Name: Section: Reg. No.

One Mark Test - 1

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer : 50x1=50

1. The range of the function $\frac{1}{1-2\sin x}$ is

a) $(-\infty, -1) \cup \left(\frac{1}{3}, \infty\right)$ b) $\left(-1, \frac{1}{3}\right)$

c) $\left[-1, \frac{1}{3}\right]$ d) $(-\infty, -1) \cup \left[\frac{1}{3}, \infty\right)$

2. The number of relations on a set containing 3 elements is

a) 9 b) 81 c) 512 d) 1024

3. For non - empty sets A and B, if $A \subset B$ then $(A \times B) \cap (B \times A)$ equal

a) $A \cap B$ b) $A \times A$ c) $B \times B$ d) none of these

4. If $n(A) = 2$ and $n(B \cup C) = 3$, then $n[(A \times B) \cup (A \times C)]$ is

a) 2^3 b) 3^2 c) 6 d) 5

5. Let $X = \{1, 2, 3, 4\}$, $R = \{(1, 1), (1, 2), (1, 3), (2, 2), (3, 3), (2, 1), (3, 1), (1, 4), (4, 1)\}$ then R is

a) Reflexive b) Symmetric c) Transitive d) Equivalence

6. If the function $f : [-3, 3] \to S$ defined by $f(x) = x^2$ is onto, then S is

a) $[-9, 9]$ b) R c) $[-3, 3]$ d) $[0, 9]$

7. The function $f : R \to R$ is defined by $f(x) = \sin x + \cos x$ is

a) an odd function b) neither an odd function nor an even function

c) an even function d) both odd function and even function

8. The function $f : [0, 2\pi] \to [-1, 1]$ defined by $f(x) = \sin x$ is

a) one-to-one b) onto c) bijection d) cannot be defined

9. The number of constant functions from a set containing m elements to a set containing n elements is

a) mn b) m c) n d) $m+n$

10. Let $f : R \to R$ be defined by $f(x) = 1 - |x|$. Then the range of f is

a) R b) $(1, \infty)$ c) $(-1, \infty)$ d) $(-\infty, 1]$

11. If $A = \{(x, y) : y = e^x, x \in R\}$ and $B = \{(x, y) : y = e^{-x}, x \in R\}$ then $n(A \cap B)$ is

a) infinity b) 0 c) 1 d) 2

12. If $A = \{x, y\} : y = \sin x, x \in R\}$ and $B = \{x, y\} : y = \cos x, x \in R\}$ then $A \cap B$ contains

a) no element b) infinitely many elements

c) only one element d) cannot be determined

13. Let A and B be subsets of the universal set N, the set of natural numbers, then $A' \cup [(A \cap B) \cup B']$ is

a) A b) A′ c) B d) N

14. If $n((A \times B) \cap (A \times C)) = 8$ and $n(B \cap C) = 2$, then $n(A)$ is

a) 6 b) 4 c) 8 d) 16

15. The range of the function $f(x) = |\lfloor x \rfloor - x|$, $x \in R$ is

a) [0, 1] b) [0, ∞) c) [0, 1) d) (0, 1)

16. The rule $f(x) = x^2$ is a bijection if the domain and the co-domain are given by

a) R, R b) R, (0, ∞) c) (0, ∞), R d) [0, ∞), [0, ∞)

17. Let R be the universal relation on a set X with more than one element. Then R is

a) not reflexive b) not symmetric c) transitive d) none of the above

18. Let X = {1, 2, 3, 4}, Y = {a, b, c, d} and f = {(1, a), (4, b), (2, c), (3, d), (2, d)}. Then f is

a) an one-to-one function b) an onto function

c) a function which is not one-to-one d) not a function

19. Let R be the set of all real numbers. Consider the following subsets of the plane $R \times R$. $S = \{(x, y) : y = x + 1 \text{ and } 0 < x < 2\}$ and $T = \{(x, y) : x - y \text{ is an integer}\}$. Then which of the following is true?

a) T is an equivalence relation but S is not an equivalence relation

b) Neither S nor T is an equivalence relation

c) Both S and T are equivalence relation

d) S is an equivalence relation but T is not an equivalence relation

20. If $n(A \cap B) = 3$ and $n(A \cup B) = 10$, then $n(P(A \Delta B))$ is

a) 28 b) 12 c) 128 d) 21

21. If $n(P(A)) = 1024$, $n(A \cup B) = 15$ and $n(P(B)) = 32$, then $n(A \cap B)$ is

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

22. If $n(A) = 10$ and $n(A \cap B) = 3$ then $n((A \cap B)' \cap A)$ is

a) 5 b) 6 c) 7 d) 9

23. If P(A) denotes the power set of A, then $n(P(P(P(\phi))))$ is

a) 2 b) 3 c) 6 d) 4

24. The domain of the function $y = \sqrt{x^2 - 5x + 6}$ is

a) $(-\infty, 2]$ b) $[3, \infty)$ c) $(-\infty, 2] \cup [3, \infty)$ d) $(-\infty, 1]$

25. The largest possible domain of $y = \dfrac{\sqrt{9 - x^2}}{\sqrt{x^2 - 1}}$ is

a) $[-3, -1)$ b) $(1, 3]$ c) $[-3, -1) \cup (1, 3]$ d) $[-2, -1)$

26. The solution of $5x - 1 < 24$ and $5x + 1 > -24$ is

a) (4, 5) b) (−3, 4) c) (−5, 5) d) (−5, 4)

27. The solution set of the following inequality $|x-1| \geq |x-3|$ is

a) $[0, 2]$ b) $[2, \infty)$ c) $(0, 2)$ d) $(-\infty, 2)$

28. If $\frac{|x-2|}{x-2} \geq 0$, then x belongs to

a) $[2, \infty)$ b) $(2, \infty)$ c) $(-\infty, 2)$ d) $(-2, \infty)$

29. If $|x+2| \leq 9$, then x belongs to

a) $(-\infty, -7)$ b) $[-11, 7]$ c) $(-\infty, -7) \cup [11, \infty)$ d) $(-11, 7)$

30. The value of $\log_{\sqrt{2}} 512$ is

a) 16 b) 18 c) 9 d) 12

31. If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is

a) 0.5 b) 2.5 c) 1.5 d) 1.25

32. The value of $\log_3 11 \log_{11} 13 \log_{13} 15 \log_{15} 27 \log_{27} 81$ is

a) 1 b) 2 c) 3 d) 4

33. The number of real roots of $(x+3)^4 + (x+5)^4 = 16$ is

a) 4 b) 2 c) 3 d) 0

34. If a and b are the roots of the equation $x^2 - kx + 16 = 0$ and satisfy $a^2 + b^2 = 32$, then the value of k is

a) 10 b) -8 c) $-8, 8$ d) 6

35. If 3 is the logarithm of 343, then the base is

a) 5 b) 7 c) 6 d) 9

36. The numbers of solutions of $x^2 + |x-1| = 1$ is

a) 1 b) 0 c) 2 d) 3

37. The value of $\log_a b \log_b c \log_c a$ is

a) 2 b) 1 c) 3 d) 4

38. The value of $\log_9 27 - \log_{27} 9$ is

a) $\frac{1}{6}$ b) $\frac{2}{3}$ c) $\frac{5}{6}$ d) $\frac{7}{6}$

39. The value of $\log_3 5 \cdot \log_{25} 27$ is

a) $\frac{1}{5}$ b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{4}{3}$

40. If $\log_a 324 = 4$ then the value of a is

a) $\sqrt{2}$ b) 3 c) $3\sqrt{2}$ d) $\sqrt{3}$

41. The value of $\log_3 \frac{1}{81}$ is

a) -2 b) 8 c) 4 d) 27

42. Given that x, y and b are real numbers $x < y$, $b > 0$, then

a) $xb < yb$ b) $xb > yb$ c) $xb \le yb$ d) $\frac{x}{b} \ge \frac{y}{b}$

43. If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$, then the value of $A+B$ is

a) $\frac{-1}{2}$ b) $\frac{-2}{3}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$

44. If $\frac{kx}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$, then the value of k is

a) 1 b) 2 c) 3 d) 4

45. The equation whose roots are numerically equal but opposite in sign to the roots of $3x^2 - 5x - 7 = 0$ is

a) $3x^2 - 5x - 7 = 0$ b) $3x^2 + 5x - 7 = 0$ c) $3x^2 - 5x + 7 = 0$ d) $3x^2 + x - 7 = 0$

46. If a and b are the real roots of the equation $x^2 - kx + c = 0$ then the distance between the points (a, 0) and (b, 0) is

a) $\sqrt{k^2 - 4c}$ b) $\sqrt{4k^2 - c}$ c) $\sqrt{4c - k^2}$ d) $\sqrt{k - 8c}$

47. If 8 and 2 are the roots of $x^2 + ax + c = 0$ and 3, 3 are the roots of $x^2 + dx + b = 0$, then the roots of the equation $x^2 + ax + b = 0$ are

a) 1, 2 b) −1, 1 c) 9, 1 d) −1, 2

48. Find a so that the sum of product of the roots of the equation $2x^2 + (a-3)x + 3a - 5 = 0$ are equal is

a) 1 b) 2 c) 0 d) 4

49. If $\log_4 2^{8x} = 2^{\log_2 8}$ then the value of x is

a) 1 b) 4 c) 2 d) 3

50. The value of $(-1000)^{-2/3}$ is

a) 100 b) $\frac{1}{100}$ c) $\frac{1}{10}$ d) 10

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Name: Section: Reg. No.

One Mark Test - 2

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. If $\tan 40° = \lambda$, then $\dfrac{\tan 140° - \tan 130°}{1 + \tan 140° \tan 130°} =$

   a) $\dfrac{1-\lambda^2}{\lambda}$ b) $\dfrac{1+\lambda^2}{\lambda}$ c) $\dfrac{1+\lambda^2}{2\lambda}$ d) $\dfrac{1-\lambda^2}{2\lambda}$

2. Which one of the following is not true?

   a) $\sin\theta = -\dfrac{3}{4}$ b) $\cos\theta = -1$ c) $\tan\theta = 25$ d) $\sec\theta = \dfrac{1}{4}$

3. $\cos 1° + \cos 2° + \cos 3° + \ldots + \cos 179° =$

   a) 0 b) 1 c) -1 d) 89

4. The maximum value of $4\sin^2 x + 3\cos^2 x + \sin\dfrac{x}{2} + \cos\dfrac{x}{2}$ is

   a) $4+\sqrt{2}$ b) $3+\sqrt{2}$ c) 9 d) 4

5. $\dfrac{1}{\cos 80°} - \dfrac{\sqrt{3}}{\sin 80°} =$

   a) $\sqrt{2}$ b) $\sqrt{3}$ c) 2 d) 4

6. If $\cos 28° + \sin 28° = K^3$, then $\cos 17°$ is equal to

   a) $\dfrac{K^3}{\sqrt{2}}$ b) $-\dfrac{K^3}{\sqrt{2}}$ c) $\pm\dfrac{K^3}{\sqrt{2}}$ d) $-\dfrac{K^3}{\sqrt{3}}$

7. If $f(\theta) = |\sin\theta| + |\cos\theta|$, $\theta \in R$, then $f(\theta)$ is in the interval

   a) [0, 2] b) $[1, \sqrt{2}]$ c) [1, 2] d) [0, 1]

8. $\cos 2\theta \cos 2\phi + \sin^2(\theta-\phi) - \sin^2(\theta+\phi)$ is equal to

   a) $\sin 2(\theta+\phi)$ b) $\cos 2(\theta+\phi)$ c) $\sin 2(\theta-\phi)$ d) $\cos 2(\theta-\phi)$

9. A wheel is spinning at 2 radians / second. How many seconds will it take to make 10 complete rotations?

   a) 10π seconds b) 20π seconds c) 5π seconds d) 15π seconds

10. $\left(1+\cos\dfrac{\pi}{8}\right)\left(1+\cos\dfrac{3\pi}{8}\right)\left(1+\cos\dfrac{5\pi}{8}\right)\left(1+\cos\dfrac{7\pi}{8}\right) =$

    a) $\dfrac{1}{8}$ b) $\dfrac{1}{2}$ c) $\dfrac{1}{\sqrt{2}}$ d) $\dfrac{1}{\sqrt{3}}$

11. If $\pi < 2\theta < \frac{3\pi}{2}$, then $\sqrt{2+\sqrt{2+2\cos 4\theta}}$ equals to

a) $-2\cos\theta$ b) $-2\sin\theta$ c) $2\cos\theta$ d) $2\sin\theta$

12. Let $f_k(x) = \frac{1}{k}[\sin^k x + \cos^k x]$ where $x \in R$ and $k \geq 1$. Then $f_4(x) - f_6(x) =$

a) $\frac{1}{4}$ b) $\frac{1}{12}$ c) $\frac{1}{6}$ d) $\frac{1}{3}$

13. If $\sin\alpha + \cos\alpha = b$, then $\sin 2\alpha$ is equal to

a) $b^2 - 1$, if $b \leq \sqrt{2}$ b) $b^2 - 1$, if $b > \sqrt{2}$ c) $b^2 - 1$, if $b \geq 1$ d) $b^2 - 1$, if $b \geq \sqrt{2}$

14. In a ΔABC, if (i) $\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2} > 0$ (ii) $\sin A \sin B \sin C > 0$ then

a) Both (i) and (ii) are true b) Only (i) is true

c) Only (ii) is true d) Neither (i) nor (ii) is true

15. If $\tan\alpha$ and $\tan\beta$ are the roots of $x^2 + ax + b = 0$ then $\frac{\sin(\alpha+\beta)}{\sin\alpha \sin\beta}$ is equal to

a) $\frac{b}{a}$ b) $\frac{a}{b}$ c) $-\frac{a}{b}$ d) $-\frac{b}{a}$

16. The $\cos p\theta + \cos q\theta = 0$ and if $p \neq q$, then θ is equal to (n is any integer)

a) $\frac{\pi(4n+1)}{p-q}$ b) $\frac{\pi(2n+1)}{p \pm q}$ c) $\frac{\pi(n \pm 1)}{p \pm q}$ d) $\frac{\pi(n+2)}{p+q}$

17. $\frac{\cos 6x + 6\cos 4x + 15\cos 2x + 10}{\cos 5x + 5\cos 3x + 10\cos x}$ is equal to

a) $\cos 2x$ b) $\cos x$ c) $\cos 3x$ d) $2\cos x$

18. In a triangle ABC, $\sin^2 A + \sin^2 B + \sin^2 C = 2$ then the triangle is

a) equilateral triangle b) isosceles triangle c) right triangle d) scalene triangle

