Standard : X
M401

Mathematics

One Mark Test (Full Portion)

Time : 1 Hr
Marks : 50

SECTION - I

Note : Choose the correct answer from the given four alternatives and write the option code and the corresponding answer. **50 x 1 = 50**

1. If $A = \{1, 2, 3, 4, 5\}$, $B = N$ and $f : A \to B$ be defined by $f(x) = x^2$, then the range of f is
   a) $\{1, 2, 3, 4, 5\}$ b) $\{1, 8, 27, 64, 125\}$
   c) $\{1, 4, 9, 16, 25\}$ d) $\{2, 4, 6, 8, 10\}$
2. For two sets A and B, $A \cup B = A$ if and only if
   a) $B \subseteq A$ b) $A \subseteq B$ c) $A \neq B$ d) $A \cap B = \phi$
3. If $A \subset B$, then $A \cap B$ is
   a) B b) $A \setminus B$ c) A d) $B \setminus A$
4. For any three sets A, B and C, $A \cap (B \cup C)$ is
   a) $(A \cup B) \cup (B \cap C)$ b) $(A \cap B) \cup (A \cap C)$
   c) $A \cup (B \cap C)$ d) $(A \cup B) \cap (B \cup C)$
5. For any three sets A, B and C, $B \setminus (A \cup C)$ is
   a) $(A \setminus B) \cap (A \setminus C)$ b) $(B \setminus A) \cap (B \setminus C)$
   c) $(B \setminus A) \cap (A \setminus C)$ d) $(A \setminus B) \cap (B \setminus C)$
6. The number of terms in the Arithmetic series $5 + 11 + 17 + \ldots + 95$ is
   a) 15 b) 17 c) 16 d) 14
7. Which one of the following is not true?
   a) A sequence is a real valued function defined on N
   b) Every function represents a sequence
   c) A sequence may have infinitely many terms
   d) A sequence may have a finite number of terms
8. If the sequence $a_1, a_2, a_3, \ldots$ is in A.P, then the sequence $a_5, a_{10}, a_{15}, \ldots$ is
   a) a G.P b) an A.P
   c) neither A.P nor G.P d) a constant sequence
9. If x, 2x + 2, 3x + 3 are in G.P, then 5x, 10x + 10, 15x + 15 form
   a) an A.P b) a G.P
   c) a constant sequence d) neither A.P nor a G.P
10. If $x \neq 0$, then $1 + \sec x + \sec^2 x + \sec^3 x + \sec^4 x + \sec^5 x$ is equal to
    a) $(1 + \sec x)(\sec^2 x + \sec^3 x + \sec^4 x)$
    b) $(1 + \sec x)(1 + \sec^2 x \sec^4 x)$
    c) $(1 - \sec x)(\sec x + \sec^3 x + \sec^5 x)$
    d) $(1 + \sec x)(1 + \sec^3 x + \sec^4 x)$
11. The GCD of $x^3 + 1$ and $x^4 - 1$ is
    a) $x^3 - 1$ b) $x^3 + 1$ c) $x + 1$ d) $x - 1$
12. The LCM of $x^3 - a^3$ and $(x - a)^2$ is
    a) $(x^3 - a^3)(x + a)$ b) $(x^3 - a^3)(x - a)^2$
    c) $(x - a)^2(x^2 + ax + a^2)$ d) $(x + a)^2(x^2 + ax + a^2)$

13. The lowest form of the rational expression $\frac{x^2+5x+6}{x^2-x-6}$ is

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

14. If $\frac{a+b}{a-b}$ and $\frac{a^3-b^3}{a^3+b^3}$ are the two rational expressions, then their product is

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

15. A quadratic equation whose one root is 3 is

a) $x^2-6x-5=0$ b) $x^2+6x-5=0$
c) $x^2-5x-6=0$ d) $x^2-5x+6=0$

16. If $A=\begin{pmatrix}2&3\\-9&5\end{pmatrix}-\begin{pmatrix}1&5\\7&-1\end{pmatrix}$, then the additive inverse of A is

a) $\begin{pmatrix}1&-2\\-16&6\end{pmatrix}$ b) $\begin{pmatrix}3&8\\-2&4\end{pmatrix}$ c) $\begin{pmatrix}3&8\\16&6\end{pmatrix}$ d) $\begin{pmatrix}-1&2\\16&-6\end{pmatrix}$

