VITMEE Previous Year Question Papers

1. To the lines ax2+2hxy+by2=0 ax^2 + 2hxy + by^2 = 0 ax2+2hxy+by2=0, the lines a2x2+2h(a+b)xy+b2y2=0 a^2x^2 + 2h(a+b)xy + b^2y^2 = 0 a2x2+2h(a+b)xy+b2y2=0 are
   (a) equally inclined

(b) perpendicular
(c) bisector of the angle
(d) None of the above

2. If R be a relation from A = {1, 2, 3, 4} to B = {1, 3, 5} such that (a, b) ∈ R ⇔ a < b, then R or R^{-1} is
(a) {(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)}
(b) {(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)}
(c) {(3, 3), (3, 5), (5, 3), (5, 5)}
(d) {(3, 3), (3, 4), (4, 5)}
3. If x + iy = (1 - i√3)^{100}, then find (x, y).
(a) (2^{99}, 2^{99}√3)
(b) (2^{99}, -2^{99}√3)
(c) (-2^{99}, 2^{99}√3)
(d) None of these
4. For a GP, a_n = 3(2^n), ∀ n ∈ N. Find the common ratio.
(a) 2
(b) 1/2
(c) 3
(d) 1/3
5. If a, b, c are in HP, then a/(b+c), b/(c+a), c/(a+b) will be in
(a) AP
(b) GP
(c) HP
(d) None of these
6. If (x^2 + 2x + 7)/(2x + 3) < 6, x ∈ R, then
(a) x > 11 or x < -3/2
(b) x > 11 or x < -1
(c) -3/2 < x < -1
(d) -1 < x < 11 or x < -3/2
7. The number of ways of painting the faces of a cube of six different colours is
(a) 1
(b) 6
(c) 6!
(d) 36
8. A line passes through (2, 2) and is perpendicular to the line 3x + y = 3. What is its y-intercept?
(a) 1/3
(b) 2/3
(c) 1
(d) 4/3
9. The number of common tangents to the circles x^2 + y^2 = 4 and x^2 + y^2 - 6x - 8y = 24 is

(a) 0
(b) 1
(c) 3
(d) 4

10. If D is the set of all real x such that 1 - e^{(1/x)} - 1 is positive, then D is equal to
(a) (-∞, 1]
(b) (-∞, 0)
(c) (1, ∞)
(d) (-∞, 0) ∪ (1, ∞)
11. Find the value of the limit lim_{x→0} √(1 - cos x)/x.
(a) 0
(b) 1
(c) √2
(d) does not exist
12. Evaluate ∫ (x^2 + 4)/(x^4 + 16) dx.
(a) (1/(2√2)) tan^{-1} ((x^2 - 4)/(2x√2)) + C
(b) (1/(2√2)) tan^{-1} ((x^2 - 4)/(2√2)) + C
(c) (1/(2√2)) tan^{-1} ((x^2 - 4)/(x√2)) + C
(d) None of the above
13. Evaluate ∫_{π/4}^{3π/4} 1/(1 + cos x) dx
(a) 2
(b) -2
(c) 1/2
(d) -1/2
14. If one AM 'A' and two GM p and q are inserted between two given numbers, then find the value of p^2/q + q^2/p.
(a) A
(b) 2A
(c) 3A
(d) 4A
15. If the roots of the equation x^2 + ax + b = 0 are c and d, then one of the roots of the equation x^2 + (2c + a)x + c + ac + b = 0 is
(a) c
(b) d - c
(c) 2d
(d) 2c
16. The sum of the coefficients of (6a - 5b)^n, where n is a positive integer, is (a) 1 (b) -1 (c) 2^n (d) 2^{n-1}
17. Find the value of (7.995)^{1/3} correct to four decimal places.
(a) 1.9995
(b) 1.9996