19. The principal solution of $\sin\theta = \frac{1}{2}$ is

a) $\frac{1}{2}$ b) $\frac{\pi}{6}$ c) π d) $\frac{-\pi}{2}$

20. The principal solution of $\cos\theta = \frac{1}{2}$ is

a) $\frac{\pi}{4}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{3}$ d) $\frac{\pi}{2}$

21. If $(A + B) = 45$ then the value of $(1 + \tan A)(1 + \tan B)$ is

a) 1 b) 3 c) 4 d) 2

22. The value of $\sin 765^\circ$ is

a) $\frac{1}{2}$ b) $\frac{1}{\sqrt{3}}$ c) $\frac{1}{\sqrt{2}}$ d) 1

23. The value of $\sin 12^\circ \sin 48^\circ \sin 54^\circ$ is

a) $\frac{1}{16}$ b) $\frac{1}{8}$ c) $\frac{1}{3}$ d) $\frac{1}{4}$

24. The principal value of $\operatorname{cosec}^{-1}\left(\frac{2}{\sqrt{3}}\right)$ is

a) $\frac{\pi}{4}$ b) $\frac{\pi}{2}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{3}$

25. The principal value of $\tan^{-1}\left(\frac{-1}{\sqrt{3}}\right)$ is

a) $\frac{\pi}{6}$ b) $-\frac{\pi}{6}$ c) $\frac{\pi}{4}$ d) $-\frac{\pi}{4}$

26. The number of sides of a polygon having 44 diagonals is

a) 4 b) 4! c) 11 d) 22

27. $1+3+5+7+.....+17$ is equal to

a) 101 b) 81 c) 71 d) 61

28. If ${}^{2n}C_3 : {}^{n}C_3 = 11:1$ then the value of n is

a) 5 b) 6 c) 11 d) 7

29. The number of rectangles that a chessboard has

a) 81 b) 9^8 c) 1296 d) 6561

30. If P_r stands for ${}^{r}P_r$, then the sum of the series $1+P_1+2P_2+3P_2+....+nP_n$ is

a) P_{n+1} b) $P_{n+1}-1$ c) $P_{n-1}+1$ d) ${}^{(n+1)}P_{(n-1)}$

31. The number of 10 digit numbers that can be written by using the digits 2 and 3 is

a) ${}^{10}C_2 + {}^{9}C_2$ b) 2^{10} c) $2^{10}-2$ d) 10!

32. If ${}^{n}C_4, {}^{n}C_5, {}^{n}C_4$ are in A.P the value of n can be

a) 14 b) 11 c) 9 d) 5

33. ${}^{(n-1)}C_r + {}^{(n-1)}C_{(r-1)}$ is

a) ${}^{(n+1)}C_r$ b) ${}^{(n-1)}C_r$ c) ${}^{n}C_r$ d) ${}^{n}C_{r-1}$

34. In 3 fingers, the number of ways four rings can be worn in ..... ways.

a) 4^3-1 b) 3^4 c) 68 d) 64

35. The sum of the digits at the 10th place of all numbers termed with the help of 2, 4, 5, 7 taken all at a time is

a) 432 b) 108 c) 36 d) 18

36. There are 10 points in a plane and 4 of them are collinear. The number of straight lines joining any two points is

a) 45 b) 40 c) 39 d) 38

37. If ${}^{(n+5)}P_{(n+1)} = \left(\frac{11(n-1)}{2}\right) {}^{(n+3)}P_n$ then the value of n are

a) 7 and 11 b) 6 and 7 c) 2 and 11 d) 2 and 6

38. The product of r consecutive positive integers is divisible by

a) r! b) (r−1)! c) (r+1)! d) r^r

39. If ${}^{a^2-a}C_2 = {}^{a^2-a}C_4$ then the value of 'a' is

a) 2 b) 3 c) 4 d) 5

40. The number of 5 digits numbers all digits of which are odd is

a) 2^5 b) 5^5 c) 5^6 d) 6^{25}

41. In a plane there are 10 points are there out of which 4 points are collinear, then the number of triangles formed is

a) 110 b) ${}^{10}C_3$ c) 120 d) 116

42. The number of ways in which a host lady invite 8 people for a party of 8 out of 12 people of whom two donot want to attend the party together is

a) $2\times {}^{11}C_7 + {}^{10}C_8$ b) ${}^{11}C_7 + {}^{10}C_8$ c) ${}^{12}C_8 - {}^{10}C_6$ d) ${}^{10}C_6 + 2!$

43. In an examination there are three multiple choice questions and each question has 5 choices. Number of ways in which a student can fail to get all answer correct is

a) 125 b) 124 c) 64 d) 63

44. The number of five digit telephone numbers having atleast one of their digits repeated is

a) 90000 b) 100000 c) 30240 d) 69760

45. The number of ways of choosing 5 cards out of a deck of 52 cards which include at least one king is

a) ${}^{52}C_5$ b) ${}^{48}C_5$ c) ${}^{52}C_5 + {}^{48}C_5$ d) ${}^{52}C_5 - {}^{48}C_5$

46. The number of parallelograms that can be formed from a set of four parallel line intersecting another set of three parallel lines.

a) 6 b) 9 c) 12 d) 18

47. Everybody in a room shakes hands with everybody else. The total number of shake hands is 66. The number of persons in the room is

a) 11 b) 12 c) 10 d) 6

48. The number of ways in which the following prize be given to a class of 30 boys first and second in mathematics, first and second in physics, first in chemistry and first in english is

a) $30^4 \times 29^2$ b) $30^3 \times 29^3$ c) $30^2 \times 29^4$ d) 30×29^5

49. If 10 lines are drawn in a plane such that no two of them are parallel and no three are concurrent then the total number of points of intersection are

a) 45 b) 40 c) 10! d) 2^{10}

50. If ${}^{15}C_{2r-1} = {}^{15}C_{2r+4}$ then the value of r is

a) 2 b) 4 c) 5 d) 3

Name: Section: Reg. No.

One Mark Test - 3

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. If a, 8, b are in A.P, a, 4, b are in G.P, and if a, x, b are in H.P then x is
   a) 2 b) 1 c) 4 d) 16
2. If a is a the arithmetic mean and g is the geometric mean of two numbers, then
   a) $a \le g$ b) $a \ge g$ c) $a = g$ d) $a > g$
3. The sequence $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}+\sqrt{2}}, \frac{1}{\sqrt{3}+2\sqrt{2}}, \ldots\ldots$ form an
   a) A.P b) G.P c) H.P d) AGP
4. The value of $2+4+6+\ldots+2n$ is
   a) $\frac{n(n-1)}{2}$ b) $\frac{n(n+1)}{2}$ c) $\frac{2n(n+1)}{2}$ d) $n(n+1)$
5. The value of $5+10+15+\ldots\ldots+5n$ is
   a) $\frac{n(n-1)}{2}$ b) $\frac{3n(n+1)}{2}$ c) $\frac{5n(n+1)}{2}$ d) $\frac{7n(n+1)}{2}$
6. The coefficient of x^6 in $(2+2x)^{10}$ is
   a) ${}^{10}C_6$ b) 2^6 c) ${}^{10}C_6\, 2^6$ d) ${}^{10}C_6\, 2^{10}$
7. If ${}^nC_{10} > {}^nC_r$ for all possible r, then a value of n is
   a) 10 b) 21 c) 19 d) 20
8. The HM of two positive numbers whose AM and Gm are 16, 8 respectively is
   a) 10 b) 6 c) 5 d) 4
9. The value of the series $\frac{1}{2}+\frac{7}{4}+\frac{13}{8}+\frac{19}{16}+\ldots+$ ..... is
   a) 14 b) 7 c) 4 d) 6
10. The sum of an infinite G.P is 18. If the first term is 6, the common ratio is
    a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $\frac{1}{6}$ d) $\frac{3}{4}$
11. The remainder when 38^{15} is divided by 13 is
    a) 12 b) 1 c) 11 d) 5
12. $\frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}+\ldots$ is
    a) 0 b) 1 c) ∞ d) -1
13. The nth term of the sequence $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}$ ..... is
    a) $2^n - n - 1$ b) $n-2$ c) $2^n + n - 1$ d) $2^n - 1$

14. The sum upto n terms of the series $\sqrt{2}+\sqrt{8}+\sqrt{18}+\sqrt{32}+....$ is

a) $\frac{n(n+1)}{2}$ b) $2n(n+1)$ c) $\frac{n(n+1)}{\sqrt{2}}$ d) 1

15. The sum up to n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}}+\frac{1}{\sqrt{3}+\sqrt{5}}+\frac{1}{\sqrt{5}+\sqrt{7}}+....$ is

a) $\sqrt{2n+1}$ b) $\frac{\sqrt{2n+1}}{2}$ c) $\sqrt{2n+1}-1$ d) $\frac{\sqrt{2n+1}-1}{2}$

16. The value of $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+....$ is

a) $\frac{e^2+1}{2e}$ b) $\frac{(e+1)^2}{2a}$ c) $\frac{(e-1)^2}{2e}$ d) $\frac{e^2+1}{2a}$

17. The value of $1-\frac{1}{2}\left(\frac{2}{3}\right)+\frac{1}{3}\left(\frac{2}{3}\right)^2-\frac{1}{4}\left(\frac{2}{3}\right)^3+.....$ is

a) $\ell og\left(\frac{5}{3}\right)$ b) $\frac{3}{2}\ell og\left(\frac{5}{3}\right)$ c) $\frac{5}{3}\ell og\left(\frac{5}{3}\right)$ d) $\frac{2}{3}\ell og\left(\frac{2}{3}\right)$

18. If S_n denotes the sum of n term of an A.P whose common difference is d, the value of $S_n-2S_{n-1}+S_{n-2}$ is

a) d b) 2d c) 4d d) d^2

19. If $(1+x^2)^2\ (1+x)^n=a_0+a_1x+a_2x^2+.....+x^{n+4}$ and if a_0, a_1, a_2 are in A.P, then n is

a) 1 b) 2 c) 3 d) 4

20. If ${}^nC_9 > {}^nC_r$ for all values of r, then a value of n is

a) 9 b) 19 c) 17 d) 18

21. The coefficient of x^8y^{12} in the expansion of $(2x+3y)^{20}$ is

a) 0 b) $2^8\,3^{12}$ c) $2^8\,3^{12}+2^{12}\,3^8$ d) ${}^{20}C_8\,2^8 3^{12}$

22. The coefficient of x^2 in the expansion of $(2x+3)^5$ is

a) 720 b) 1080 c) 810 d) 5

23. If the sum up to n - terms of the series $\sqrt{3}+\sqrt{75}+\sqrt{243}+.....$ is $435\sqrt{3}$ then the value of n is

a) 15 b) 10 c) 5 d) 25

24. The coefficient of x^3 in the expansion of $\left(2x^2-\frac{3}{x}\right)^3$ is

a) -36 b) 36 c) 30 d) -30

25. $\sqrt{\frac{1-2x}{1+2x}}$ is approximately equal to

a) $1-2x-x^2$ b) $1+2x+x^2$ c) $1+2x$ d) $1-2x+x^2$

26. Which of the following equation is the locus of $(at^2, 2at)$?

a) $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ b) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ c) $x^2+y^2=a^2$ d) $y^2=4ax$

27. The slope of the line which makes an angle $45°$ with the line $3x-y=-5$ are

a) $1, -1$ b) $\frac{1}{2}, -2$ c) $1, \frac{1}{2}$ d) $2, -\frac{1}{2}$

28. The point on the line $2x-3y=5$ is equidistance from $(1, 2)$ and $(3, 4)$ is

a) $(7, 3)$ b) $(4, 1)$ c) $(1, -1)$ d) $(-2, 3)$

29. The equation of the line with slope 2 and the length of the perpendicular from the origin equal to $\sqrt{5}$ is

a) $x-2y=\sqrt{5}$ b) $2x-y=\sqrt{5}$ c) $2x+y=5$ d) $2x-y-5=0$

30. The intercepts of the perpendicular bisector of the line segment joining $(1, 2)$ and $(3, 4)$ with coordinate axes are

a) $5, -5$ b) $5, 5$ c) $5, 3$ d) $5, -4$

31. Equation of the straight line that forms an isosceles triangle with the coordinate axes in the I - quadrant with perimeter $4+2\sqrt{2}$ is

a) $x+y+2=0$ b) $x+y-2=0$ c) $x+y-\sqrt{2}=0$ d) $x+y+\sqrt{2}=0$

32. If the point $(8, -5)$ lies on the locus of $\frac{x^2}{16}-\frac{y^2}{25}=k$, then the value of k is

a) 0 b) 1 c) 2 d) 3

33. Which of the following point lie on the locus of $3x^2+3y^2-8x-12y+17=0$?

a) $(0, 0)$ b) $(-2, 3)$ c) $(1, 2)$ d) $(0, -1)$

34. Straight line joining the points $(2, 3)$ and $(-1, 4)$ passes through the point (α, β) is

a) $\alpha+2\beta=7$ b) $3\alpha+\beta=9$ c) $\alpha+3\beta=11$ d) $3\alpha+\beta=11$

35. The equation of the locus of the point whose distance from y-axis is half the distance from origin is

a) $x^2+3y^2=0$ b) $x^2-3y^2=0$ c) $3x^2+y^2=0$ d) $3x^2-y^2=0$

36. A line perpendicular to the line $5x-y=0$ forms a triangle with the coordinate axes. If the area of the triangle is 5 square units then its equation is

a) $x+5y\pm5\sqrt{2}=0$ b) $x-5y\pm5\sqrt{2}=0$ c) $5x+y\pm5\sqrt{2}=0$ d) $5x-y\pm5\sqrt{2}=0$