17. Matrix $A=[a_{ij}]_{m\times n}$ is a square matrix if

a) $m<n$ b) $m>n$ c) $m=1$ d) $m=n$

18. If $A=(1\ -2\ 3)$ and $B=\begin{pmatrix}-1\\2\\-3\end{pmatrix}$ then $A+B$

a) (0 0 0) b) $\begin{pmatrix}0\\0\\0\end{pmatrix}$ c) (−14) d) not defined

19. If $\begin{pmatrix}8&4\\x&8\end{pmatrix}=4\begin{pmatrix}2&1\\1&2\end{pmatrix}$ then the value of x is

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

20. If $A=\begin{pmatrix}1&-2\\-3&4\end{pmatrix}$ and $A+B=0$, then B is

a) $\begin{pmatrix}1&-2\\-3&4\end{pmatrix}$ b) $\begin{pmatrix}-1&2\\3&-4\end{pmatrix}$ c) $\begin{pmatrix}-1&-2\\-3&-4\end{pmatrix}$ d) $\begin{pmatrix}1&0\\0&1\end{pmatrix}$

21. The centre of a circle is at (−6, 4). If one end of a diameter of the circle is at the origin, then the other end is

a) (12, −8) b) (−6, 4) c) (4, −6) d) (−12, 8)

22. The point P which divides the line segment joining the points A(1, −3) and B(−3, 9) internally in the ratio 1 : 3 is

a) (2, 1) b) (0, 0) c) $\left(\frac{5}{3},2\right)$ d) (1, −2)

23. If the line segment joining the points A(3, 4) and B(4, −3) meets the x axis at P, then the ratio in which P divides the segment AB is

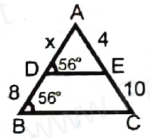
a) 4 : 3 b) 3 : 4 c) 2 : 3 d) 4 : 1

24. The point of intersection of the straight lines $9x - y - 2 = 0$ and $2x + y - 9 = 0$ is
a) 6 b) 4 c) 1 d) 3

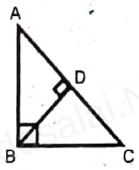
25. The point intersection of the straight lines $9x - y - 2 = 0$ and $2x + y - 9 = 0$ is
a) $(-1, 7)$ b) $(7, 1)$ c) $(1, 7)$ d) $(-1, -7)$

26. In ΔABC, the internal bisector AD of $\angle A$ meets the side BC at D. If BD = 2.5 cm, AB = 5 cm and AC = 4.2 cm, then DC =
a) 21 cm b) 210 cm c) 2.1 cm d) 0.21 cm

27. If the straight line intersects the sides AB and AC of a ΔABC at D and E respectively and is parallel to BC, then $\frac{AE}{AC}$ =
a) $\frac{AD}{DB}$ b) $\frac{AD}{AB}$ c) $\frac{DE}{BC}$ d) $\frac{AD}{EC}$

28. In the figure, the value x is equal to


a) 4.2 b) 3.2
c) 0.8 d) 0.4

29. From the given figure, identify the wrong statement


a) $\Delta ADB \sim \Delta ABC$ b) $\Delta ABD \sim \Delta ABC$
c) $\Delta BDC \sim \Delta ABC$ d) $\Delta ADB \sim \Delta BDC$

30. If a vertical stick 12 m long casts a shadow 8 m long on the ground at the same time a tower casts a shadow 40 m long on the ground, then the height of the tower is
a) 40 m b) 50 m c) 75 m d) 60 m

31. A ladder leaning against a vertical wall, makes on angle of 60° with the ground. If the foot of the ladder is 3.5 m away from the wall, then the length of the ladder is
a) 3.5 m b) $3.5\sqrt{3}$ m c) 7 m d) $7\sqrt{3}$ m