(c) 1.9990
(d) 1.9991

18. The values of constants a and b so that lim_{x→∞} [(x^2 + 1)/(x + 1) - ax - b] = 0 are
(a) a = 0, b = 0
(b) a = 1, b = -1
(c) a = -1, b = 1
(d) a = 2, b = -1
19. The projection of the vector i - 2j + k on the vector 4i - 4j + 7k is
(a) 5√6/10
(b) 19/10
(c) 9/19
(d) √6/19
20. If a, b, c are three non-zero vectors such that a + b + c = 0 and m = a·b + b·c + c·a, then
(a) m < 0
(b) m > 0
(c) m = 0
(d) m = 3
21. A line making angles 45° and 60° with the positive directions of the axes of x and y makes with the positive direction of z-axis, an angle of
(a) 60°
(b) 120°
(c) 60° or 120°
(d) None of these
22. If I = [[1 0] [0 1]], J = [[0 1] [-1 0]] and B = [[cos θ sin θ] [-sin θ cos θ]], then B is equal to (a) I cos θ + J sin θ (b) I sin θ + J cos θ (c) I cos θ - J sin θ (d) -I cos θ + J sin θ
23. Which of the following is correct?
(a) Determinant is a square matrix
(b) Determinant is a number associated to a matrix
(c) Determinant is a number associated to a square matrix
(d) All of the above
24. If α, β and γ are the roots of $x^3 + αx^2 + b = 0$, then the value of |β γ α| is
(a) $-a^3$
(b) $a^3 - 3b$
(c) a^3
(d) $a^2 - 3b$
25. If the axes are shifted to the point (1, -2) without solution, then the equation $2x^2 + y^2 - 4x + 4y = 0$ becomes
(a) $2X^2 + 3Y^2 = 6$
(b) $2X^2 + Y^2 = 6$

(c) $X^2 + 2Y^2 = 6$
(d) None of the above

26. If $f(x) = \int x^2, x \leq 0$ then $x = 0$ is
(a) point of minima
(b) point of maxima
(c) point of discontinuity
(d) None of the above

27. In a group (G, *), the equation x * a = b has a
(a) unique solution b * a^{-1}
(b) unique solution a^{-1} * b
(c) unique solution a^{-1} * b^{-1}
(d) many solutions

28. A die is rolled twice and the sum of the numbers appearing on them is observed to be 7. What is the conditional probability that the number 2 has appeared at least once?
(a) 1/2
(b) 1/3
(c) 2/3
(d) 2/5

29. The locus of the mid-points of the focal chord of the parabola $y^2 = 4ax$ is
(a) $y^2 = a(x - a)$
(b) $y^2 = 2a(x - a)$
(c) $y^2 = 4a(x - a)$
(d) None of these

30. Find the value of sin 12° sin 48° sin 54°.
(a) 1/2
(b) 1/4
(c) 1/6
(d) 1/8

31. In an equilateral triangle, the inradius, circumradius and one of the exradii are in the ratio
(a) 2 : 3 : 5
(b) 1 : 2 : 3
(c) 1 : 3 : 7
(d) 3 : 7 : 9

32. Let p and q be two statements. Then, p ∨ q is false, if
(a) p is false and q is true
(b) both p and q are false
(c) both p and q are true
(d) None of the above

33. In how many ways 6 letters be posted in 5 different letter boxes? (a) 5^6
(b) 6^5

(c) 5!
(d) 6!

34. If A and B be two sets such that A × B consists of 6 elements. If three elements A × B are (1, 4), (2, 6) and (3, 6), find B × A.
(a) {(1, 4), (1, 6), (2, 4), (2, 6), (3, 4), (3, 6)}
(b) {(4, 1), (4, 2), (4, 3), (6, 1), (6, 2), (6, 3)}
(c) {(4, 4), (6, 6)}
(d) {(4, 1), (6, 2), (6, 3)}
35. Let f : R → R be defined as f(x) = x^2 + 1, find f^{-1}(-5).
(a) {φ}
(b) φ
(c) {5}
(d) (-5, 5)
36. If X is a poisson variate such that P(X = 1) = P(X = 2), then P(X = 4) is equal to
37. The area enclosed by y = 3x − 5, y = 0, x = 3 and x = 5 is
(a) 12 sq units
(b) 13 sq units
(c) 13/2 sq units
(d) 14 sq units
38. The order and degree of the differential equation (1 + 4 dy/dx)^{2/3} = 4 d^2y/dx^2 are respectively
(a) 1, 2/3
(b) 3, 2/3
(c) 2, 3
(d) 2, 2/3
39. The solution of the differential equation dy/dx = $(4x + y + 1)^2$, is
(a) (4x + y + 1) = tan (2x + C)
(b) $(4x + y + 1)^2$ = 2 tan (2x + C)
(c) $(4x + y + 1)^3$ = 3 tan (2x + C)
(d) (4x + y + 1) = 2 tan (2x + C)
40. The system of equations 2x + y − 5 = 0, x − 2y + 1 = 0, 2x − 14y − a = 0 is consistent. Then, a is equal to
(a) 1
(b) 2
(c) 5
(d) None of these

Answer Key

1. a 2. c 3. c 4. a 5. c 6. d 7. a 8. d 9. b 10. d
2. d 12. a 13. a 14. b 15. b 16. a 17. b 18. b 19. b 20. a
3. a 22. a 23. c 24. c 25. b 26. a 27. a 28. b 29. b 30. d
4. b 32. b 33. a 34. b 35. b 36. c 37. d 38. c 39. d 40. d