37. If the equation of the base opposite to the vertex $(2, 3)$ of an equilateral triangle is $x+y=2$, then the length of a side is

a) $\sqrt{\frac{3}{2}}$ b) 6 c) $\sqrt{6}$ d) $3\sqrt{2}$

38. Find the slope of the straight line passing through the points $(5, 7)$ and $(7, 5)$.

a) 1 b) -1 c) 0 d) -2

39. The length of the perpendicular from the origin to the live $3x - 4y = 1$ is

a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{1}{25}$

40. The length of perpendicular from the origin to the line $\frac{x}{3} - \frac{y}{4} = 1$ is

a) $\frac{11}{5}$ b) $\frac{5}{12}$ c) $\frac{12}{5}$ d) $\frac{5}{7}$

41. The image of the point $(-2, 3)$ in the line $y = x$ is

a) $(-3, -2)$ b) $(3, -2)$ c) $(-2, 3)$ d) $(-2, -3)$

42. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals to

a) -3 b) -1 c) 3 d) 1

43. If the line represented by the equation $6x^2 + 41xy - 7y^2 = 0$ make an angles α and β with x-axis, then $\tan\alpha \tan\beta =$

a) $\frac{-6}{7}$ b) $\frac{6}{7}$ c) $\frac{-7}{6}$ d) $\frac{7}{6}$

44. If the two straight lines $x + (2k - 7)y + 3 = 0$ and $3kx + 9y - 5 = 0$ are perpendicular then the value of k is

a) $k = 3$ b) $k = \frac{1}{3}$ c) $k = \frac{2}{3}$ d) $k = \frac{3}{2}$

45. The area of the triangle formed by the lines $x^2 - 4y^2 = 0$ and $x = a$ is

a) $2a^2$ b) $\frac{\sqrt{3}}{2}a^2$ c) $\frac{1}{2}a^2$ d) $\frac{2}{\sqrt{3}}a^2$

46. If a vertex of a square is at the origin and its one side lies along the line $4x + 3y - 20 = 0$ then the area of the square is

a) 20 sq.units b) 16 sq.units c) 25 sq.units d) 4 sq.units

47. The y - intercept of the straight line passing through $(1, 3)$ and perpendicular to $2x - 3y + 1 = 0$ is

a) $\frac{3}{2}$ b) $\frac{9}{2}$ c) $\frac{2}{3}$ d) $\frac{2}{9}$

48. θ is acute angle between the lines $x^2 - xy - 6y^2 = 0$, then $\frac{2\cos\theta + 3\sin\theta}{4\sin\theta + 5\cos\theta}$ is

a) 1 b) $\frac{-1}{9}$ c) $\frac{5}{9}$ d) $\frac{1}{9}$

49. The line $(p + 2q)x + (p - 3q)y = p - q$ for different values of p and q passes through the point

a) $\left(\frac{3}{2}, \frac{5}{2}\right)$ b) $\left(\frac{2}{5}, \frac{2}{5}\right)$ c) $\left(\frac{3}{5}, \frac{3}{5}\right)$ d) $\left(\frac{2}{5}, \frac{3}{5}\right)$

50. The coordinates of the four vertices of a quadrilateral are $(-2, 4)$, $(-1, 2)$, $(1, 2)$ and $(2, 4)$ taken inorder. The equation of the line passing through the vertex $(-1, 2)$ and dividing the quadrilateral in the equal areas is

a) $x + 1 = 0$ b) $x + y = 1$ c) $x + y + 3 = 0$ d) $x - y + 3 = 0$

★★★★★

XI-OT

MAT-4

Name: Section: Reg. No.

One Mark Test - 4

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. If the points $(x, -2)$, $(5, 2)$, $(8, 8)$ are collinear, then x, is equal to

   a) -3 b) $\frac{1}{3}$ c) 1 d) 3

2. If A is a square matrix, then which of the following is not symmetric?

   a) $A+A^T$ b) AA^T c) A^TA d) $A-A^T$

3. If $A=\begin{bmatrix} a & x \\ y & a \end{bmatrix}$ and if $xy=1$, then det (AA^T) is equal to

   a) $(a-1)^2$ b) $(a^2+1)^2$ c) a^2-1 d) $(a^2-1)^2$

4. The value of x, for which the matrix $A=\begin{bmatrix} e^{x-2} & e^{7+x} \\ e^{2+x} & e^{2x+3} \end{bmatrix}$ is singular.

   a) 9 b) 8 c) 7 d) 6

5. The value of the determinant of $A=\begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix}$ is

   a) $-2abc$ b) abc c) 0 d) $a^2+b^2+c^2$

6. The matrix A satisfying the equation $\begin{bmatrix} 1 & 3 \\ 0 & 1 \end{bmatrix} A = \begin{bmatrix} 1 & 1 \\ 0 & -1 \end{bmatrix}$ is

   a) $\begin{bmatrix} 1 & 4 \\ 1 & 0 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -4 \\ 1 & 0 \end{bmatrix}$ c) $\begin{bmatrix} 1 & 4 \\ 0 & -1 \end{bmatrix}$ d) $\begin{bmatrix} 1 & -4 \\ 1 & 1 \end{bmatrix}$

7. If $A+I=\begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$, then $(A+I)(A-I)$ is equal to

   a) $\begin{bmatrix} -5 & 4 \\ 8 & -9 \end{bmatrix}$ b) $\begin{bmatrix} -5 & 4 \\ -8 & 9 \end{bmatrix}$ c) $\begin{bmatrix} 5 & 4 \\ 8 & 9 \end{bmatrix}$ d) $\begin{bmatrix} -5 & -4 \\ -8 & -9 \end{bmatrix}$

8. A root of the equation $\begin{vmatrix} 3-x & -6 & 3 \\ -6 & 3-x & 3 \\ 3 & 3 & -6-x \end{vmatrix} = 0$ is

   a) 6 b) 3 c) 0 d) -6

9. If $A=\begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, $B=\begin{bmatrix} a & -1 \\ b & -1 \end{bmatrix}$ and $(A+B)^2=A^2+B^2$, then the values of a and b are

   a) $a=4, b=1$ b) $a=1, b=4$ c) $a=0, b=4$ d) $a=2, b=4$

10. What must be the matrix X, if $2X+\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}=\begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?

    a) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ d) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

11. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & -2 \\ a & 2 & b \end{bmatrix}$ is a matrix satisfying the equation $AA^T = 9I$, where I is 3×3 identity matrix, then the ordered pair (a, b) is equal to

a) $(2, -1)$ b) $(-2, 1)$ c) $(2, 1)$ d) $(-2, -1)$

12. If $\begin{vmatrix} 2a & x_1 & y_1 \\ 2b & x_2 & y_2 \\ 2c & x_3 & y_3 \end{vmatrix} = \frac{abc}{2} \neq 0$, then the area of the triangle whose vertices are $\left(\frac{x_1}{a}, \frac{y_1}{a}\right), \left(\frac{x_1}{b}, \frac{y_2}{b}\right), \left(\frac{x_3}{c}, \frac{y_3}{c}\right)$ is

a) $\frac{1}{4}$ b) $\frac{1}{4}abc$ c) $\frac{1}{8}$ d) $\frac{1}{8}abc$

13. If the square of the matrix $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is the unit matrix of order 2, then α, β and γ should satisfy the relation.

a) $1+\alpha^2+\beta\gamma=0$ b) $1-\alpha^2-\beta\gamma=0$ c) $1-\alpha^2+\beta\gamma=0$ d) $1+\alpha^2-\beta\gamma=0$

14. If $a \neq b$, b, c satisfy $\begin{vmatrix} a & 2b & 2c \\ 3 & b & c \\ 4 & a & b \end{vmatrix} = 0$, then abc =

a) $a+b+c$ b) 0 c) b^3 d) $ab+bc$

15. If $A = \begin{vmatrix} -1 & 2 & 4 \\ 3 & 1 & 0 \\ -2 & 4 & 2 \end{vmatrix}$ and $B = \begin{vmatrix} -2 & 4 & 2 \\ 6 & 2 & 0 \\ -2 & 4 & 8 \end{vmatrix}$, then B is given by

a) $B = 4A$ b) $B = -4A$ c) $B = -A$ d) $B = 6A$

16. Let A and B be two symmetric matrices of same order. Then which one of the following statement is not true?

a) $A+B$ is a symmetric matrix b) AB is a symmetric matrix

c) $AB = (BA)^T$ d) $A^TB = AB^T$

17. If $\Delta = \begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix}$, then $\begin{vmatrix} ka & kb & kc \\ kx & ky & kz \\ kp & kq & kr \end{vmatrix}$ is

a) Δ b) $k\Delta$ c) $3k\Delta$ d) $k^3\Delta$

18. The value of $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{DA} + \overrightarrow{CD}$ is

a) $\overrightarrow{AD}$ b) $\overrightarrow{CA}$ c) $\vec{0}$ d) $-\overrightarrow{AD}$

19. If ABCD is a parallelogram, then $\overrightarrow{AB} + \overrightarrow{AD} + \overrightarrow{CB} + \overrightarrow{CD}$ is equal to

a) $2(\overrightarrow{AB} + \overrightarrow{AD})$ b) $4\overrightarrow{AC}$ c) $4\overrightarrow{BD}$ d) $\vec{0}$

20. If $\vec{a} + 2\vec{b}$ and $3\vec{a} + m\vec{b}$ are parallel, then the value of m is

a) 3 b) $\frac{1}{3}$ c) 6 d) $\frac{1}{6}$

21. The unit vector parallel to the resultant of the vectors $\hat{i}+\hat{j}-\hat{k}$ and $\hat{i}-2\hat{j}+\hat{k}$ is

a) $\frac{\hat{i}-\hat{j}+\hat{k}}{\sqrt{5}}$ b) $\frac{2\hat{i}+\hat{j}}{\sqrt{5}}$ c) $\frac{2\hat{i}-\hat{j}+\hat{k}}{\sqrt{5}}$ d) $\frac{2\hat{i}-\hat{j}}{\sqrt{5}}$

22. If $\overrightarrow{BA}=3\hat{i}+2\hat{j}+\hat{k}$ and the position vector of B is $\hat{i}+3\hat{j}-\hat{k}$, then the position vector of A is

a) $4\hat{i}-2\hat{j}+\hat{k}$ b) $4\hat{i}+5\hat{j}$ c) $4\hat{i}$ d) $-4\hat{i}$

23. If $\vec{a}$ and $\vec{b}$ having same magnitude and angle between them is $60°$ and their scalar product is $\frac{1}{2}$ then $|\vec{a}|$ is

a) 2 b) 3 c) 7 d) 1

24. If $|\vec{a}|=13$, $|\vec{b}|=5$ and $\vec{a}\cdot\vec{b}=60°$ then $|\vec{a}\times\vec{b}|$ is

a) 15 b) 35 c) 45 d) 25

25. If the points whose position vectors $10\hat{i}+3\hat{j}$, $12\hat{i}+5\hat{j}$ and $a\hat{i}+11\hat{j}$ are collinear then a is equal to

a) 6 b) 3 c) 5 d) 8

26. A vector $\overrightarrow{OP}$ makes $60°$ and $45°$ with the positive direction of the x and y axes respectively. Then the angle between $\overrightarrow{OP}$ and z-axis is

a) $45°$ b) $60°$ c) $90°$ d) $30°$

27. A vector makes equal angle with the positive direction of the coordinate axes. Then each angle is equal to

a) $\cos^{-1}\left(\frac{1}{3}\right)$ b) $\cos^{-1}\left(\frac{2}{3}\right)$ c) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ d) $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

28. If $\vec{a}+2\vec{b}$ and $4\vec{a}+m\vec{b}$ are parallel then the value of m is

a) 4 b) $\frac{1}{4}$ c) 8 d) $\frac{1}{8}$

29. If $|\vec{a}+\vec{b}|=60$, $|\vec{a}-\vec{b}|=40$ and $|\vec{b}|=46$ then $|\vec{a}|$ is

a) 42 b) 12 c) 22 d) 32

30. The value of $\theta\in\left(0,\frac{\pi}{2}\right)$ for which the vectors $\vec{a}=(\sin\theta)\hat{i}+(\cos\theta)\hat{j}$ and $\vec{b}=\hat{i}-\sqrt{3}\hat{j}+2\hat{k}$ are perpendicular, is equal to

a) $\frac{\pi}{3}$ b) $\frac{\pi}{5}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{2}$

31. If $\vec{r}$ be the position vector of any point and let α, β and γ be the direction angles of $\vec{r}$. Then $\sin^2\alpha+\sin^2\beta+\sin^2\gamma=$

a) 1 b) 0 c) 2 d) ∞

32. One of the diagonals of a parallelogram ABCD with $\vec{a}$ and $\vec{b}$ are adjacent sides is $\vec{a}+\vec{b}$. The other diagonal $\overrightarrow{BD}$ is

a) $\vec{a}-\vec{b}$ b) $\vec{b}-\vec{a}$ c) $\vec{a}+\vec{b}$ d) $\frac{\vec{a}+\vec{b}}{2}$

33. If $\vec{a}$, $\vec{b}$, $\vec{c}$ are the position vectors of three collinear points, then which of the following is true?

a) $\vec{a}=\vec{b}+\vec{c}$ b) $2\vec{a}=\vec{b}+\vec{c}$ c) $\vec{b}=\vec{c}+\vec{a}$ d) $4\vec{a}+\vec{b}+\vec{c}=\vec{0}$

34. $\lim_{\theta\to 0}\frac{\sin\sqrt{\theta}}{\sqrt{\sin\theta}}=$

a) 1 b) -1 c) 0 d) 2

35. $\lim_{x\to\infty}\frac{\sin x}{x}=$

a) 1 b) 0 c) ∞ d) $-\infty$

36. $\lim\left(\frac{x^2+5x+3}{x^2+x+3}\right)^x$ is

a) e^4 b) e^2 c) e^3 d) 1

37. $\lim_{x \to \pi/2} \frac{2x-\pi}{\cos x} =$

a) 2 b) 1 c) −2 d) 0

38. $\lim_{x \to 0} \frac{e^{\sin x}-1}{x} =$

a) 1 b) e c) $\frac{1}{e}$ d) 0

39. $\lim_{x \to 3} \lfloor x \rfloor =$

a) 2 b) 3 c) does not exist d) 0

40. If $\lim_{x \to 0} \frac{\sin px}{\tan 3x} = 4$ then the value of p is

a) 6 b) 9 c) 12 d) 4

41. $\lim_{x \to 0} \frac{a^x - b^x}{x} =$

a) log ab b) $\log\left(\frac{a}{b}\right)$ c) $\log\left(\frac{b}{a}\right)$ d) $\frac{a}{b}$

