

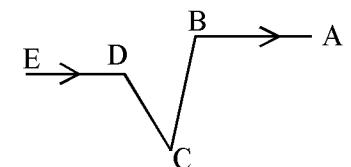
VII (EM) ADM

CENTRE FOR PEDAGOGICAL STUDIES IN MATHEMATICS (CPSM) ACHIEVEMENT-CUM-DIAGNOSTIC TEST IN MATHEMATICS - 2024

INSTRUCTION : Write your Name, Class, Roll No. etc. in the answersheet. Select the correct answer out of (a), (b), (c) and (d) of particular item and fill the specific rectangle **■** with blue/black ball pen denoting the correct answer. For example, if (c) is the correct answer to Q. No. X: blacken like this: Q. No. X: **□■□**. Rough work is to be done on separate paper. Marks will be deducted for wrong answer. Don't waste time for answering a question which appears difficult to you, better try the next question.

1. What is the complement of $\frac{2}{5}$ of a right angle?
 (a) 36° (b) 54° (c) 27° (d) 64°
2. The measures of three angles of an isosceles right angled triangle are
 (a) $90^\circ, 45^\circ, 45^\circ$ (b) $90^\circ, 30^\circ, 30^\circ$
 (c) $90^\circ, 60^\circ, 60^\circ$ (d) $90^\circ, 60^\circ, 30^\circ$
3. Fill in the blank. "In a right angled triangle the acute angles are _____"
 (a) equal (b) Complementary
 (c) Supplementary (d) none of these
4. In $\triangle ABC$, $\angle BAC = 84^\circ$, $\angle ABC = 5x^\circ$ and $\angle ACB = 3x^\circ$ find x .
 (a) 16 (b) 24 (c) 10 (d) 12

5. The angle between the two diagonals of a quadrilateral is 90° , the quadrilateral is a
 (a) rectangle (b) square
 (c) parallelogram (d) isosceles trapezium
 $\leftrightarrow \leftrightarrow$
6. $AB \parallel CD$, the transversal PQ intersects AB and CD at R and S respectively. A Straight line through S meets RB at T . If $\angle TRS = 115^\circ$ and $\angle RST : \angle TSD = 2:3$ find $\angle STB$.
 (a) 65° (b) 39° (c) 141° (d) 115°
7. From a point inside an equilateral triangle the lengths of the perpendiculars on the sides are p, q and r respectively. The length of each side of the triangle is
 (a) $\frac{2}{3}(p + q + r)$ (b) $\frac{2}{\sqrt{3}}(p + q + r)$
 (c) $\frac{1}{6}(p + q + r)$ (d) $\frac{1}{3}(p + q + r)$
8. In the adjoining figure
 $\overleftrightarrow{AB} \parallel \overleftrightarrow{DE}$, $\angle ABC = 122^\circ$
 and $\angle CDE = 123^\circ$ Find $\angle BCD$
 (a) 57° (b) 58°
 (c) 65° (d) 115°



9. If two straight lines intersect such that the four vertical angles are equal, then each angle is

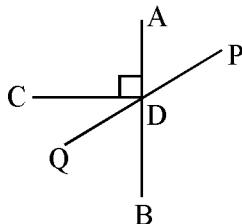
(a) 45° (b) 100° (c) 60° (d) 90°

10. In the adjoining figure

$\angle ADC = 90^\circ$, $\angle CDQ = 37^\circ$

Find $\angle PDB$

(a) 127° (b) 120°
(c) 143° (d) 133°



11. The supplement of five-sixth of a right angle is

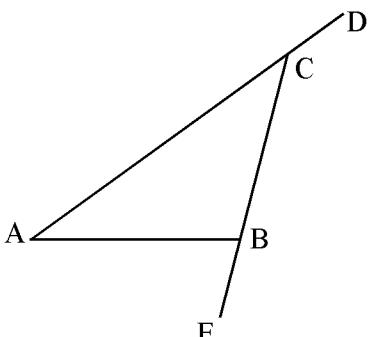
(a) 15° (b) 115°
(c) 105° (d) 125°

12. In the adjoining figure

$\angle ABE = 40^\circ$, $\angle CAB = 30^\circ$,
 $\angle ACB = \varphi$, and $\angle BCD = 110^\circ$

