac{-2xy}{(x^2 + 1)}$

Ans: [4]

7. If $y = ce^{-x} + \frac{1}{2} \sin x - \frac{1}{2} \cos x$, then $\frac{dy}{dx} + y = ?$

- (1) $\cos x$ (2) 0 (3) $\sin x$ (4) None

Ans: [3]

8. What are the coordinate of focii of ellipse $x^2 - 2x + 9y^2 = 0$

- (1) $\left(2 \pm \frac{2\sqrt{2}}{3}, 0\right)$ (2) $\left(1 \pm \frac{2\sqrt{2}}{3}, 0\right)$ (3) $\left(\pm \frac{2\sqrt{2}}{3}, 0\right)$ (4) None

Ans: [2]

9. $y = x^2 - 2x + 4$, coordinates of vertex of above parabola is

- (1) (1, 3) (2) (3, 6) (3) (1, 4) (4) (4, 1)

Ans: [1]

10. Let α, β be roots of equation $x^2 - 2x + 3 = 0$, then the equation. Whose roots are $(\alpha + 1)$ & $(\beta + 1)$ is

- (1) $x^2 + 4x + 6 = 0$ (2) $x^2 - 4x - 6 = 0$ (3) $x^2 - 2x - 6 = 0$ (4) $x^2 - 4x + 6 = 0$

Ans: [4]

11. $\int_1^e \log_e x \, dx = ?$

- (1) $e + 1$ (2) $e - 1$ (3) e (4) 1

Ans: [4]

12. $f(x) = \frac{x^2 - 9}{x - 3}$, find range

- (1) $R - \{6\}$ (2) $(-\infty, 3)$ (3) $(-\infty, -6)$ (4) $(6, \infty)$

Ans: [1]

13. If $y = x^{n+1}$ then $\frac{d^n y}{dx^n}(1) =$

- (1) $(n+1)!$ (2) $n+1$ (3) $n!$ (4) n

Ans: [1]

14. $P(A) = 0.25, P(B) = 0.5, P(A \cap B) = 0.15$ Find $P(\bar{A} \cap \bar{B}) = ?$

- (1) 0.25 (2) 0.4 (3) 0.6 (4) 0.3

Ans: [2]

15. a_1, a_2, a_3 are in A.P. & a_p, a_q, a_r are in G.P. then $a_p : a_q$ is

- (1) $\frac{p-q}{q-r}$ (2) $\frac{p-r}{p-q}$ (3) pqr (4) none of these

Ans: [1]

16. If $A = \begin{bmatrix} 0 & a & 0 \\ b & 0 & c \\ 0 & d & 0 \end{bmatrix}$ then

- (1) If $A \times x = 0$ then $x = 0$ (2) If $A \times x = 0$ then x not necessarily equal to 0
 (3) If $A \times x = 0$ then A^{-1} does not exist (4) None of these

Ans: [2]

17. The sum of roots of equation $(x-1)^3 + 8 = 0$ is

- (1) $1+2\omega+2\omega^2$ (2) $1-2\omega-2\omega^2$
 (3) $2\omega+2\omega^2$ (4) $1-2\omega+2\omega^2$

Ans: [2]

18. If \hat{a} be unit vector then $\hat{a} \cdot [\hat{i} \times (\hat{a} \times \hat{i}) + \hat{j} \times (\hat{a} \times \hat{j}) + \hat{k} \times (\hat{a} \times \hat{k})] =$

- (1) 0 (2) 2 (3) 3 (4) 4

Ans: [2]

19. Find the sum of series $\frac{1}{1.2} + \frac{1}{2.3} + \frac{1}{3.4} + \dots + \frac{1}{n(n+1)}$

- (1) $\left(\frac{n}{n+1}\right)$ (2) $\frac{1}{n+1}$
 (3) $\frac{1}{n-1}$ (4) None of these

Ans: [1]