42. $\lim_{x \to \infty} \frac{\sqrt{x^2-1}}{2x+1} =$

a) 1 b) 0 c) −1 d) $\frac{1}{2}$

43. $\lim_{x \to 0} \frac{x e^x - \sin x}{x}$ is

a) 1 b) 2 c) 3 d) 0

44. $\lim_{n \to \infty} \left(\frac{1}{n^2} + \frac{2}{n^2} + \frac{3}{n^2} + \ldots + \frac{n}{n^2}\right)$ is

a) $\frac{1}{2}$ b) 0 c) 1 d) ∞

45. Let f be a continuous function on [2, 5]. If f takes only rational values for all x and $f(3) = 12$ then $f(4.5)$ is equal to

a) $\frac{f(3)+f(4.5)}{7.5}$ b) 12 c) 17.5 d) $\frac{f(4.5)-f(3)}{1.5}$

46. At $x = \frac{3}{2}$ the function $f(x) = \frac{|2x-3|}{2x-3}$ is

a) continuous b) discontinuous c) differentiable d) non-zero

47. The value of $\lim_{x \to 0} \frac{\sin x}{\sqrt{x^2}}$ is

a) 1 b) −1 c) 0 d) limit does not exist

48. $\lim_{\alpha \to \pi/4} \frac{\sin\alpha - \cos\alpha}{\alpha - \frac{\pi}{4}}$ is

a) $\sqrt{2}$ b) $\frac{1}{\sqrt{2}}$ c) 1 d) 2

49. Let the function f be defined by $f(x) = \begin{cases} 3x & 0 \le x \le 1 \\ -3x+5 & 1 < x \le 2 \end{cases}$, then

a) $\lim_{x \to 1} f(x) = 1$ b) $\lim_{x \to 1} f(x) = 3$ c) $\lim_{x \to 1} f(x) = 2$ d) $\lim_{x \to 1} f(x)$ does not exist

50. $\lim_{x \to 0} \frac{8^x - 4^x - 2^x + 1^x}{x^2} =$

a) 2 log 2 b) $2(\log 2)^2$ c) log 2 d) 3 log 2

★★★★★

Name: Section:

One Mark Test - 5

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. If $y = mx + c$ and $f(0) = f'(0) = 1$, then $f(2)$ is

a) 1 b) 2 c) 3 d) -3

2. If $y = \frac{1}{a-z}$, then $\frac{dz}{dy}$ is

a) $(a-z)^2$ b) $-(z-a)^2$ c) $(z+a)^2$ d) $-(z+a)^2$

3. If $y = f(x^2+2)$ and $f'(3) = 5$, then $\frac{dy}{dx}$ at $x = 1$ is

a) 5 b) 25 c) 15 d) 10

4. $\frac{d}{dx}\left(\frac{2}{\pi}\sin x^0\right)$ is

a) $\frac{\pi}{180}\cos x^0$ b) $\frac{1}{90}\cos x^0$ c) $\frac{\pi}{90}\cos x^0$ d) $\frac{2}{\pi}\cos x^0$

5. If $f(x) = \begin{cases} x+2, & -1 < x < 3 \\ 5, & x = 3 \\ 8-x, & x > 3 \end{cases}$, then at $x = 3$, $f'(x)$ is

a) 1 b) -1 c) 0 d) does not exist

6. $x = \frac{1-t^2}{1+t^2}$, $y = \frac{2t}{1+t^2}$ then $\frac{dy}{dx}$ is

a) $-\frac{y}{x}$ b) $\frac{y}{x}$ c) $-\frac{x}{y}$ d) $\frac{x}{y}$

7. If $x = a\sin\theta$ and $y = b\cos\theta$, then $\frac{d^2y}{dx^2}$ is

a) $\frac{a}{b^2}\sec^2\theta$ b) $-\frac{b}{a}\sec^2\theta$ c) $-\frac{b}{a^2}\sec^3\theta$ d) $-\frac{b^2}{a^2}\sec^3\theta$

8. The derivative of $f(x) = x|x|$ at $x = -3$ is

a) 6 b) -6 c) does not exist d) 0

9. If $pv = 81$, then $\frac{dp}{dv}$ at $v = 9$ is

a) 1 b) -1 c) 2 d) -2

10. If $f(x) = \begin{cases} ax^2 - b, & -1 < x < 1 \\ \frac{1}{|x|}, & \text{elsewhere} \end{cases}$ is differentiable at $x = 1$, then

a) $a = \frac{1}{2}$, $b = \frac{-3}{2}$ b) $a = \frac{-1}{2}$, $b = \frac{3}{2}$ c) $a = -\frac{1}{2}$, $b = -\frac{3}{2}$ d) $a = \frac{1}{2}$, $b = \frac{3}{2}$

11. The differential coefficient of $\log_{10}x$ with respect to $\log_x 10$ is

a) 1 b) $-(\log_{10}x)^2$ c) $(\log_x 10)^2$ d) $\frac{x}{100}$

12. If $f(x) = x + 2$, then $f'(f(x))$ at $x = 4$ is

a) 8 b) 1 c) 4 d) 5

13. If $g(x) = (x^2 + 2x + 1)\ f(x)$ and $f(0) = 5$ and $\lim_{x \to 0} \frac{f(x) - 5}{x} = 4$, then $g'(0)$ is

a) 20 b) 14 c) 18 d) 12

14. It is given that $f'(a)$ exists, then $\lim_{x \to a} \frac{xf(a) - af(x)}{x - a}$ is

a) $f(a) - af'(a)$ b) $f'(a)$ c) $-f'(a)$ d) $f(a) + af'(a)$

15. If $f(x) = \begin{cases} x + 1, & \text{when } x < 2 \\ 2x - 1, & \text{when } x \geq 2 \end{cases}$, then $f'(2)$ is

a) 0 b) 1 c) 2 d) does not exist

16. If $y = \frac{(1 - x)^2}{x^2}$, then $\frac{dy}{dx}$ is

a) $\frac{2}{x^2} + \frac{2}{x^3}$ b) $-\frac{2}{x^2} + \frac{2}{x^3}$ c) $\frac{2}{x^2} - \frac{2}{x^3}$ d) $-\frac{2}{x^3} + \frac{2}{x^2}$

17. The number of points in R in which the function $f(x) = |x - 1| + |x - 3| + \sin x$ is not differentiable is

a) 3 b) 2 c) 1 d) 4

18. $\int \frac{e^x(1 + x)}{\cos^2(xe^x)} dx$ is

a) $\cot(xe^x) + c$ b) $\sec(xe^x) + c$ c) $\tan(xe^x) + c$ d) $\cos(xe^x) + c$

19. $\int \frac{\sqrt{\tan x}}{\sin 2x} dx$ is

a) $\sqrt{\tan x} + c$ b) $2\sqrt{\tan x} + c$ c) $\frac{1}{2}\sqrt{\tan x} + c$ d) $\frac{1}{4}\sqrt{\tan x} + c$

20. If $\int \frac{3^x}{x^2} dx = k\left(3^x\right) + c$, then the value of k is

a) $\log 3$ b) $-\log 3$ c) $-\frac{1}{\log 3}$ d) $\frac{1}{\log 3}$

21. $\int \frac{e^{6\log x} - e^{5\log x}}{e^{4\log x} - e^{3\log x}} dx$ is

a) $x + c$ b) $\frac{x^3}{3} + c$ c) $\frac{3}{x^3} + c$ d) $\frac{1}{x^2} + c$

22. $\int \frac{\sec x}{\sqrt{\cos 2x}} dx$ is

a) $\tan^{-1}(\sin x) + c$ b) $2\sin^{-1}(\tan x) + c$ c) $\tan^{-1}(\cos x) + c$ d) $\sin^{-1}(\tan x) + c$

23. $\int \frac{\sec^2 x}{\tan^2 x - 1} dx$

a) $2\log\left|\frac{1 - \tan x}{1 + \tan x}\right| + c$ b) $\log\left|\frac{1 + \tan x}{1 - \tan x}\right| + c$

c) $\frac{1}{2}\log\left|\frac{\tan x + 1}{\tan x - 1}\right| + c$ d) $\frac{1}{2}\log\left|\frac{\tan x - 1}{\tan x + 1}\right| + c$

24. $\int \sin\sqrt{x}\, dx$ is

a) $2(-\sqrt{x}\cos\sqrt{x} + \sin\sqrt{x}) + c$ b) $2(-\sqrt{x}\cos\sqrt{x} - \sin\sqrt{x}) + c$

c) $2(-\sqrt{x}\sin\sqrt{x} - \cos\sqrt{x}) + c$ d) $2(-\sqrt{x}\sin\sqrt{x} + \cos\sqrt{x}) + c$

25. $\int \frac{x^2 + \cos^2 x}{x^2 + 1} \operatorname{cosec}^2 x\, dx$ is

a) $\cot x + \sin^{-1} x + c$ b) $\cot x + \tan^{-1} x + c$

c) $-\tan x + \cot^{-1} x + c$ d) $-\cot x - \tan^{-1} x + c$

26. $\int\sqrt{\frac{1-x}{1+x}}\,dx$ is

a) $\sqrt{1-x^2}+\sin^{-1}x+c$ b) $\sin^{-1}x-\sqrt{1-x^2}+c$

c) $\log|x+\sqrt{1-x^2}|-\sqrt{1-x^2}+c$ d) $\sqrt{1-x^2}+\log|x+\sqrt{1-x^2}|+c$

27. $\int\tan^{-1}\left(\sqrt{\frac{1-\cos 2x}{1+\cos 2x}}\right)dx$ is

a) x^2+c b) $2x^2+c$ c) $\frac{x^2}{2}+c$ d) $-\frac{x^2}{2}+c$

28. $\int\frac{1}{x\sqrt{(\log x)^2-5}}\,dx$ is

a) $\log|x+\sqrt{x^2-5}|+c$ b) $\log|\log x+\sqrt{\log x-5}|+c$

c) $\log|\log x+\sqrt{(\log x)^2-5}|+c$ d) $\log|\log x-\sqrt{(\log x)^2-5}|+c$

29. $\int\frac{\sin^8 x-\cos^8 x}{1-2\sin^2 x\cos^2 x}\,dx$ is

a) $\frac{1}{2}\sin 2x+c$ b) $-\frac{1}{2}\sin 2x+c$ c) $\frac{1}{2}\cos 2x+c$ d) $-\frac{1}{2}\cos 2x+c$

30. $\int\frac{e^x(x^2\tan^{-1}x+\tan^{-1}x+1)}{x^2+1}\,dx$ is

a) $e^x\tan^{-1}(x+1)+c$ b) $\tan^{-1}(e^x)+c$ c) $e^x\frac{(\tan^{-1}x)^2}{2}+c$ d) $e^x\tan^{-1}x+c$

31. If X and Y be two events such that $P\left(\frac{X}{Y}\right)=\frac{1}{2}$, $P\left(\frac{Y}{X}\right)=\frac{1}{3}$ and $P(X\cap Y)=\frac{1}{6}$, then $P(X\cup Y)$ is

a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{1}{6}$ d) $\frac{2}{3}$

32. It is given that the events A and B are such that $P(A)=\frac{1}{4}$, $P\left(\frac{A}{B}\right)=\frac{1}{2}$ and $P\left(\frac{B}{A}\right)=\frac{2}{3}$. Then P(B) is

a) $\frac{1}{6}$ b) $\frac{1}{3}$ c) $\frac{2}{3}$ d) $\frac{1}{2}$

33. Ten coins are tossed. The probability of getting at least 8 heads is

a) $\frac{7}{64}$ b) $\frac{7}{32}$ c) $\frac{7}{16}$ d) $\frac{7}{128}$

34. If two events A and B are independent such that $P(A)=0.35$ and $P(A\cup B)=0.6$, then P(B) is

a) $\frac{5}{13}$ b) $\frac{1}{13}$ c) $\frac{4}{13}$ d) $\frac{7}{13}$

35. A bag contains 6 green, 2 white and 7 black balls. If two balls are drawn simultaneously, then the probability that both are different colour is

a) $\frac{68}{105}$ b) $\frac{71}{105}$ c) $\frac{64}{105}$ d) $\frac{73}{105}$

36. If A and B are two events such that $A\subset B$ and $P(B)\neq 0$, then which of the following is correct?

a) $P\left(\frac{A}{B}\right)=\frac{P(A)}{P(B)}$ b) $P\left(\frac{A}{B}\right)<P(A)$ c) $P\left(\frac{A}{B}\right)\geq P(A)$ d) $P\left(\frac{A}{B}\right)>P(B)$

37. A bag contains 5 white and 3 black balls. Five balls are drawn successively without replacement. The prabability that they are alternately of different colour is

a) $\frac{3}{14}$ b) $\frac{5}{14}$ c) $\frac{1}{14}$ d) $\frac{9}{14}$

38. If m is a number such that $m\leq 5$, then the probability that quadratic equation $2x^2+2mx+m+1=0$ has real roots is

a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{4}{5}$

39. The probability of two events A and B are 0.3 and 0.6 respectively. The probability that both A and B occur simultaneously is 0.18. The probability that neither A nor B occurs is

a) 0.1 b) 0.72 c) 0.42 d) 0.28

40. If two events A and B are such that $P(A) = \frac{3}{10}$ and $P(A \cap B) = \frac{1}{2}$, then $P(A \cap B)$ is

a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{1}{5}$

41. A number is selected from the set $\{1, 2, 3, \ldots, 20\}$. The probability that the selected number is divisible by 3 or 4 is

a) $\frac{2}{5}$ b) $\frac{1}{8}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$

42. Two items are chosen from a lot containing twelve items of which four are defective, then the probability that at least one of the item is defective

a) $\frac{19}{33}$ b) $\frac{17}{33}$ c) $\frac{23}{33}$ d) $\frac{13}{33}$

43. Four persons are selected at random from a group of 3 men, 2 women and 4 children. The probability that exactly two of them are children is

a) $\frac{3}{4}$ b) $\frac{10}{23}$ c) $\frac{1}{2}$ d) $\frac{10}{21}$

44. A, B and C try to hit a target simultaneously but independently. Their respective probabilities of hitting the target are $\frac{3}{4}, \frac{1}{2}, \frac{5}{8}$. The probability that the target hit by A or B but not by C is

a) $\frac{21}{64}$ b) $\frac{7}{32}$ c) $\frac{9}{64}$ d) $\frac{7}{8}$

45. If A and B are any two events, then the probability that exactly one of them occur is

a) $P(A \cup B) + P(A \cup B)$ b) $P(A \cap B) + P(A \cap B)$

c) $P(A) + P(B) - P(A \cap B)$ d) $P(A) + P(B) + 2P(A \cap B)$

46. If a and b are chosen randomly from the set $\{1, 2, 3, 4\}$ with replacement, then the probability of the real roots of the equation $x^2 + ax + b = 0$ is

a) $\frac{3}{16}$ b) $\frac{5}{16}$ c) $\frac{7}{16}$ d) $\frac{11}{16}$

47. If A and B are two events such that $P(A) = 0.4$, $P(B) = 0.8$ and $P\left(\frac{B}{A}\right) = 0.6$, then $P(\overline{A} \cap B)$ is

a) 0.96 b) 0.24 c) 0.56 d) 0.66

48. A number x is chosen at random from the first 100 natural numbers. Let A be the event of numbers which satisfies $\frac{(x-10)(x-50)}{x-30} \geq 0$, then $P(A)$ is

a) 0.20 b) 0.51 c) 0.71 d) 0.70

49. A matrix is chosen at random from a set of all matrices of order 2, with elements 0 or 1 only. The probability that the determinant of the matrix chosen is non zero will be

a) $\frac{3}{16}$ b) $\frac{3}{8}$ c) $\frac{1}{4}$ d) $\frac{5}{8}$

50. In a certain college 4% of the boys and 1% of the girls are taller than the 1.8 meter. Further 60% of the students are girls. If a student at random and is taller then 1.8 meters, then the probability that the student is a girl is

a) $\frac{2}{11}$ b) $\frac{3}{11}$ c) $\frac{5}{11}$ d) $\frac{7}{11}$

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Name: Section: Reg. No.

