

- To the lines  $ax^2 + 2hxy + by^2 = 0$ , the lines  $a^2x^2 + 2h(a+b)xy + b^2y^2 = 0$  are
  - equally inclined
  - perpendicular <http://sscbankrecruitment.in/>
  - bisector of the angle
  - None of the above
- If  $R$  be a relation from  $A = \{1, 2, 3, 4\}$  to  $B = \{1, 3, 5\}$  such that  $(a, b) \in R \Leftrightarrow a < b$ , then  $R \circ R^{-1}$  is
  - $\{(1, 3), (1, 5), (2, 3), (2, 5), (3, 5), (4, 5)\}$
  - $\{(3, 1), (5, 1), (3, 2), (5, 2), (5, 3), (5, 4)\}$
  - $\{(3, 3), (3, 5), (5, 3), (5, 5)\}$
  - $\{(3, 3), (3, 4), (4, 5)\}$
- If  $x + iy = (1 - i\sqrt{3})^{100}$ , then find  $(x, y)$ .
  - $(2^{99}, 2^{99}\sqrt{3})$
  - $(2^{99}, -2^{99}\sqrt{3})$
  - $(-2^{99}, 2^{99}\sqrt{3})$
  - None of these
- For a GP,  $a_n = 3(2^n)$ ,  $\forall n \in N$ . Find the common ratio.
  - 2
  - 1/2
  - 3
  - 1/3
- If  $a, b, c$  are in HP, then  $\frac{a}{b+c}, \frac{b}{c+a}, \frac{c}{a+b}$  will be in
  - AP
  - GP
  - HP
  - None of these
- If  $\frac{x^2 + 2x + 7}{2x + 3} < 6$ ,  $x \in R$ , then
  - $x > 11$  or  $x < -\frac{3}{2}$
  - $x > 11$  or  $x < -1$
  - $-\frac{3}{2} < x < -1$
  - $-1 < x < 11$  or  $x < -\frac{3}{2}$
- The number of ways of painting the faces of a cube of six different colours is
  - 1
  - 6
  - 6!
  - 36
- A line passes through  $(2, 2)$  and is perpendicular to the line  $3x + y = 3$ . What is its  $y$ -intercept?
  - 1/3
  - 2/3
  - 1
  - 4/3
- The number of common tangents to the circles  $x^2 + y^2 = 4$  and  $x^2 + y^2 - 6x - 8y = 24$  is
  - 0
  - 1
  - 3
  - 4
- If  $D$  is the set of all real  $x$  such that  $1 - e^{(1/x) - 1}$  is positive, then  $D$  is equal to
  - $(-\infty, 1]$
  - $(-\infty, 0)$
  - $(1, \infty)$
  - $(-\infty, 0) \cup (1, \infty)$
- Find the value of the limit  $\lim_{x \rightarrow 0} \frac{\sqrt{1 - \cos x}}{x}$ .
  - 0
  - 1
  - $\sqrt{2}$
  - does not exist
- Evaluate  $\int \frac{x^2 + 4}{x^4 + 16} dx$ .
  - $\frac{1}{2\sqrt{2}} \tan^{-1} \left( \frac{x^2 - 4}{2x\sqrt{2}} \right) + C$
  - $\frac{1}{2\sqrt{2}} \tan^{-1} \left( \frac{x^2 - 4}{2\sqrt{2}} \right) + C$
  - $\frac{1}{2\sqrt{2}} \tan^{-1} \left( \frac{x^2 - 4}{x\sqrt{2}} \right) + C$
  - None of the above
- Evaluate  $\int_{\pi/4}^{3\pi/4} \frac{1}{1 + \cos x} dx$ 
  - 2
  - 2
  - 1/2
  - 1/2
- If one AM 'A' and two GM  $p$  and  $q$  are inserted between two given numbers, then find the value of  $\frac{p^2}{q} + \frac{q^2}{p}$ .
  - A
  - 2A
  - 3A
  - 4A
- If the roots of the equation  $x^2 + ax + b = 0$  are  $c$  and  $d$ , then one of the roots of the equation  $x^2 + (2c + a)x + c^2 + ac + b = 0$  is
  - $c$
  - $d - c$
  - $2d$
  - $2c$
- The sum of the coefficients of  $(6a - 5b)^n$ , where  $n$  is a positive integer, is
  - 1
  - 1
  - $2^n$
  - $2^{n-1}$