20. $3, 5, 7, \dots, 60$ terms $2, 5, 8, \dots, 50$ terms then number of common terms

- (1) 20 (2) 25
 (3) 30 (4) 35

Ans: [1]

21. Sum of all natural numbers between 250 to 1000 divisible by 3 is ?

- (1) 156375 (2) 156378 (3) 157878 (4) 147878

Ans: [1]

22. $f(x) = a \log|x| + x$ has extremum at $x = 1$ then value of a is

- (1) 0 (2) -1 (3) 1 (4) 2

Ans: [2]

23. $\frac{1}{1+x}, -\frac{1-x}{(1+x)^2}, \frac{(1-x)^2}{(1+x)^3}, \dots$ Find the sum of this infinite series

- (1) 1 (2) $\frac{1}{2}$ (3) $\frac{1}{3}$ (4) None of these

Ans: [2]

24. The equation of the line passing through mid point of the intercept of line $2x + 3y = 4$ between the axes and origin is

- (1) $2x - 3y = 0$ (2) $2x + 3y = 0$ (3) $3x + 2y = 0$ (4) $3x - 2y = 0$

Ans: [1]

25. $f(D(f) \rightarrow R) = \frac{1}{\sqrt{x+|x|}}$ then $D(f)$ is

- (1) $(-\infty, \infty)$ (2) $[0, \infty)$ (3) $(0, \infty)$ (4) $(-\infty, \infty)$

Ans: [3]

26. $\cos^{-1} \frac{x}{2} + \cos^{-1} \frac{y}{2} = \alpha$ then value of $\frac{x^2 - 2xy \cos \alpha + y^2}{\sin^2 \alpha} =$

- (1) 4 (2) 1 (3) 2 (4) 3

Ans: [1]

27. $\vec{a}, \vec{b}, \vec{c}$ are three unit vectors $|\vec{a} + \vec{b} + \vec{c}| = 1$, \vec{a} and \vec{b} are perpendicular. Angle of \vec{c} with \vec{a} and \vec{b} are α and β respectively value of $(\cos \alpha + \cos \beta)^2$ is

- (1) 1 (2) 2 (3) 4 (4) 0

Ans: [1]

28. $\lim_{x \rightarrow 1} \frac{(2x-3)(\sqrt{x}-1)}{2x^2+x-3} =$

- (1) -10 (2) $-\frac{1}{10}$ (3) 1 (4) -1

Ans: [2]

29. $\log_{\sqrt{3}} 9 =$

- (1) 2 (2) 3 (3) 4 (4) 8

Ans: [3]

30. If $\log_2 x = a$ then $16^{a-1} =$

- (1) $16x^4$ (2) $\frac{x^4}{16}$ (3) $\frac{x^{16}}{4}$ (4) $4x^{16}$

Ans: [2]

31. If $z = 2 - 3i$ thus $z^2 - 4z + 14$ is

- (1) 0 (2) 1 (3) -1 (4) i

Ans: [2]

32. $\frac{x+3}{x-2} \leq 2$ then solution set is

- (1) $(-\infty, 2) \cup [7, \infty)$ (2) $(-\infty, 1) \cup (2, \infty)$ (3) $(-\infty, 2) \cup (7, \infty)$ (4) None of these

Ans: [1]

33. $\frac{x}{2x+1} \geq \frac{1}{4}$ and $\frac{6x}{4x-1} < \frac{1}{2}$ then solution set of system is

- (1) $(-\infty, -\frac{1}{2})$ (2) $(-\frac{1}{2}, \frac{1}{2})$ (3) ϕ (4) $(-2, -\frac{1}{2})$

Ans: [3]

34. Find the equation of line perpendicular to the line segment joining $(1, 0)$ and $(2, 3)$ which in dividing is ratio of $1 : 3$ is

- (1) $12x - 4y = 7$ (2) $4x + 12y = 14$ (3) $12x + 4y = 5$ (4) None

Ans: [2]