One Mark Test - 6

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. Let A and B be subsets of the universal set N, the set of natural numbers. Then $A' \cup [(A \cap B) \cup B']$ is
   a) A b) A′ c) B d) N
2. If $A = \{(x, y) : y = e^x, x \in R\}$ and $B = \{(x, y) : y = e^{-x}, x \in R\}$, then $n(A \cap B)$ is
   a) Infinity b) 0 c) 1 d) 2
3. If $n((A \times B) \cap (A \times C)) = 8$ and $n(B \cap C) = 2$, then $n(A)$ is
   a) 6 b) 4 c) 8 d) 16
4. The range of the function $f(x) = |\lfloor x \rfloor - x|, x \in \mathbb{R}$ is
   a) [0, 1] b) [0, ∞) c) [0, 1) d) (0, 1)
5. If $|x + 2| \le 9$, then x belongs to
   a) $(-\infty, -7)$ b) $[-11, 7]$ c) $(-\infty, -7) \cup [11, \infty)$ d) $(-11, 7)$
6. The value of $\log_a b \log_b c \log_c a$ is
   a) 2 b) 1 c) 3 d) 4
7. The value of $\log_3 11 . \log_{11} 13 . \log_{13} 15 . \log_{15} 27 . \log_{27} 81$ is
   a) 1 b) 2 c) 3 d) 4
8. If a and b are the real roots of the equation $x^2 - kx + c = 0$, then the distance between the points (a, 0) and (b, 0) is
   a) $\sqrt{K^2 - 4c}$ b) $\sqrt{4K^2 - c}$ c) $\sqrt{4c - K^2}$ d) $\sqrt{K - 8c}$
9. $\frac{1}{\cos 80^\circ} - \frac{\sqrt{3}}{\sin 80^\circ} =$
   a) $\sqrt{2}$ b) $\sqrt{3}$ c) 2 d) 4
10. $\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots + \cos 179^\circ =$
    a) 0 b) 1 c) −1 d) 89
11. Which of the following is not true?
    a) $\sin\theta = -\frac{3}{4}$ b) $\cos\theta = -1$ c) $\tan\theta = 25$ d) $\sec\theta = \frac{1}{4}$
12. If $\tan\alpha$ and $\tan\beta$ are the roots of $x^2 + ax + b = 0$, then $\frac{\sin(\alpha + \beta)}{\sin\alpha \sin\beta}$ is equal to
    a) $\frac{b}{a}$ b) $\frac{a}{b}$ c) $-\frac{a}{b}$ d) $-\frac{b}{a}$

13. The principal value of $\tan^{-1}\left(\frac{-1}{\sqrt{3}}\right)$ is

a) $\frac{\pi}{3}$ b) $\frac{-\pi}{6}$ c) $\frac{-\pi}{3}$ d) $\frac{\pi}{6}$

14. $\cos 35° + \cos 85° + \cos 155° =$

a) 0 b) $\frac{1}{\sqrt{3}}$ c) $\frac{1}{\sqrt{2}}$ d) $\cos 275°$

15. The number of 5 digit numbers all digits of which are odd is

a) 2^5 b) 5^5 c) 5^6 d) 6^{25}

16. Number of sides of a polygon having 44 diagonals is

a) 4 b) 4! c) 11 d) 22

17. If ${}^{2n}C_3 : {}^{n}C_3 = 11 : 1$ then the value of n is

a) 5 b) 6 c) 11 d) 7

18. $1+3+5+7+.....+17$ is equal to

a) 101 b) 81 c) 71 d) 61

19. If a is the arithmetic mean and g is the geometric mean of two numbers, then

a) $a \le g$ b) $a \ge g$ c) $a = g$ d) $a > g$

20. The remainder when 38^{15} is divided by 13 is

a) 12 b) 1 c) 11 d) 5

21. The coefficient of x^5 in the series e^{-2x} is

a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $\frac{-4}{15}$ d) $\frac{4}{15}$

22. The co-efficient of x^{-17} in the expansion of $\left(x^4 - \frac{1}{x^3}\right)^{15}$ is

a) 1365 b) −1365 c) 3003 d) −3003

23. The sum of the series $\frac{1}{\log_2 4} + \frac{1}{\log_4 4} + \frac{1}{\log_8 4} + ... + \frac{1}{\log_{2^n} 4}$ is

a) $\frac{n(n+1)}{2}$ b) $\frac{n(n+1)(2n+1)}{12}$ c) $\frac{n(n+1)}{4}$ d) none of these

24. Distance between the lines $5x+3y-7=0$ and $15x+9y+14=0$ is

a) $\frac{35}{\sqrt{34}}$ b) $\frac{1}{3\sqrt{34}}$ c) $\frac{35}{3\sqrt{34}}$ d) $\frac{35}{2\sqrt{34}}$

25. Which of the following equation is the locus of $(at^2, 2at)$

a) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ b) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ c) $x^2 + y^2 = a^2$ d) $y^2 = 4ax$

26. The coefficient of x^6 in $(2+2x)^{10}$ is

a) ${}^{10}C_6$ b) 2^6 c) ${}^{10}C_6\ 2^6$ d) ${}^{10}C_6\ 2^{10}$

27. A line perpendicular to the line $5x - y = 0$ forms a triangle with the coordinate axes. If the area of the triangle is 5 sq.units, then its equation is

a) $x + 5y \pm 5\sqrt{2} = 0$ b) $x - 5y \pm 5\sqrt{2} = 0$ c) $5x + y \pm 5\sqrt{2} = 0$ d) $5x - y \pm 5\sqrt{2} = 0$

28. The image of the point (2, 3) in the line $y = -x$ is

a) $(-3, -2)$ b) $(-3, 2)$ c) $(-2, -3)$ d) $(3, 2)$

29. If $A = \begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$, then for what value of λ, $A^2 = O$?

a) 0 b) ± 1 c) -1 d) 1

30. If $A = \begin{bmatrix} a & x \\ y & a \end{bmatrix}$ and if $xy = 1$, then $\det(AA^T)$ is equal to

a) $(a-1)^2$ b) $(a^2+1)^2$ c) a^2-1 d) $(a^2-1)^2$

31. The value of the determinant of $A = \begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix}$ is

a) $-2abc$ b) abc c) 0 d) $a^2+b^2+c^2$

32. If $\vec{a}+2\vec{b}$ and $3\vec{a}+m\vec{b}$ are parallel, then the value of m is

a) 3 b) $\frac{1}{3}$ c) 6 d) $\frac{1}{6}$

33. A vector makes equal angle with the positive direction of the coordinate axes. Then each angle is equal to

a) $\cos^{-1}\left(\frac{1}{3}\right)$ b) $\cos^{-1}\left(\frac{2}{3}\right)$ c) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ d) $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

34. If $\vec{a}, \vec{b}, \vec{c}$ are the position vectors of three collinear points, then which of the following is true?

a) $\vec{a} = \vec{b}+\vec{c}$ b) $2\vec{a} = \vec{b}+\vec{c}$ c) $\vec{b} = \vec{c}+\vec{a}$ d) $4\vec{a} = \vec{b}+\vec{c} = \vec{0}$

35. If $\vec{a}$ and $\vec{b}$ having same magnitude and angle between them is $60°$ and their scalar product is $\frac{1}{2}$ then $|\vec{a}|$ is

a) 2 b) 3 c) 7 d) 1

36. If $|\vec{a}| = 13$, $|\vec{b}| = 5$ and $\vec{a}\cdot\vec{b} = 60°$ then $|\vec{a}\times\vec{b}|$ is

a) 15 b) 35 c) 45 d) 25

37. $\lim_{x\to 0} \frac{e^x - 1}{x} =$

a) 1 b) 0 c) -1 d) ∞

38. $\lim_{x\to 0} \frac{e^{\sin x} - 1}{x} =$

a) 1 b) e c) $\frac{1}{e}$ d) 0

39. $\lim_{n\to\infty} \left(\frac{1}{n^2} + \frac{2}{n^2} + \frac{3}{n^2} + \ldots + \frac{n}{n^2}\right) =$

a) $\frac{1}{2}$ b) 0 c) 1 d) ∞

40. The value of $\lim_{x \to 0} \frac{\sin x}{\sqrt{x^2}}$ is

a) 1 b) -1 c) 0 d) limit does not exist

41. If $y = f(x^2+2)$ and $f'(3) = 5$, then $\frac{dy}{dx}$ at $x = 1$ is

a) 5 b) 25 c) 15 d) 10

42. If $y = \frac{1}{a-z}$, then $\frac{dz}{dy}$ is

a) $(a-z)^2$ b) $-(z-a)^2$ c) $(z+a)^2$ d) $-(z+a)^2$

43. If $f(x) = x\tan^{-1}x$, then $f'(1)$ is

a) $1+\frac{\pi}{4}$ b) $\frac{1}{2}+\frac{\pi}{4}$ c) $\frac{1}{2}-\frac{\pi}{4}$ d) 2

44. If $x = a\sin\theta$ and $y = b\cos\theta$, then $\frac{d^2y}{dx^2}$ is

a) $\frac{a}{b^2}\sec^2\theta$ b) $-\frac{b}{a}\sec^2\theta$ c) $-\frac{b}{a^2}\sec^3\theta$ d) $-\frac{b^2}{a^2}\sec^3\theta$

45. The derivative of $f(x) = x|x|$ at $x = -3$ is

a) 6 b) -6 c) does not exist d) 0

46. $\int \frac{\sec x}{\sqrt{\cos 2x}}dx$ is

a) $\tan^{-1}(\sin x)+c$ b) $2\sin^{-1}(\tan x)+c$ c) $\tan^{-1}(\cos x)+c$ d) $\sin^{-1}(\tan x)+c$

47. $\int x^2\cos x\,dx$ is

a) $x^2\sin x+2x\cos x-2\sin x+c$ b) $x^2\sin x-2x\cos x-2\sin x+c$

c) $-x^2\sin x+2x\cos x+2\sin x+c$ d) $-x^2\sin x-2x\cos x+2\sin x+c$

48. $\int e^{\sqrt{x}}\,dx$ is

a) $2\sqrt{x}\,(1-e^{\sqrt{x}})+c$ b) $2\sqrt{x}\,(e^{\sqrt{x}}-1)+c$ c) $2e^{\sqrt{x}}(1-\sqrt{x})+c$ d) $2e^{\sqrt{x}}(\sqrt{x}-1)+c$

49. If A and B are two events such that $A \subset B$ and $P(B) \neq 0$, the which of the following is correct?

a) $P(A/B) = \frac{P(A)}{P(B)}$ b) $P(A/B) < P(A)$ c) $P(A/B) \geq P(A)$ d) $P(A/B) > P(B)$

50. Ten coins are tossed. The probability of getting at least 8 heads is

a) $\frac{7}{64}$ b) $\frac{7}{32}$ c) $\frac{7}{16}$ d) $\frac{7}{128}$

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Name: Section: Reg. No.

One Mark Test - 7

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. If $A = \{(x, y) : y = \sin x, x \in R\}$ and $B = \{(x, y) : y = \cos x, x \in R\}$ then $A \cap B$ contains
   a) no element b) infinitely many elements
   c) only one element d) cannot be determined

2. If the function $f : [-3, 3] \to S$ defined by $f(x) = x^2$ is onto, then S is
   a) $[-9, 9]$ b) $\mathbb{R}$ c) $[-3, 3]$ d) $[0, 9]$

3. The function $f : \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = \sin x + \cos x$ is
   a) an odd function b) neither an odd function nor an even function
   c) an even function d) both odd function and even function

4. Find the range of the function $\frac{1}{2\cos x - 1}$ is
   a) $\left(-\infty, \frac{-1}{3}\right] \cup [1, \infty)$ b) $(-\infty, \infty)$ c) $\left(\frac{-1}{3}, 1\right)$ d) $\left(-\infty, \frac{-1}{3}\right) \cup (1, \infty)$

5. Find the range of $f(x) = x^2$ is
   a) $(-\infty, \infty)$ b) $[0, \infty)$ c) $(0, \infty)$ d) $[0, \infty]$

6. Given that x, y and b are real numbers $x < y$, $b > 0$ then
   a) $xb < yb$ b) $xb > yb$ c) $xb \le yb$ d) $\frac{x}{b} \ge \frac{y}{b}$

7. Find the value of $\log_{\sqrt{2}} 512$ is
   a) 16 b) 18 c) 9 d) 12

8. If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$, then the value of $A + B$ is
   a) $\frac{-1}{2}$ b) $\frac{-2}{3}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$

9. If 3 is the logarithm of 343, then the base is
   a) 5 b) 7 c) 6 d) 9

10. The maximum value of $4\sin^2 x + 3\cos^2 x + \sin\frac{x}{2} + \cos\frac{x}{2}$ is
    a) $4 + \sqrt{2}$ b) $3 + \sqrt{2}$ c) 9 d) 2

11. Which of the following is not true?
    a) $\sin\theta = -\frac{3}{4}$ b) $\cos\theta = -1$ c) $\tan\theta = 25$ d) $\sec\theta = \frac{1}{4}$

12. A wheel is spinning at 2 radians/second. How many seconds will it take to make 10 complete rotations?
a) 10π seconds b) 20π seconds c) 5π seconds d) 15π seconds

13. If $\sin\alpha + \cos\alpha = b$, then $\sin 2\alpha$ is equal to
a) $b^2 - 1$, if $b \le \sqrt{2}$ b) $b^2 - 1$, if $b > \sqrt{2}$ c) $b^2 - 1$, if $b \le 1$ d) $b^2 - 1$, if $b \ge \sqrt{2}$

14. Find the principal value of $\operatorname{cosec}^{-1}\left(\frac{2}{\sqrt{3}}\right)$ is
a) $\frac{-\pi}{3}$ b) $\frac{\pi}{3}$ c) $\frac{\pi}{6}$ d) $\frac{-\pi}{6}$

