Sample Paper

1

Time : 90 Minutes   **Max Marks : 40**

SECTION-A

Section A consists of 20 questions of 1 mark each. Any 16 quesions are to be attempted.

1.   Two numbers are in the ratio of 15 : 11. If their H.C.F. is 13, then numbers will be

(a) 195 and 143   (b)   190 and 140

(c) 185 and 163   (d)   185 and 143

2.   Put suitable word in the sentence below:

$\dfrac{35}{50}$ has .... decimal expansion.

(a) Terminating   (b)   Non-terminating

(c) Recurring   (d)   Repeating

3.   Which of the following is true?

(a) π is equal to $\dfrac{22}{7}$

(b) The only real numbers are rational numbers

(c) Every non-terminating decimal can be written as a periodic decimal

(d) 0.21 lies between 0.2 and 0.3

4.   A polynomial of degree 7 is divided by a polynomial of degree 4. Degree of the quotient is

(a) less than 3   (b)   3   (c)   more than 3   (d)   more than 5

5.   If 1 is zero of polynomial

$p(x) = ax^2 - 3(a - 1)x - 1$, find a.

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

6. Two isosceles triangles have their corresponding angles equal and their areas are in the ratio 25 : 36. The ratio of their corresponding height is

    (a) 25 : 35   (b) 36 : 25   (c) 5 : 6   (d) 6 : 5

7. Two dice are thrown at a time, then find the probability that the difference of the numbers shown on the dice is 1.

    (a) $\dfrac{3}{16}$ (b) $\dfrac{5}{18}$ (c) $\dfrac{7}{36}$ (d) $\dfrac{7}{18}$

8. The coordinates of the point which is reflection of point (–3, 5) in x-axis are

    (a) (3, 5)   (b) (3, –5)   (c) (–3, –5)   (d) (–3, 5)

9. In the given figure, AD is the bisector of ∠A. If BD = 4 cm, DC = 3 cm and AB = 6 cm, determine AC
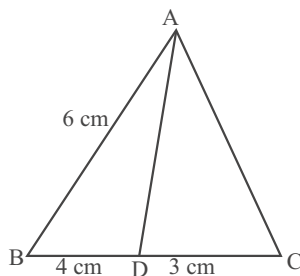

    (a) 4.5 cm   (b) 3.5 cm   (c) 4.8 cm   (d) 3.2 cm

10. If $b \tan \theta = a$, the value of $\dfrac{a \sin \theta - b \cos \theta}{a \sin \theta + b \cos \theta}$ is

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

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

11. If the sum of the ages (in years) of a father and his son is 65 and twice the difference of their ages (in years) is 50, what is the age of the father?

    (a) 45 years   (b) 40 years   (c) 50 years   (d) 55 years

12. If the point P(6, 2) divides the line segment joining A(6, 5) and B(4, y) in the ratio 3 : 1, then the value of y is

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

13. If $x = p \sec \theta$ and $y = q \tan \theta$, then

    (a) $x^2 - y^2 = p^2 q^{2z}$ (b) $x^2 q^2 - y^2 p^2 = pq$

    (c) $x^2 q^2 - y^2 p^2 = \dfrac{1}{p^2 q^2}$ (d) $x^2 q^2 - y^2 p^2 = p^2 q^2$

14. If $f(x) = 2x^3 - 6x + 4x - 5$ and $g(x) = 3x^2 - 9$, then the value of $f(1) + g(-2)$ is

    (a) –3   (b) –2   (c) 3   (d) 2

15. A book containing 100 pages is opened at random. Find the probability that a doublet page is found.

    (a) $\dfrac{8}{25}$ (b) $\dfrac{9}{100}$ (c) $\dfrac{7}{100}$ (d) $\dfrac{11}{100}$

16. $\sin^2 \theta + \operatorname{cosec}^2 \theta$ is always

    (a) greater than 1   (b) less than 1

    (c) greater than or equal to 2   (d) equal to 2

17. Points A and B are 90 km. apart from each other on a highway. A car starts from A and another from B at the same time. If they go in the same direction, they meet in 9 hrs and if they go in opposite directions, they meet in 9/7 hrs. Find their speeds.