Find φ ,

(a) 45° (b) 60°
(c) 20° (d) 15°



13. The solid having ten plane surfaces is

(a) nonagon pyramid (b) nonagon prism
(c) octagonal pyramid (d) decagonal pyramid

14. A pyramid has 11 surfaces, the number of edges of the pyramid is

(a) 11 (b) 12 (c) 30 (d) 20

15. One side of a triangle is produced both ways and the measure of the exterior angles thus formed are 105° and 120° . The least angle of the triangle is

(a) 60° (b) 45° (c) 40° (d) 55°

16. The angle between the internal bisector and the external bisector of an angle is

(a) 45° (b) 60° (c) 90° (d) 180°

17. In $\triangle ABC$, $\angle A + \angle B = 135^\circ$ and $\angle B + \angle C = 120^\circ$, the measure of $\angle ABC$ is

(a) 90° (b) 65° (c) 60° (d) 75°

18. In $\triangle ABC$, $\angle ABC = 2\angle BAC$ and $\angle ACB = 3\angle BAC$, find the measure of the least angle of the triangle.

(a) 90° (b) 75° (c) 60° (d) 30°

19. The difference between the complementary and supplementary angles of an angle is

(a) 180° (b) 90° (c) 45° (d) 60°

20. In ΔABC , $\angle A : \angle B : \angle C = 1 : 2 : 3$, find $\angle B$

(a) 30° (b) 45° (c) 60° (d) 90°

21. Factorize :

$$x^2 + y^2 + yz + zx + 2xy$$

(a) $(x + y)(x + y + z)$ (b) $(y + z)(x + y + z)$
(c) $(z + x)(x + y + z)$ (d) $(x + y)(y + z)$

22. P is the third number of the series 188, 186, P, 174, 158, 126; The value of $\sqrt{P-13}$ is

(a) 14 (b) 12 (c) 13 (d) Non of these

23. $(-2ab^2)^0 =$

(a) 0 (b) 1 (c) $-ab^2$ (d) ab^2

24. If $x = 2$ and $y = 3$, find $\frac{1}{x^x} + \frac{1}{y^y}$

(a) $3\frac{15}{31}$ (b) 31 (c) $\frac{1}{31}$ (d) $\frac{31}{108}$

25. If $a = 3$, $b = 2$ and $c = 1$ then $\frac{a}{b} + \frac{b}{c} + \frac{c}{a} =$

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

26. $p - [-q - \{-r - (p - \overline{q-r}) + p - q\}] =$

(a) $p + q + r$ (b) $p + q - r$
(c) $p - q - 2r$ (d) $p + q - 2r$

27. What should be subtracted from $a + b - c$ so that the difference will be $a + b + c$.

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

28. If $x - \frac{1}{x} = 3$ then $\frac{x}{x^2 - x - 1} =$

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

29. If $x + \frac{1}{x} = 3$ then $x^4 + \frac{1}{x^4} =$

(a) 47 (b) 51 (c) 45 (d) 23

30. The sum of the present ages of x students of your class is 'a' years; after 2 years the sum of the ages of those students will be

(a) $2(a + x)$ yrs. (b) $(a + ax)$ yrs.
(c) $(a + x)$ yrs. (d) $(a + 2x)$ yrs.