15. If ${}^{10}P_{r-1} = 2X\ {}^{6}P_r$, then the value of r is
a) 6 b) 4 c) 2 d) 10

16. The number of 5 digit numbers all digits of which are odd is
a) 25 b) 5^5 c) 5^6 d) 625

17. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines.
a) 6 b) 9 c) 12 d) 18

18. In a plane there are 10 points are there out of which 4 points are collinear, then the number of triangles formed is
a) 110 b) ${}^{10}C_3$ c) 120 d) 116

19. A polygon has 90 diagonals. Find the number of its sides are
a) 30 b) 15 c) 20 d) 25

20. The value of $2+4+6+.....+2n$ is
a) $\frac{n(n-1)}{2}$ b) $\frac{n(n+1)}{2}$ c) $\frac{2n(2n+1)}{2}$ d) $n(n+1)$

21. If ${}^{n}C_{10} > {}^{n}C_r$ for all possible r, then a value of n is
a) 10 b) 21 c) 19 d) 20

22. The nth term of the sequence $\frac{1}{2}, \frac{3}{4}, \frac{7}{8}, \frac{15}{16}, \ldots$ is
a) $2^n - n - 1$ b) $1 - 2^{-n}$ c) $2^{-n} + n - 1$ d) 2^{n-1}

23. If the points $(8, -5)$ lies on the locus $\frac{x^2}{16} - \frac{y^2}{25} = k$, then the value of k is
a) 0 b) 1 c) 2 d) 3

24. If the lines represented by the equation $6x^2 + 41xy - 7y^2 = 0$ make angles α and β with x-axis, then $\tan\alpha \tan\beta =$
a) $-\frac{6}{7}$ b) $\frac{6}{7}$ c) $-\frac{7}{6}$ d) $\frac{7}{6}$

25. One of the equation of the line represented by the equation $x^2 + 2xy\cot\theta - y^2 = 0$ is
a) $x - y\cot\theta = 0$ b) $x + y\tan\theta = 0$
c) $x\cos\theta + y(\sin\theta + 1) = 0$ d) $x\sin\theta + y(\cos\theta + 1) = 0$

26. If $A = \begin{bmatrix} a & x \\ y & a \end{bmatrix}$ and if $xy = 1$, then $\det(AA^T)$ is equal to
a) $(a-1)^2$ b) $(a^2+1)^2$ c) $a^2 - 1$ d) $(a^2-1)^2$

27. If there are n interchanges of rows (columns) of a matrix A then the determinant of the resulting matrix is

a) $(-1)\,|A|$ b) $(-1)^{n-1}\,|A|$ c) $(-1)^{n}\,|A|$ d) $(-1)^{n+1}\,|A|$

28. Find the area of the triangle whose vertices are $(-2,-3)$, $(3,2)$ and $(-1,-8)$.

a) 25 square units b) 15 square units c) 10 square units d) 30 square units

29. What must be the matrix X, if $2X+\begin{bmatrix}1 & 2\\ 3 & 4\end{bmatrix}=\begin{bmatrix}3 & 8\\ 7 & 2\end{bmatrix}$?

a) $\begin{bmatrix}1 & 3\\ 2 & -1\end{bmatrix}$ b) $\begin{bmatrix}1 & -3\\ 2 & -1\end{bmatrix}$ c) $\begin{bmatrix}2 & 6\\ 4 & -2\end{bmatrix}$ d) $\begin{bmatrix}2 & -6\\ 4 & -2\end{bmatrix}$

30. If the points $(x,-2)$, $(5,2)$, $(8,8)$ are collinear, then x is equal to

a) -3 b) $\frac{1}{3}$ c) 1 d) 3

31. Let $\vec{r}=x\hat{i}+y\hat{j}+z\hat{k}$ be the position vector of any point and let α, β, γ be the direction angles of $\vec{r}$ Then the sum of the squares of the direction cosines of $\vec{r}$ is

a) 0 b) 1 c) 2 d) 3

32. One of the diagonals of parallelogram ABCD with $\vec{a}$ and $\vec{b}$ as adjacent sides is $\vec{a}+\vec{b}$. The other diagonal $\overrightarrow{BD}$ is

a) $\vec{a}-\vec{b}$ b) $\vec{b}-\vec{a}$ c) $\vec{a}+\vec{b}$ d) $\frac{\vec{a}+\vec{b}}{2}$

33. Let $\vec{r}$ be the position vector of any point and let α, β, γ be the direction angles of $\vec{r}$. Then $\sin^2\alpha+\sin^2\beta+\sin^2\gamma=$

a) 2 b) 1 c) 0 d) 3

34. The value of $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{DA}+\overrightarrow{CD}$ is

a) $\overrightarrow{AD}$ b) $\overrightarrow{CA}$ c) $\vec{0}$ d) $-\overrightarrow{AD}$

35. $\lim\limits_{x\to 0} x^2\sin\left(\frac{1}{x}\right)=$

a) 1 b) 2 c) 0 d) 3

36. The value of $\lim\limits_{x\to k^-} x-\lfloor x\rfloor$, where k is an integer is

a) -1 b) 1 c) 0 d) 2

37. The value of $\lim\limits_{\alpha\to\pi/4}\dfrac{\sin\alpha-\cos\alpha}{\alpha-\frac{\pi}{4}}$ is

a) $\sqrt{2}$ b) $\frac{1}{\sqrt{2}}$ c) 1 d) 4

38. $\lim\limits_{x\to 3}\lfloor x\rfloor=$

a) 1 b) 3 c) does not exist d) 0

39. If $pv = 81$, then $\frac{dp}{dv}$ at $v = 9$ is

a) 1 b) -1 c) 2 d) -2

40. The derivative of $f(x) = x|x|$ at $x = -3$ is

a) 6 b) -6 c) does not exist d) 0

41. If $g(x) = (x^2 + 2x + 1) f(x)$ and $f(0) = 5$ and $\lim_{x \to 0} \frac{f(x) - 5}{x} = 4$, then $g'(0)$ is

a) 20 b) 14 c) 18 d) 12

42. If $\int f(x)\,dx = g(x) + c$, then $\int f(x)\, g'(x)\,dx$

a) $\int (f(x))^2\,dx$ b) $\int f(x)g(x)\,dx$ c) $\int f'(x)g(x)\,dx$ d) $\int (g(x))^2\,dx$

43. $\int \frac{\sec x}{\sqrt{\cos 2x}}\,dx =$

a) $\tan^{-1}(\sin x) + c$ b) $2\sin^{-1}(\tan x) + c$ c) $\tan^{-1}(\cos x) + c$ d) $\sin^{-1}(\tan x) + c$

44. $\int \frac{\sqrt{\tan x}}{\sin 2x}\,dx$ is

a) $\sqrt{\tan x} + c$ b) $2\sqrt{\tan x} + c$ c) $\frac{1}{2}\sqrt{\tan x} + c$ d) $\frac{1}{4}\sqrt{\tan x} + c$

45. A number is selected from the set {1, 2, 3, ...20}. The probability that the selected number is divisible by 3 or 4 is

a) $\frac{2}{5}$ b) $\frac{1}{8}$ c) $\frac{1}{2}$ d) $\frac{2}{3}$

46. If $\overline{A}$ is the complementary event of A, then $P(\overline{A})$ is

a) $P(A)$ b) $1 + P(A)$ c) $P(A) - 1$ d) $1 - P(A)$

47. If two events A and B are indpendent such that $P(A) = 0.35$ and $P(A \cup B) = 0.6$, then $P(B)$ is

a) $\frac{5}{13}$ b) $\frac{1}{13}$ c) $\frac{4}{13}$ d) $\frac{7}{13}$

48. It is given that the events A and B are such that $P(A) = \frac{1}{4}$, $P\left(\frac{A}{B}\right) = \frac{1}{2}$ and $P\left(\frac{B}{A}\right) = \frac{2}{3}$. Then $P(B)$ is

a) $\frac{1}{6}$ b) $\frac{1}{3}$ c) $\frac{2}{3}$ d) $\frac{1}{2}$

49. If $P(S) = 1$, then the probability of the impossible event is

a) 0 b) 1 c) 2 d) none of these

50. Two items are chosen from a lot containing twelve items of which four are defective, then the probability that at least one of the item is defective

a) $\frac{19}{33}$ b) $\frac{17}{33}$ c) $\frac{23}{33}$ d) $\frac{13}{33}$

★★★★★

Name: Section: Reg. No.

One Mark Test - 8

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. For non-empty sets A and B, if $A \subset B$ then $(A \times B) \cap (B \times A)$ is equal to

   a) $A \cap B$ b) $A \times A$ c) $B \times B$ d) none of these

2. The relation R defined on a set $A = \{0, -1, 1, 2\}$ by $x\,Ry$ if $|x^2 + y^2| \le 2$, then which one of the following is true?

   a) $R = \{(0, 0), (0, -1), (0, 1), (-1, 0), (-1, 1), (1, 2), (1, 0)\}$

   b) $R^{-1} = \{(0, 0), (0, -1), (0, 1), (-1, 0), (1, 0)\}$

   c) Domain of R is $\{0, -1, 1, 2\}$ d) Range of R is $\{0, -1, 1\}$

3. The function $f : [0, 2\pi] \to [-1, 1]$ defined by $f(x) = \sin x$ is

   a) one - to - one b) onto c) bijection d) cannot be defined

4. Let $X = \{1, 2, 3, 4\}$, $Y = \{a, b, c, d\}$ and $f = \{(1, a), (4, b), (2, c), (3, d), (2, d)\}$. Then f is

   a) an one-to-one function b) an onto function

   c) a function which is not one-to-one d) not a function

5. The solution set of the following inequality $|x - 1| \ge |x - 3|$ is

   a) $[0, 2]$ b) $[2, \infty)$ c) $(0, 2)$ d) $(-\infty, 2)$

6. If a and b are the roots of the equation $x^2 - kx + 16 = 0$ and satisfy $a^2 + b^2 = 32$, then the value of k is

   a) 10 b) -8 c) $-8, 8$ d) 6

7. If 8 and 2 are the roots of $x^2 + ax + c = 0$ and 3, 3 are the roots of $x^2 + dx + b = 0$, then the roots of the equation $x^2 + ax + b = 0$ are

   a) 1, 2 b) -1, 1 c) 9, 1 d) -1, 2

8. The value of $\log_3 5 \log_{25} 27$ is

   a) $\frac{-3}{2}$ b) $\frac{3}{2}$ c) $\frac{1}{2}$ d) $\frac{-1}{2}$

9. Find the principal value of $\operatorname{cosec}^{-1}\left(\frac{2}{\sqrt{3}}\right)$ is

   a) $\frac{\pi}{3}$ b) $\frac{-\pi}{3}$ c) $\frac{\pi}{6}$ d) $\frac{-\pi}{6}$

10.

   a) $1 : 2 : 3$ b) $1 : 2 : \sqrt{3}$ c) $\sqrt{3} : 2 : 1$ d) $1 : \sqrt{3} : 2$

11. $\left(1 + \cos\frac{\pi}{8}\right)\left(1 + \cos\frac{3\pi}{8}\right)\left(1 + \cos\frac{5\pi}{8}\right)\left(1 + \cos\frac{7\pi}{8}\right) =$

   a) $\frac{1}{8}$ b) $\frac{1}{2}$ c) $\frac{1}{\sqrt{3}}$ d) $\frac{1}{\sqrt{2}}$

12. Which of the following is not true?

   a) $\frac{3}{4}$ b) $\cos\theta = -1$ c) $\tan\theta = 25$ d) $\sec\theta = \frac{}{4}$

13. If $f(\theta) = |\sin\theta| + |\cos\theta|$, $\theta \in R$, then $f(\theta)$ is in the interval

a) $[0, 2]$ b) $[1, \sqrt{2}]$ c) $[1, 2]$ d) $[0, 1]$

14. The sum of the digits at the 10th place of all numbers formed with the help of 2, 4, 5, 7 taken all at a time is

a) 432 b) 108 c) 36 d) 18

15. There are 10 points in a plane and 4 of them are collinear. The number of straight lines joining any two points is

a) 45 b) 40 c) 39 d) 38

16. In a plane there are 10 points are there out of which 4 points are collinear, then the number of triangles formed is

a) 110 b) ${}^{10}C_3$ c) 120 d) 116

17. The number of rectangles that a chessboard has .....

a) 81 b) 9^9 c) 1296 d) 6561

18. The value of $2+4+6+.....+2n$ is

a) $\frac{n(n-1)}{2}$ b) $\frac{n(n+1)}{2}$ c) $\frac{2n(2n+1)}{2}$ d) $n(n+1)$

19. The sum of an infinite GP is 18. If the first term is 6, the common ratio is

a) $\frac{1}{3}$ b) $\frac{2}{3}$ c) $\frac{1}{6}$ d) $\frac{3}{4}$

20. The sum upto n terms of the series $\frac{1}{\sqrt{1}+\sqrt{3}} + \frac{1}{\sqrt{3}+\sqrt{5}} + \frac{1}{\sqrt{5}+\sqrt{7}} + ...$ is

a) $\sqrt{2n+1}$ b) $\frac{\sqrt{2n+1}}{2}$ c) $\sqrt{2n+1}-1$ d) $\frac{\sqrt{2n+1}-1}{2}$

21. The value of $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+....$ is

a) $\frac{e^2+1}{2e}$ b) $\frac{(e+1)^2}{2e}$ c) $\frac{(e-1)^2}{2e}$ d) $\frac{e^2-1}{2e}$

22. Which of the following point lie on the locus of $3x^2+3y^2-8x-12y+17=0$

a) $(0, 0)$ b) $(-2, 3)$ c) $(1, 2)$ d) $(0, -1)$

23. The length of $\perp$ from the origin to the line $\frac{x}{3}-\frac{y}{4}=1$ is

a) $\frac{11}{5}$ b) $\frac{5}{12}$ c) $\frac{12}{5}$ d) $\frac{5}{7}$

24. If the equation of the base opposite to the vertex (2, 3) of an equilateral triangle is $x+y=2$, then the length of a side is

a) $\sqrt{\frac{3}{2}}$ b) 6 c) $\sqrt{6}$ d) $3\sqrt{2}$

25. If one of the lines given by $6x^2-xy+4cy^2=0$ is $3x+4y=0$, then c equals to

a) -3 b) -1 c) 3 d) 1

26. Unit matrix is an example of a ..... matrix.

a) scalar b) square matrix c) diagonal matrix d) zero matrix

27. For any two matrices A and B of suitable orders, we have $(AB)^T =$

a) AB b) $A^T B^T$ c) BA d) $B^T A^T$

28. If there are n interchanges of rows (columns) of a matrix A then the determinant of the resulting matrix is

a) $|A|^n$ b) [illegible] c) [illegible] d) [illegible]