(a) 40 km/hr, 30 km/hr

(b) 10 km/hr, 20 km/hr

(c) 20 km/hr, 30km/hr

(d) 50 km/hr, 40km/hr

18. The two consecutive odd positive integers, the sum of whose squares is 290 are

(a) 9, 11   (b) 11, 13   (c) 13, 15   (d) 15, 17

19. Determine the value of k for which the following system of equations becomes consistent :

$7x - y = 5, 21x - 3y = k.$

(a) k = 15   (b) k = 11   (c) k = 4   (d) k = $\dfrac{11}{2}$

20. The product of two numbers is 4107. If the H.C.F. of these numbers is 37, then find the greater number.

(a) 111   (b) 137   (c) 37   (d) 311

SECTION-B

Section B consists of 20 questions of 1 mark each. Any 16 quesions are to be attempted.

21. ABCD is a square. F is the mid-point of AB, BE is one-third of BC. If the area of the ΔFBE is 108 sq. cm find the length AC.

(a) $\left(\sqrt{36\sqrt{2}}\right)$ cm

(b) $37\sqrt{2}$ cm

(c) $\left(36\sqrt{2}\right)$ cm

(d) $(36)^2$ cm

22. A ladder 15 m long reaches a window which is 9 m above the ground on one side of the street. Keeping its foot at the same point, the ladder is turned to the other side of the street to reach a window 12 m high. Find the width of the street.
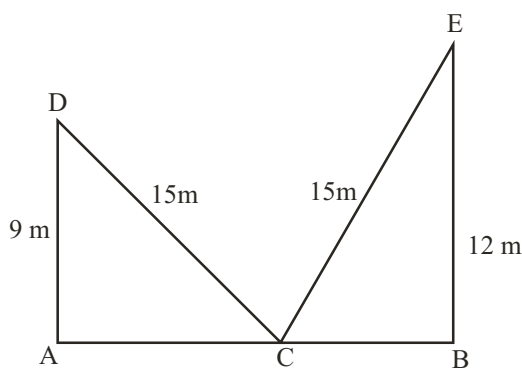
(a) 21 m   (b) 18 m   (c) 22 m   (d) 12 m

23. The graphs of the equations x – y = 2 and kx + y = 3, where k is a constant, intersect at the point (x, y) in the first quadrant, if and only if k is

(a) equal to – 1

(b) greater than – 1

(c) less than 3/2

(d) lying between – 1 and 3/2

24. If $0 < x \le \dfrac{\pi}{2}$, then sin x + cosec x ≥

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

25. If 5θ and 4θ are acute angles satisfying $\sin 5\theta = \cos 4\theta$, then $2\sin 3\theta - \sqrt{3} \tan 3\theta$ is equal to

(a) $\sin 2\theta$ (b) $\dfrac{1}{2}$ (c) $\dfrac{1}{\sqrt{3}}$ (d) 0

26. Which among the following is correct?

(a) The ratios of the areas of two similar triangles is equal to the ratio of their corresponding sides.

(b) The areas of two similar triangles are in the ratio of the corresponding altitudes.

(c) The ratio of area of two similar triangles are in the ratio of the corresponding medians.

(d) If the areas of two similar triangles are equal, then the triangles are congruent.

27. If the system of equations $2x + 3y = 7$ and $2ax + (a + b)y = 28$ represents coincident lines, which of the conditions holds true?

(a) $b = 2a$ (b) $a = 2b$

(c) $2a + b = 0$ (d) $a + 2b = 0$

28. Solve the following system of linear equations :

$2(ax - by) + (a + 4b) = 0$
$2(bx + ay) + (b - 4a) = 0$

(a) $x = 0$, $y = 1$ (b) $x = -1/2$, $y = 2$

(c) $x = 1$, $y = 2$ (d) $x = 1/2$, $y = -1/2$

29. Find α and β if $x + 1$ and $x + 2$ are factors of $p(x) = x^3 + 3x^2 - 2\alpha x + \beta$

(a) $3, -1$ (b) $-1, 0$ (c) $0, -3$ (d) $5, 6$

30. If one zero of the quadratic polynomial $2x^2 - 8x - m$ is $\dfrac{5}{2}$, then the other zero is

(a) $\dfrac{2}{3}$ (b) $-\dfrac{2}{3}$ (c) $\dfrac{3}{2}$ (d) $\dfrac{-15}{2}$

31. If $x = 2$ and $x = 0$ are roots of the polynomials $f(x) = 2x^3 - 5x^2 + ax + b$. Then values of a and b respectively are

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

32. If $\cos A = -$, find the value of $9 \cot^2 A - 1$.

(a) 1 (b) $\dfrac{16}{65}$ (c) $\dfrac{65}{16}$ (d) 0

33. Which of the following statement is false?

(a) All isosceles triangles are similar.   (b) All equilateral triangles are similar.