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

$$\lim_{x \rightarrow \infty} \left( \frac{x^2 + 1}{x + 1} - ax - b \right) = 0 \text{ are}$$

- (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  $\mathbf{i} - 2\mathbf{j} + \mathbf{k}$  on the vector  $4\mathbf{i} - 4\mathbf{j} + 7\mathbf{k}$  is

- (a)  $\frac{5\sqrt{6}}{10}$  (b)  $\frac{19}{9}$   
(c)  $\frac{9}{19}$  (d)  $\frac{\sqrt{6}}{19}$

20. If  $\mathbf{a}, \mathbf{b}, \mathbf{c}$  are three non-zero vectors such that  $\mathbf{a} + \mathbf{b} + \mathbf{c} = \mathbf{0}$  and  $m = \mathbf{a} \cdot \mathbf{b} + \mathbf{b} \cdot \mathbf{c} + \mathbf{c} \cdot \mathbf{a}$ , then

- (a)  $m < 0$  (b)  $m > 0$   
(c)  $m = 0$  (d)  $m = 3$

21. A line making angles  $45^\circ$  and  $60^\circ$  with the positive directions of the axes of  $x$  and  $y$  makes with the positive direction of  $z$ -axis, an angle of

- (a)  $60^\circ$  (b)  $120^\circ$   
(c)  $60^\circ$  or  $120^\circ$  (d) None of these

22. If  $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ ,  $J = \begin{bmatrix} 0 & 1 \\ -1 & 0 \end{bmatrix}$  and

$$B = \begin{bmatrix} \cos \theta & \sin \theta \\ -\sin \theta & \cos \theta \end{bmatrix}, \text{ then } B \text{ is equal to}$$

- (a)  $I \cos \theta + J \sin \theta$   
(b)  $I \sin \theta + J \cos \theta$   
(c)  $I \cos \theta - J \sin \theta$   
(d)  $-I \cos \theta + J \sin \theta$

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  $\alpha, \beta$  and  $\gamma$  are the roots of  $x^3 + ax^2 + b = 0$ ,

$$\text{then the value of } \begin{vmatrix} \alpha & \beta & \gamma \\ \beta & \gamma & \alpha \\ \gamma & \alpha & \beta \end{vmatrix} \text{ is}$$

- (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  $f(x) = \begin{cases} x^2, & x \leq 0 \\ 2 \sin x, & x > 0 \end{cases}$ , 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  $(G, *)$ , then 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)  $\frac{1}{2}$  (b)  $\frac{1}{3}$   
(c)  $\frac{2}{3}$  (d)  $\frac{2}{5}$

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  $\sin 12^\circ \sin 48^\circ \sin 54^\circ$ .

- (a)  $\frac{1}{2}$  (b)  $\frac{1}{4}$   
(c)  $\frac{1}{6}$  (d)  $\frac{1}{8}$



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,  $p \vee q$  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  $A \times B$  consists of 6 elements. If three elements  $A \times B$  are  $(1, 4)$ ,  $(2, 6)$  and  $(3, 6)$ , find  $B \times A$ .  
 (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  $f: R \rightarrow R$  be defined as  $f(x) = x^2 + 1$ , find  $f^{-1}(-5)$ .  
 (a)  $\{\phi\}$   
 (b)  $\phi$   
 (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
- (a)  $\frac{1}{2e^2}$   
 (b)  $\frac{1}{3e^2}$   
 (c)  $\frac{2}{3e^2}$   
 (d)  $\frac{1}{e^2}$
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)  $13\frac{1}{2}$  sq units  
 (d) 14 sq units
38. The order and degree of the differential equation  $\left(1 + 4 \frac{dy}{dx}\right)^{2/3} = 4 \frac{d^2y}{dx^2}$  are respectively  
 (a) 1,  $\frac{2}{3}$   
 (b) 3, 2  
 (c) 2, 3  
 (d) 2,  $\frac{2}{3}$
39. The solution of the differential equation  $\frac{dy}{dx} = (4x + y + 1)^2$ , 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
11. d	12. a	13. a	14. b	15. b	16. a	17. b	18. b	19. b	20. a
21. a	22. a	23. c	24. c	25. b	26. a	27. a	28. b	29. b	30. d
31. b	32. b	33. a	34. b	35. b	36. c	37. d	38. c	39. d	40. d