29. If the square of the matrix $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is the unit matrix of order 2, then α, β and γ should satisfy the relation.

a) $1+\alpha^2+\beta\gamma=0$ b) $1-\alpha^2-\beta\gamma=0$ c) $1-\alpha^2+\beta\gamma=0$ d) $1+\alpha^2-\beta\gamma=0$

30. The vectors $\vec{a}-\vec{b}$, $\vec{b}-\vec{c}$, $\vec{c}-\vec{a}$ are

a) parallel to each other b) unit vectors
c) mutually perpendicular vectors d) coplanar vectors

31. Vectors $\vec{a}$ and $\vec{b}$ are inclined at an angle $\theta=120°$. If $|\vec{a}|=1$, $|\vec{b}|=2$, then $[(\vec{a}+3\vec{b})\times(3\vec{a}-\vec{b})]^2$ is equal to

a) 225 b) 275 c) 325 d) 300

32. If (1, 2, 4) and $(2, -3\lambda, -3)$ are the initial and terminal points of the vectors $\hat{i}+5\hat{j}-7\hat{k}$, then the value of λ is equal to

a) $\frac{7}{3}$ b) $\frac{-7}{3}$ c) $\frac{-5}{3}$ d) $\frac{5}{3}$

33. $\lim_{x\to\infty} \frac{\sin x}{x} =$

a) 1 b) 0 c) ∞ d) $-\infty$

34. $\lim_{x\to 0} \frac{8^x-4^x-2^x+1^x}{x^2} =$

a) $2\log 2$ b) $2(\log 2)^2$ c) $\log 2$ d) $3\log 2$

35. $\lim_{x\to 0} \frac{e^{\sin x}-1}{x} =$

a) 1 b) e c) $\frac{1}{e}$ d) 0

36. $\lim_{x\to 1} \frac{\sqrt{x}-1}{x-1} =$

a) 1 b) $\frac{1}{2}$ c) -1 d) $\frac{-1}{2}$

37. If $y=\cos(\sin x^2)$, then $\frac{dy}{dx}$ at $x=\sqrt{\frac{\pi}{2}}$ is

a) -2 b) 2 c) $-2\sqrt{\frac{\pi}{2}}$ d) 0

38. If $f(x)=x\tan^{-1}x$, then $f'(1)$ is

a) $1+\frac{\pi}{4}$ b) $\frac{1}{2}+\frac{\pi}{4}$ c) $\frac{1}{2}-\frac{\pi}{4}$ d) 2

39. The derivative of $f(x)=x|x|$ at $x=-3$ is

a) 6 b) -6 c) does not exist d) 0

40. The number of points in $\mathbb{R}$ in which the function $f(x)=|x-1|+|x-3|+\sin x$ is not differential, is

a) 3 b) 2 c) 1 d) 4

41. Find the derivative $y = \frac{\log x}{e^x}$ is

a) $e^{-x}\left[\frac{1}{x} - \log x\right]$ b) $e^{x}\left[\frac{1}{x} - \log x\right]^{e^x}$ c) $e^{-x}\left[x - \log x\right]$ d) $e^{-x}\left[\frac{1}{x} + \log x\right]$

42. $\int \sec^2 x \, dx =$

a) $\sec x + c$ b) $\operatorname{cosec}^2 x + c$ c) $\cos^2 x + c$ d) $\tan x + c$

43. $\int \frac{\sec x}{\sqrt{\cos 2x}} dx =$

a) $\tan^{-1}(\sin x) + c$ b) $2\sin^{-1}(\tan x) + c$ c) $\tan^{-1}(\cos x) + c$ d) $\sin^{-1}(\tan x) + c$

44. $\int \sqrt{\frac{1-x}{1+x}} dx$ is

a) $\sqrt{1-x^2} + \sin^{-1} x + c$ b) $\sin^{-1} x - \sqrt{1-x^2} + c$

c) $\log|x + \sqrt{1-x^2}| - \sqrt{1-x^2} + c$ d) $\sqrt{1-x^2} + \log|x + \sqrt{1-x^2}| + c$

45. $\int \frac{x+2}{\sqrt{x^2-1}} dx =$

a) $\sqrt{x^2-1} - 2\log|x + \sqrt{x^2-1}| + c$ b) $\sin^{-1} x - 2\log|x + \sqrt{x^2-1}| + c$

c) $2\log|x + \sqrt{x^2-1}| - \sin^{-1} x + c$ d) $\sqrt{x^2-1} + 2\log|x + \sqrt{x^2-1}| + c$

46. $\int e^{\sqrt{x}} dx =$

a) $2\sqrt{x}(1 - e^{\sqrt{x}}) + c$ b) $2\sqrt{x}(e^{\sqrt{x}} - 1) + c$ c) $2e^{\sqrt{x}}(1 - \sqrt{x}) + c$ d) $2e^{\sqrt{x}}(\sqrt{x} - 1) + c$

47. Nine coins are tossed once, find the probability to get at least two heads are

a) $\frac{5}{256}$ b) $\frac{251}{256}$ c) $\frac{256}{251}$ d) $\frac{215}{256}$

48. A matrix is chosen at random from a set of all matrices of order 2, with elements 0 or 1 only. The probability that the determinant of the matrix chosen is non-zero will be

a) $\frac{3}{16}$ b) $\frac{3}{8}$ c) $\frac{1}{4}$ d) $\frac{5}{8}$

49. If two events A and B are such that $P(\overline{A}) = \frac{3}{10}$ and $P(A \cap \overline{B}) = \frac{1}{2}$, then $P(A \cap B)$ is

a) $\frac{1}{2}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{1}{5}$

50. If m is a number such that $m \le 5$, then the probability that quadratic equation $2x^2 + 2mx + m + 1 = 0$ has real roots is

a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{4}{5}$

Name: Section: Reg. No.

One Mark Test - 9

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. The range of the function $\frac{1}{1-2\sin x}$ is

   a) $(-\infty,-1)\cup\left(\frac{1}{3},\infty\right)$ b) $\left(-1,\frac{1}{3}\right)$ c) $\left[-1,\frac{1}{3}\right]$ d) $(-\infty,-1]\cup\left[\frac{1}{3},\infty\right)$

2. Let $f:\mathbb{R}\to\mathbb{R}$ be defined by $f(x)=1-|x|$. Then the range of f is

   a) $\mathbb{R}$ b) $(1,\infty)$ c) $(-1,\infty)$ d) $(-\infty,1]$

3. The rule $f(x)=x^2$ is a bijection if the domain and the co-domain are given by

   a) $\mathbb{R},\mathbb{R}$ b) $\mathbb{R},(0,\infty)$ c) $(0,\infty),\mathbb{R}$ d) $[0,\infty),[0,\infty)$

4. The number of relations on a set containing 3 elements is

   a) 9 b) 81 c) 512 d) 1024

5. If $\frac{|x-2|}{x-2}\geq 0$, then x belongs to

   a) $[2,\infty)$ b) $(2,\infty)$ c) $(-\infty,2)$ d) $(-2,\infty)$

6. The solution set of the following inequality $|x-1|\geq|x-3|$ is

   a) $[0,2]$ b) $[2,\infty)$ c) $(0,2)$ d) $(-\infty,2)$

7. Find a so that the sum and product of the roots of the equation $2x^2+(a-3)x+3a-5=0$ are equal is

   a) 1 b) 2 c) 0 d) 4

8. If a and b are the real roots of the equation $x^2-kx+c=0$, then the distance between the points $(a,0)$ and $(b,0)$ is

   a) $\sqrt{k^2-4c}$ b) $\sqrt{4k^2-4c}$ c) $\sqrt{4c-k^2}$ d) $\sqrt{k-8c}$

9. Which of the following is not true?

   a) $\sin\theta=-\frac{3}{4}$ b) $\cos\theta=-1$ c) $\tan\theta=25$ d) $\sec\theta=\frac{1}{4}$

10. In a ΔABC, if (i) $\sin\frac{A}{2}\sin\frac{B}{2}\sin\frac{C}{2}>0$ (ii) $\sin A\sin B\sin C>0$ then

    a) both (i) and (ii) are true b) only (i) is true
    c) only (ii) is true d) neither (i) nor (ii) is true

11. Find the principal solution of $\operatorname{cosec}\theta=-2$ is

    a) $-\frac{\pi}{6}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{3}$ d) $\frac{-\pi}{3}$

12. Find the length of an arc of a circle of radius 5cm subtending a central angle measuring 15° is

    a) $\frac{5}{12}$cm b) $\frac{12}{5}$cm c) $\frac{5\pi}{15}$cm d) $\frac{5\pi}{12}$cm

13. The number of 5 digit numbers all digits of which are odd is

    a) 25 b) 5^5 c) 5^6 d) 625

14. In an examination there are three multiple choice questions and each question has 5 choices. Number of ways in which a student can fail to get all answer correct is

a) 125 b) 124 c) 64 d) 63

15. A polygon has 90 diagonals. Find the number of its sides is

a) 15 b) 10 c) 25 d) 35

16. A coin is tossed 8 times. How many different sequences of heads and tails are possible?

a) 2^6 b) 2^4 c) 2^8 d) 2^{10}

17. Find the value of $\sum_{k=1}^{n} \frac{1}{k(k+1)}$ is

a) $1-\frac{1}{n+1}$ b) $\frac{1}{n+1}$ c) $\frac{1}{n-1}$ d) $1+\frac{1}{n+1}$

18. The value of series $\frac{1}{2}+\frac{7}{4}+\frac{13}{8}+\frac{19}{16}+\ldots$ is

a) 14 b) 7 c) 4 d) 6

19. The coefficient of x^5 in the series e^{-2x} is

a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $-\frac{4}{15}$ d) $\frac{4}{15}$

20. The coefficient of $x^8 y^{12}$ in the expansion of $(2x+3y)^{20}$ is

a) 0 b) $2^8 3^{12}$ c) $2^8 3^{12} + 2^{12} 3^8$ d) ${}^{20}C_8\ 2^8 3^{12}$

21. The slope of the line which makes an angle $45°$ with the line $3x - y = -5$ are

a) 1, -1 b) $\frac{1}{2}$, -2 c) 1, $\frac{1}{2}$ d) 2, $\frac{-1}{2}$

22. The image of the point (2, 3) in the line $-x = y$ is

a) $(-3, -2)$ b) $(-3, 2)$ c) $(-2, -3)$ d) (3, 2)

23. The y intercept of the straight line passing through (1, 3) and perpendicular to $2x - 3y + 1 = 0$ is

a) $\frac{3}{2}$ b) $\frac{9}{2}$ c) $\frac{2}{3}$ d) $\frac{2}{9}$

24. Which of the following equation is the locus of $(at^2, 2at)$?

a) $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ b) $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ c) $x^2+y^2=a^2$ d) $y^2=4ax$

25. The area of the triangle formed by the lines $x^2-4y^2=0$ and $x=a$ is

a) $2a^2$ b) $\frac{\sqrt{3}}{2}a^2$ c) $\frac{1}{2}a^2$ d) $\frac{2}{\sqrt{3}}a^2$

26. Determinants can be defined only for

a) square matrix b) zero matrix c) unit matrix d) diagonal matrix

27. Find the value of $\begin{bmatrix} \cos\theta & \sin\theta \\ -\sin\theta & \cos\theta \end{bmatrix}$ is

a) 0 b) -1 c) 1 d) 2

28. Find the area of the triangle whose vertices are $(-2, -3)$, (3, 2) and $(-1, -8)$

a) 25 square units b) 15 square units c) 10 square units d) 30 square units

29. If (1, 2, 4) and $(2, -3\lambda-3)$ are the initial and terminal points of the vector $\hat{i}+5\hat{j}-7\hat{k}$, then the value of λ is equal to

a) $\frac{7}{3}$ b) $\frac{-7}{3}$ c) $\frac{-}{3}$ d) $\frac{}{3}$

30. The value of $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{DA}+\overrightarrow{CD}$ is

a) $\overline{AD}$ b) $\overline{CA}$ c) [illegible] d) [illegible]

31. If $\vec{a}=2\hat{i}+\hat{j}+3\hat{k}$ and $\vec{b}=3\hat{i}+5\hat{j}-2\hat{k}$ then find the value of $|\vec{a}\times\vec{b}|$ is

a) $\sqrt{507}$ b) $\sqrt{705}$ c) 507 d) 705

32. If ABCD is a parallelogram, then $\overrightarrow{AB}+\overrightarrow{AD}+\overrightarrow{CB}+\overrightarrow{CD}$ is equal to

a) $2(\overrightarrow{AB}+\overrightarrow{AD})$ b) $4\overrightarrow{AC}$ c) $4\overrightarrow{BD}$ d) $\vec{0}$

33. Find the value of $\lim_{x\to 2^+}\frac{1}{(x-2)^3}$ is

a) 0 b) 2 c) -2 d) limit does not exist

34. Find the value of $\lim_{x\to 0}\sin x$ is

a) ∞ b) 0 c) 1 d) -1

35. Find the value of $\frac{d}{dx}\left(\frac{2}{\pi}\sin x^\circ\right)$ is

a) $\frac{\pi}{180}\cos x^\circ$ b) $\frac{1}{90}\cos x^\circ$ c) $\frac{\pi}{90}\cos x^\circ$ d) $\frac{2}{\pi}\cos x^\circ$

36. If $y=mx+c$ and $f(0)=f'(0)=1$, then $f(2)$ is

a) 1 b) 2 c) 3 d) -3

37. If $f(x)=\begin{cases} x+2, & -1<x<3 \\ 5, & x=3 \\ 8-x, & x>3 \end{cases}$, then at $x=3$, $f'(x)$ is

a) 1 b) -1 c) 0 d) does not exist

38. If $f(x)=x\tan^{-1}x$, then $f'(1)$ is

a) $1+\frac{\pi}{4}$ b) $\frac{1}{2}+\frac{\pi}{4}$ c) $\frac{1}{2}-\frac{\pi}{4}$ d) 2