31. $ab =$

(a) $\frac{(a+b)^2}{2} - \frac{(a-b)^2}{2}$

(b) $\frac{(a+b)^2}{4} - \frac{(a-b)^2}{4}$

(c) $\frac{(a+b)^2}{4} + \frac{(a-b)^2}{4}$

(d) $\frac{(a-b)^2}{4} - \frac{(a+b)^2}{4}$

32. The average of three numbers is x ; if the first number is a and the third number is $\frac{a}{2}$ then the second number is

(a) $3\left(x - \frac{a}{2}\right)$

(b) $3\left(x + \frac{a}{2}\right)$

(c) $3x - \frac{a}{2}$

(d) $3x + \frac{a}{2}$

33. Find x from the equation $\frac{x}{3} + \frac{3}{4} = \frac{x}{4} - \frac{4}{5}$

(a) -18

(b) $18\frac{3}{5}$

(c) 18

(d) $-18\frac{3}{5}$

34. If $a = b^2$, $b = c^3$ and $c = 2x^4$ then find a when $x = -1$

(a) 64

(b) -64

(c) 32

(d) 48

35. If $x + \frac{1}{x} = 5$, the value of $\frac{x}{1+x+x^2}$ is

(a) 1

(b) 6

(c) $\frac{1}{6}$

(d) $\frac{1}{3}$

36. Express $\left(a^2 - \frac{1}{b^2}\right)\left(b^2 - \frac{1}{a^2}\right)$ as a perfect square.

(a) $\left(ab + \frac{1}{ab}\right)^2$

(b) $\left(ab - \frac{1}{ab}\right)^2$

(c) $(ab - 1)^2$

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

37. If $(a+b)^2 = 64$ and $(a-b)^2 = 16$, find the value of ab .

(a) 20

(b) 8

(c) 16

(d) 12

38. For what value of t the expression $\frac{x^2}{y^2} + tx + \frac{y^2}{4}$ will be a perfect square?

(a) 4

(b) ± 2

(c) ± 1

(d) none of these

39. The sum of the ages of two boys is x years. What was the sum of their ages before y years?

(a) $(x - y)$ yrs.

(b) $(x - 2y)$ yrs.

(c) $(x + 2y)$ yrs.

(d) $(x + y)$ yrs.

40. If $a = 3K$ and $b = 2K$, find the value of $4a^2 - 12ab + 9b^2$

(a) $144K^2$

(b) K^2

(c) 0

(d) 1

41. The sum of the squares of two positive numbers is 601, if one of them be 5, then the other number is

(a) 34 (b) 28 (c) 26 (d) 24

42. $1 \div [1 + 1 \div \{1 + 1 \div (1 + 1 \div \overline{1 + 1 \div 2})\}] =$

(a) $\frac{8}{13}$ (b) $\frac{13}{8}$ (c) $\frac{4}{13}$ (d) $\frac{1}{13}$

43. The number nearest to 5000 which is exactly divisible by 24, 32, 36 and 48 is

(a) 4808 (b) 5174
(c) 5184 (d) 4896

44. $2 \cdot 3\dot{7}5 + 0 \cdot 81\dot{7}3 + 4 \cdot 31 =$

(a) 7.5023 (b) 7.50307489
(c) 7.50307489 (d) 7.50307

45. Express $3\frac{7}{15}$ as a recurring decimal

(a) $3 \cdot 46\dot{7}$ (b) $3 \cdot 4\dot{6}$
(c) $3 \cdot 4\dot{6}$ (d) $3 \cdot 4\dot{7}$

46. Find the simple interest at the end of $3\frac{1}{2}$ years at the rate of $8\frac{1}{3}\%$ on Rs. 6450.

(a) Rs. 1881 (b) Rs. 1881.25
(c) Rs. 1880 (d) Rs. 8331.25

47. What sum will amount to Rs. 840 in 5 years at $6\frac{2}{3}\%$?

(a) Rs. 650 (b) Rs. 600
(c) Rs. 720 (d) Rs. 630

48. The sum of the squares of two numbers is 601; if one of them is 5, find the other.

(a) 24 (b) 26 (c) 28 (d) 18

49. The L.C.M. and H.C.F. of two fractions are $6\frac{2}{3}$ and $\frac{2}{9}$ respectively. If one fraction is $3\frac{1}{3}$ find the other