(c) All circles are similar.   (d) None of the above

34. If one root of the equation $px^2 - 14x + 8 = 0$ is six times the other, then p is equal to

(a) 2 (b) 3 (c) 1 (d) none of these

35. Determine the values of a and b for which the following system of linear equations has infinitely many solutions:

$3x - (a + 1)y = 2b - 1$, $5x + (1 - 2a)y = 3b$

(a) $a = 8, b = 5$ (b) $a = 4, b = 6$ (c) $a = 7, b = 1$ (d) $a = 5, b = 3$

36. If $\sin\theta = \dfrac{a^2 - b^2}{a^2 + b^2}$, then find $\operatorname{cosec}\theta + \cot\theta$.

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

37. Degree of polynomial $y^3 - 2y^2 - \sqrt{3}y + \dfrac{1}{2}$ is

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

38. Solve the following system of equations
$ax + by = c;$ $bx - ay = c$

(a) $x = \dfrac{a}{a^2 + b^2}, y = \dfrac{b}{a^2 + b^2}$ (b) $x = \dfrac{1}{a}, y = \dfrac{1}{b}$

(c) $x = \dfrac{2ab}{(a+b)^2}, y = \dfrac{2ab}{(a-b)^2}$ (d) $x = \dfrac{c(a+b)}{a^2 + b^2}, y = -\dfrac{c(a-b)}{a^2 + b^2}$

39. The decimal expansion of $\dfrac{21}{45}$ is :

(a) terminating   (b) non-terminating and repeating

(c) non-terminating and non-repeating   (d) none of these

40. Find the value of a if $(\sin A + \operatorname{cosec} A)^2 + (\cos A + \sec A)^2 = a + \tan^2 A + \cot^2 A$

(a) 5   (b) 4   (c) 0   (d) 7

SECTION-C

Case Study Based Questions:

Section C consists of 10 quesions of 1 mark each. Any 8 quesions are to be attempted.

Q 41. - Q 45 are based on case study-I

Case Study-I

HCF of natural numbers is the largest factor which is common to all the number and LCM of natural numbers is the smallest natural number which is multiple of all the numbers.

41. If p and q are two co-prime natural numbers, then their HCF is equal to

(a) p   (b) q   (c) 1   (d) pq

42. The LCM and HCF of two rational numbers are equal, then the numbers must be

(a) prime   (b) co-prime   (c) composite   (d) equal

43. If two positive integers a and b are expressible in the form $a = pq^2$ and $b = p^3q$; p, q being prime number, then LCM (a, b) is

(a) pq   (b) p^3q^3 (c) p^3q^2 (d) p^2q^2

44. The largest number which divides 285 and 1249 leaving remainders 9 and 7 respectively, is

(a) 46   (b) 6   (c) 12   (d) 138

45. The largest number which exactly divides 2011and 2623 leaving remainders 9 and 5 respectively is

(a) 11   (b) 22   (c) 154   (d) 13

Q 46 - Q 50 are based on case study-II

Case Study-II

An honest person invested some amount at the rate of 12% simple interest and some other amount at the rate of 10% simple interest. He received yearly interest of 130, but if he had interchanged amounts invested, he would have received 4 more as interest. If x be the amount invested at the rate of 12% and y be the amount invested at the rate of 10%, then answer the following questions.

46. What is the yearly interest in terms of x and y ?

(a) $\dfrac{12x+10y}{100}$ (b)   12 x + 10 y   (c)   10 x + 12 y   (d) $\dfrac{10x+12y}{100}$

47. Find the equation corresponding to yearly received interest of ₹130.

(a) 12 x + 10 y = 130   (b)   12 x + 10 y = 13000   (c)   6 x + 5 y = 6500   (d)   5 x + 6 y = 6500

48. Find the equation corresponding to x and y when invested amount is interchanged.

(a) 5 x + 6 y = 6700   (b)   6 x + 5 y = 6700   (c)   6 x + 5 y = 6300   (d)   5 x + 6 y = 6300

49. Which of the following is true for x and y ?

(a) x + y = 120   (b)   x + y = 1200   (c)   x – y = 100   (d)   x – y = 700

50. How much amount did he invest at different rates ?

(a) x = ₹ 500, y = ₹ 200   (b)   x = ₹ 500, y = ₹ 700

(c) x = ₹ 100, y = ₹ 500   (d)   x = ₹ 400, y = ₹ 300