39. The number of points in $\mathbb{R}$ in which the function $f(x)=|x-1|+|x-3|+\sin x$ is not differential is

a) 3 b) 2 c) 1 d) 4

40. If $\int\frac{3^{1/x}}{x^2}dx=k(3^{\frac{1}{x}})+c$, thent the value of k is

a) $\log 3$ b) $-\log 3$ c) $-\frac{1}{\log 3}$ d) $\frac{1}{\log 3}$

41. $\int\frac{\sec x}{\sqrt{\cos 2x}}dx=$

a) $\tan^{-1}(\sin x)+c$ b) $2\sin^{-1}(\tan x)+c$ c) $\tan^{-1}(\cos x)+c$ d) $\sin^{-1}(\tan x)+c$

42. $\int\frac{\sin^8 x-\cos^8 x}{1-2\sin^2 x\cos^2 x}dx$ is

a) $\frac{1}{2}\sin 2x+c$ b) $-\frac{1}{2}\sin 2x+c$ c) $\frac{1}{2}\cos 2x+c$ d) $-\frac{1}{2}\cos 2x+c$

43. $\int \frac{\sec^2 x}{\tan^2 x - 1} dx =$

a) $2\log\left|\frac{1-\tan x}{1+\tan x}\right| + c$ b) $\log\left|\frac{1+\tan x}{1-\tan x}\right| + c$

c) $\frac{1}{2}\log\left|\frac{\tan x+1}{\tan x-1}\right| + c$ d) $\frac{1}{2}\log\left|\frac{\tan x-1}{\tan x+1}\right| + c$

44. $\int \sin\sqrt{x}\, dx =$

a) $2(-\sqrt{x}\cos\sqrt{x} + \sin\sqrt{x}) + c$ b) $2(-\sqrt{x}\cos\sqrt{x} - \sin\sqrt{x}) + c$

c) $2(-\sqrt{x}\sin\sqrt{x} - \cos\sqrt{x}) + c$ d) $2(-\sqrt{x}\sin\sqrt{x} + \cos\sqrt{x}) + c$

45. $\int e^{\sqrt{x}}\, dx =$

a) $2\sqrt{x}\,(1-e^{\sqrt{x}}) + c$ b) $2\sqrt{x}\,(e^{\sqrt{x}} - 1) + c$ c) $2e^{\sqrt{x}}\,(1-\sqrt{x}) + c$ d) $2e^{\sqrt{x}}\,(\sqrt{x}-1) + c$

46. Given that $P(A) = 0.52$, $P(B) = 0.43$ and $P(A \cap B) = 0.24$, find the value of $P(\overline{A} \cap \overline{B})$ is

a) 0.28 b) 0.71 c) 0.24 d) 0.29

47. If A and B are mutually exclusive events $P(A) = \frac{3}{8}$ and $P(B) = \frac{1}{8}$, then find $P(\overline{A} \cap B)$ is

a) $\frac{5}{8}$ b) $\frac{1}{2}$ c) $\frac{1}{8}$ d) 1

48. $P\left(\frac{A}{B}\right) + P\left(\frac{\overline{A}}{B}\right) =$

a) 0 b) 1 c) 2 d) 4

49. If A and B are independent then $P(A \cap B) =$

a) $P(A) + P(B) - P(A \cup B)$ b) $P(A) + P(B)$

c) $P(A) - P(A \cap B)$ d) $P(A) \cdot P(B)$

50. A bag contains 6 green, 2 white and 7 black balls. If two balls are drawn simultaneously, then the probability that both are different colours is

a) $\frac{68}{105}$ b) $\frac{71}{105}$ c) $\frac{64}{105}$ d) $\frac{73}{105}$

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Name: Section: Reg. No.

One Mark Test - 10

Standard XI

MATHEMATICS

Time : 1.00 hr. Marks : 50

Choose and write the correct answer: 50x1=50

1. If the function $f(x) = x\,|x|$ defined on $[-2, 2]$, then the range of the function is

   a) $[-2, 2]$ b) $[-4, 4]$ c) $(-2, 2)$ d) $(-4, 4)$

2. Find the range of the function $\frac{1}{2\cos x - 1}$ is

   a) $\left(-\infty, -\frac{1}{3}\right) \cup (1, \infty)$ b) $\left(-\infty, -\frac{1}{3}\right] \cup [1, \infty)$ c) $(-\infty, \infty)$ d) $\left(\frac{-1}{3}, 1\right)$

3. The range of the function $f(x) = \left|\lfloor x \rfloor - x\right|$, $x \in \mathbb{R}$ is

   a) $[0, 1]$ b) $[0, \infty)$ c) $[0, 1)$ d) $(0, 1)$

4. $n(A) = 2$ and $n(B \cup C) = 3$ then $n[(A \times B) \cup (A \times C)] =$

   a) 2^3 b) 3^2 c) 6 d) 5

5. The number of roots of $(x+3)^4 + (x+5)^4 = 16$ is

   a) 4 b) 2 c) 3 d) 0

6. The value of $\log_3 11 \cdot \log_{11} 13 \cdot \log_{13} 15 \cdot \log_{15} 27 \cdot \log_{27} 81$ is

   a) 1 b) 2 c) 3 d) 4

7. If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is

   a) 0.5 b) 2.5 c) 1.5 d) 1.25

8. If $\frac{kx}{(x+2)(x-1)} = \frac{2}{x+2} + \frac{1}{x-1}$, then the value of k is

   a) 1 b) 2 c) 3 d) 4

9. If $\cos 28° + \sin 28° = k^3$, then $\cos 17°$ is equal to

   a) $\frac{k^3}{\sqrt{2}}$ b) $-\frac{k^3}{\sqrt{2}}$ c) $\pm\frac{k^3}{\sqrt{2}}$ d) $-\frac{k^3}{\sqrt{3}}$

10. Let $f_k(x) = \frac{1}{k}\left[\sin^k x + \cos^k x\right]$ where $x \in R$ and $k \geq 1$. Then $f_4(x) - f_6(x) =$

    a) $\frac{1}{4}$ b) $\frac{1}{12}$ c) $\frac{1}{6}$ d) $\frac{1}{3}$

11. $\cos 1° + \cos 2° + \cos 3° + \ldots + \cos 179° =$

    a) 0 b) 1 c) -1 d) 89

12. If $\cos\theta = \cos\alpha$, where $\alpha \in [0, \pi]$, then the general solution is

    a) $\theta = n\pi \pm \alpha,\ n \in \mathbb{Z}$ b) $\theta = 2n\pi \pm \alpha,\ n \in \mathbb{Z}$

    c) $n\pi + (-1)^n \alpha,\ n \in \mathbb{Z}$ d) $n\pi - (-1)^n \alpha,\ n \in \mathbb{Z}$

13. Find the value of $\frac{7!}{2!} =$

    a) 2250 b) 2020 c) 2520 d) 2025

14. If ${}^{n}C_{x} = {}^{n}C_{y}$ then either $x = y$ or $x + y =$

a) n b) 0 c) n + 1 d) 1

15. If ${}^{a^2-a}C_2 = {}^{a^2-a}C_4$ then the value of a is

a) 2 b) 3 c) 4 d) 5

16. In 3 fingers, the number of ways four rings can be worn is ..... ways.

a) $4^3 - 1$ b) 3^4 c) 68 d) 64

17. If ${}^{n}C_{10} > {}^{n}C_{r}$, for all possible r, then a value of n is

a) 10 b) 21 c) 19 d) 20

18. The sum upto n terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \sqrt{32} + ...$ is

a) $\frac{n(n+1)}{2}$ b) $2n(n+1)$ c) $\frac{n(n+1)}{\sqrt{2}}$ d) 1

19. The remainder when 38^{15} is divided by 13 is

a) 12 b) 1 c) 22 d) 5

20. The coefficient of x^5 in the series e^{-2x} is

a) $\frac{2}{3}$ b) $\frac{3}{2}$ c) $-\frac{4}{15}$ d) $\frac{4}{15}$

21. Which of the following point lie on the locus of $3x^2 + 3y^2 - 8x - 12y + 17 = 0$

a) (0, 0) b) (−2, 3) c) (1, 2) d) (0, −1)

22. The intercepts of the perpendicular bisector of the line segment joining (1, 2) and (3, 4) with coordinate axes are

a) 5, −5 b) 5, 5 c) 5, 3 d) 5, −4

23. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$, then c equals to

a) −3 b) −1 c) 3 d) 1

24. The area of the triangle formed by the lines $x^2 - 4y^2 = 0$ and $x = a$ is

a) $2a^2$ b) $\frac{\sqrt{3}}{2}a^2$ c) $\frac{1}{2}a^2$ d) $\frac{2}{\sqrt{3}}a^2$

25. What is the equation of the bisectors of the angle between the lines $ax^2 + 2hxy + by^2 = 0$?

a) $\frac{x^2 - y^2}{a - b} = xy$ b) $\frac{x^2 - y^2}{a - b} = \frac{xy}{h}$ c) $\frac{x^2 - y^2}{a + b} = xy$ d) $\frac{x^2 + y^2}{a + b} = \frac{xy}{h}$

26. What must be the matrix X, if $2X + \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 3 \end{bmatrix}$?

a) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ b) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$ c) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ d) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

27. Which one of the following is not true about the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{bmatrix}$?

a) a scalar matrix b) a diagonal matrix
c) an upper triangular matrix d) a lower triangular matrix

28. The value of the determinant of $A = \begin{bmatrix} 0 & a & -b \\ -a & 0 & c \\ b & -c & 0 \end{bmatrix}$ is

a) 2bc b) abc c) 0 d) $a^2 + b^2 + c^2$

29. If $A+I=\begin{bmatrix}3 & -2\\ 4 & 1\end{bmatrix}$, then $(A+I)(A-I)$ is equal to

a) $\begin{bmatrix}-5 & -4\\ 8 & -9\end{bmatrix}$ b) $\begin{bmatrix}-5 & 4\\ -8 & 9\end{bmatrix}$ c) $\begin{bmatrix}5 & 4\\ 8 & 9\end{bmatrix}$ d) $\begin{bmatrix}-5 & -4\\ -8 & -9\end{bmatrix}$

30. Find the value of λ for which the vectors $\vec{a}=3\hat{i}+2\hat{j}+9\hat{k}$ and $\vec{b}=\hat{i}+\lambda\hat{j}+3\hat{k}$ are parallel.

a) $\frac{-2}{3}$ b) $\frac{3}{2}$ c) $\frac{2}{3}$ d) $\frac{-3}{2}$

31. If $\vec{r}=x\hat{i}+y\hat{j}+z\hat{k}$ be the position vector of any point and let α, β, γ be the direction angles of $\vec{r}$ then $\sin^2\alpha+\sin^2\beta+\sin^2\gamma=$

a) 0 b) 1 c) 2 d) -1

32. If $|\vec{a}|=13$, $|\vec{b}|=5$ and $\vec{a}\cdot\vec{b}=60°$ then $|\vec{a}\times\vec{b}|$ is

a) 15 b) 35 c) 45 d) 25

33. If $|\vec{a}+\vec{b}|=60$, $|\vec{a}-\vec{b}|=40$ and $|\vec{b}|=46$, then $|\vec{a}|$ is

a) 42 b) 12 c) 22 d) 32

34. Find the value of $\lim_{x\to 3}\frac{(x^2-6x+5)}{x^3-8x+7}$ is

a) $-\frac{2}{5}$ b) $\frac{2}{5}$ c) $-\frac{5}{2}$ d) $\frac{5}{2}$

35. $\lim_{x\to 0}\frac{\log(1+x)}{x}=$

a) -1 b) 0 c) 1 d) ∞

36. $\lim_{x\to 3}\lfloor x\rfloor=$

a) 2 b) 3 c) does not exist d) 0

37. At $x=\frac{3}{2}$ the function $f(x)=\frac{|2x-3|}{2x-3}$ is

a) continuous b) discontinuous c) differentiable d) non-zero

38. $\lim_{\alpha\to\pi/4}\frac{\sin\alpha-\cos\alpha}{\alpha-\frac{\pi}{4}}$ is

a) $\sqrt{2}$ b) $\frac{1}{\sqrt{2}}$ c) 1 d) 2

39. If $\lim_{x\to 0}\frac{\sin px}{\tan 3x}=4$, then the value of p is

a) 6 b) 9 c) 12 d) 4

40. Find the value of $\lim_{x\to 0}\frac{xe^x-\sin x}{x}$ is

a) 1 b) 2 c) 3 d) 0

41. $\frac{d}{dx}\left(100x^9\right)=$

a) 900 b) $900x$ c) $100x^8$ d) $900x^8$

42. If $y = \frac{1}{4}x^4$, $u = \frac{2}{3}x^3 + 5$, then $\frac{dy}{dx}$ is

a) $\frac{1}{27}x^2(2x^3+15)^3$ b) $\frac{2}{27}x(2x^3+5)^3$ c) $\frac{2}{27}x^2(2x^3+15)^3$ d) $-\frac{2}{27}x(2x^3+5)^3$

43. If $y = mx + c$ and $f(0) = f'(0) = 1$, then $f(2)$ is

a) 1 b) 2 c) 3 d) -3

44. If $pv = 81$, then $\frac{dp}{dv}$ at $v = 9$ is

a) 1 b) -1 c) 2 d) -2

45. If $f(x) = \begin{cases} x+1, & \text{when } x < 2 \\ 2x-1, & \text{when } x \geq 2 \end{cases}$, then $f'(2)$ is

a) 0 b) 1 c) 2 d) does not exist

46. The number of points in $\mathbb{R}$ in which the function $f(x) = |x-1| + |x-3| + \sin x$ is not differentiable, is

a) 3 b) 2 c) 1 d) 4

47. $\int 2^{3x+5}\,dx$ is

a) $\frac{3(2^{3x+5})}{\log 2} + c$ b) $\frac{2^{3x+5}}{2\log(3x+5)} + c$ c) $\frac{2^{3x+5}}{2\log 3} + c$ d) $\frac{2^{3x+5}}{3\log 2} + c$

48. $\int \sin^3 x\,dx$ is

a) $\frac{-3}{4}\cos x - \frac{\cos 3x}{12} + c$ b) $\frac{3}{4}\cos x + \frac{\cos 3x}{12} + c$

c) $\frac{-3}{4}\cos x + \frac{\cos 3x}{12} + c$ d) $\frac{-3}{4}\sin x - \frac{\sin 3x}{12} + c$

49. If A and B are mutually exclusive events $P(A) = \frac{3}{8}$ and $P(B) = \frac{1}{8}$, then find $P(\overline{A})$ is

a) $\frac{1}{8}$ b) $\frac{5}{8}$ c) $\frac{1}{2}$ d) 1

50. If m is a number such that $m \leq 5$, then the probability that quadratic equation $2x^2 + 2mx + m + 1 = 0$ has real roots is

a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{4}{5}$

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