(a) $\frac{2}{3}$ (b) $\frac{40}{27}$ (c) $\frac{4}{9}$ (d) $\frac{16}{9}$

50. One number is twice the other, the product of the numbers is 2048. The sum of those two numbers is

(a) 96 (b) 64 (c) 128 (d) 108

51. The greatest number of five digits which is a perfect square is

(a) 99225

(b) 99099

(c) 99956

(d) 99856

52. The unit digit of $(125)^5 + (346)^6$ is

(a) 2

(b) 1

(c) 5

(d) 6

53. The unit digit of $11^2 + 121^3 + 1221^4 + 12221^5$ is

(a) 1

(b) 5

(c) 4

(d) 3

54. Which is the greatest of the following.

$$4\frac{1}{2} \div 3\frac{1}{3}, 4\frac{1}{2} \times 3\frac{1}{3}, 4\frac{1}{2} - 3\frac{1}{3}, 4\frac{1}{2} + 3\frac{1}{3}$$

(a) $4\frac{1}{2} \div 3\frac{1}{3}$

(b) $4\frac{1}{2} \times 3\frac{1}{3}$

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

(d) $4\frac{1}{2} + 3\frac{1}{3}$

55. Determine the difference between 2 metre square and 2 square metre.

(a) no difference

(b) 4 sq.m.

(c) 1 sq.m.

(d) 2 sq.m.

56. The H.C.F. of two numbers is x and L.C.M. of those two numbers is y, if one of the numbers is z then the other is

(a) $\frac{xy}{z}$

(b) $\frac{zx}{y}$

(c) $\frac{yz}{x}$

(d) xyz

57. Express 54 Km per hour in metres per second

(a) 10 m/sec.

(b) 7.5 m/sec.

(c) 15 m/sec.

(d) 30 m/sec.

58. Three years ago the average age of A and B was 18 years. With C joining them now the average age becomes 22 years. How old is C now?

(a) 24 yrs.

(b) 27 yrs.

(c) 28 yrs.

(d) 30 yrs.

59. Find the missing term of the series 1, 4, 27, 16, ?, 36.

(a) 25

(b) 87

(c) 120

(d) 125

60. The ratio of two numbers is 3 : 5, but if each is increased by 10, the ratio becomes 5 : 7. The numbers are

(a) 13, 22

(b) 15, 25

(c) 3, 5

(d) 30, 50

61. What percent of $\frac{2}{7}$ is $\frac{1}{35}$?

(a) 5%

(b) 10%

(c) 20%

(d) 15%

62. One litre of water is evaporated from 6 litres of a solution containing 5% salt. The percentage of salt in the remaining solution is

(a) $4\frac{4}{9}\%$ (b) 5% (c) 6% (d) $5\frac{5}{7}\%$

63. How many numbers between 200 and 600 are divisible by 4, 5 and 6.

(a) 8 (b) 7 (c) 6 (d) 5

64. When n is divided by 4, the remainder 3; What will be the remainder when $2n$ is divided by 4 ?

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

65. The length of a rectangle is increased by 10% and its breadth is decreased by 10%. Then the area of the new rectangle is

(a) neither increased nor decreased
(b) increased by 1%
(c) decreased by 1%
(d) decreased by 10%

66. If each side of a square is increased by 10%, find the increase percent in its area.

(a) 10% (b) 20% (c) 19% (d) 21%

67. A six digit number is formed by repeating a three digit number, [for example 256256 or 679679 etc.] Any number of this form is always exactly divisible by

(a) 7 only (b) 11 only (c) 13 only (d) 1001

68. The smallest number to be added to 1000 so that 45 divides the sum exactly is

(a) 35 (b) 20 (c) 10 (d) 80

69. What is the unit's digit of the product of all prime numbers between 1 and 100?

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

70. Consider the following statements :

The number 23 is

A. a prime number.
B. a real number.
C. an irrational number
D. a rational number.

of these statements :

(a) A, B, D are correct (b) A, B, C are correct
(c) B, C, D are correct (d) A, C, D are correct.