32. $1-\frac{\sin^2\theta}{1+\cos\theta}$
a) $\cos\theta$ b) $\tan\theta$ c) $\cot\theta$ d) $\operatorname{cosec}\theta$

33. $\frac{\sin(90°-\theta)\sin\theta}{\tan\theta} + \frac{\cos(90°-\theta)\cos\theta}{\cot\theta}$ =
a) $\tan\theta$ b) 1 c) -1 d) $\sin\theta$

34. $(1 + \tan^2\theta)(1 - \sin\theta)(1 + \sin\theta)$ =
a) $\cos^2\theta - \sin^2\theta$ b) $\sin^2\theta - \cos^2\theta$
c) $\sin^2\theta + \cos^2\theta$ d) 0

35. $\sin^2\theta + \frac{1}{1+\tan^2\theta}$ =
a) $\operatorname{cosec}^2\theta + \cot^2\theta$ b) $\operatorname{cosec}^2\theta - \cot^2\theta$
c) $\cot^2\theta - \operatorname{cosec}^2\theta$ d) $\sin^2\theta - \cos^2\theta$

36. If the circumference of the base of a solid right circular cone is 236 cm, and its slant height is 12 cm, then its curved surface area is
a) 141.6 cm^2 b) 14.16 cm^2 c) 1416 cm^2 d) 14160 cm^2

37. The curve surface area of a right circular cylinder whose radius is a units and height is b units, is equal to
a) $\pi a^2 b$ sq.cm b) $2\pi ab$ sq.cm
c) 2π sq.cm d) 2 sq.cm

38. The total surface area of a solid hemisphere whose radius is a units, is equal to
a) $2\pi a^2$ sq.units b) $3\pi a^2$ sq units c) $3\pi a$ sq units d) $3a^2$ sq units

39. Radius and height of a right circular cone and that of a right circular cylinder are respectively equal. If the volume of the cylinder is 120 cm^3, then the volume of the cone is equal to
a) 1200 cm^3 b) 360 cm^3 c) 40 cm^3 d) 90 cm^3

40. If the diameter and height of a right circular cone are 12 cm and 8 cm respectively then the slant height is
a) 10 cm b) 20 cm c) 30 cm d) 96 cm

41. The standard deviation of the first 13 natural numbers is
a) 374 b) 37.4 c) 3.47 d) 3.74

42. If the coefficient of variation of a collection of data is 57 and C.D is 6.84, then the mean is
a) 1.2 b) 12 c) 120 d) 21

43. The range of the first 10 prime numbers 2, 3, 5, 7, 11, 13, 17, 23, 29 is
a) 28 b) 26 c) 29 d) 27

44. If the variance of 14, 18, 22, 26, 30 is 32, then the variance of 28, 36, 44, 52, 60 is
a) 64 b) 128 c) $32\sqrt{2}$ d) 32

45. Given $\Sigma(x - \bar{x})^2 = 48$ $\bar{x} = 20$ and $n = 12$. The coefficient of variation is
a) 25 b) 20 c) 30 d) 10

46. The two coins are tossed together, then the probability of getting atmost one head is
a) $\frac{4}{3}$ b) $\frac{1}{4}$ c) $\frac{3}{4}$ d) $\frac{1}{2}$

47. If s is the sample space of a random experiment, then P(s) =
a) 0 b) $\frac{1}{8}$ c) $\frac{1}{2}$ d) 1

48. Let A and B be any two events and s be the corresponding sample space, then $P(\bar{A} \cap B)$ =
a) $P(B) - P(A \cap B)$ b) $P(A \cap B) - P(B)$
c) P(S) d) $P[(A \cup B)']$

49. The probability that a student will score centum in mathematics is $\frac{4}{5}$. The probability that be will not score centum is
a) $\frac{1}{5}$ b) $\frac{2}{5}$ c) $\frac{3}{5}$ d) $\frac{4}{5}$

50. There are 6 defective items in a sample of 20 items. One item is drawn at random. The probability that it is non-defective item is
a) $\frac{7}{10}$ b) 0 c) $\frac{3}{10}$ d) $\frac{2}{3}$