Mathematics

Sample Question Paper 1

(Class 10) (Term – 1) (Session 2021-22)

Time: 1 hour 30 minutes **Number of Questions: 40**

General Instructions

1. The Question Paper contains three parts A, B and C.
2. Section A consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
3. Section B consists of 20 questions of 1 mark each. Any 16 questions are to be attempted.
4. Section C consists of 10 questions based on Two Case Studies. Attempt any 8 questions.
5. There is no negative marking.

SECTION – A

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

1. $(3+\sqrt{5})$ is:

(A) An integer
(B) A rational number
(C) An irrational number
(D) None of these

2. Which of the following rational numbers is expressible as a terminating decimal?

(A) 2027/625
(B) 1625/462
(C) 131/35
(D) 124/165

3. If two positive integers "a" and "b" are written as "a" = x^3y^2 and "b" = xy^3; x, y are prime numbers, then HCF (a, b) is:

(A) xy
(B) xy^2
(C) x^3y^3
(D) x^2y^2

4. If the HCF of 65 and 117 is expressible in the form 65 m – 117, then the value of "m" is:

(A) 4
(B) 2
(C) 1
(D) 3

5. The number of polynomials having zeroes as -2 and 5 is:

(A) 1
(B) 2
(C) 3
(D) More than 3

6. Given that one of the zeroes of the cubic polynomial $ax^3 + bx^2 + cx + d$ is zero, the product of the other two zeroes is:

(A) – c/a
(B) c/a
(C) 0
(D) – b/a

7. If the zeroes of the quadratic polynomial $ax^2 + bx + c$, $a \neq 0$ are equal, then:

(A) c and a have opposite signs
(B) c and b have opposite signs
(C) c and a have the same sign
(D) c and b have the same sign.

8. The pair of equations x = a and y = b graphically represents lines which are:

(A) Parallel
(B) Intersecting at (b, a)
(C) Coincident
(D) Intersecting at (a, b)

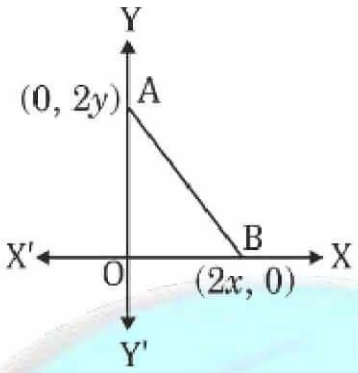
9. The pair of equations y = 0 and y = –7 has

(A) One solution
(B) Two solutions
(C) Infinitely many solutions
(D) No solution

10. If x = a, y = b is the solution of the equations x – y = 2 and x + y = 4, then the values of "a" and "b" are, respectively:

(A) 3 and 5
(B) 5 and 3
(C) 3 and 1
(D) –1 and 3

11. The coordinates of the point which is equidistant from the three vertices of the ΔAOB as shown in the figure is:



(A) (x, y)
(B) (y, x)
(C) $\left(\frac{x}{2}, \frac{y}{2}\right)$
(D) $\left(\frac{y}{2}, \frac{x}{2}\right)$

12. The distance of the point P (2, 3) from the x-axis is

(A) 2
(B) 3
(C) 1
(D) 5

13. The distance between the points A (0, 6) and B (0, – 2) is

(A) 6
(B) 8
(C) 4
(D) 2

14. The distance of the point P (– 6, 8) from the origin is

(A) 8
(B) $2\sqrt{7}$
(C) 10
(D) 6

15. The distance between the points (0, 5) and B (– 5, 0) is

(A) 5
(B) $5\sqrt{2}$
(C) $2\sqrt{5}$
(D) 10

16. AOBC is a rectangle whose three vertices are vertices A(0,3), O(0,0) and B(5,0). The length of its diagonal is:

(A) 5
(B) 3
(C) $\sqrt{34}$
(D) 4

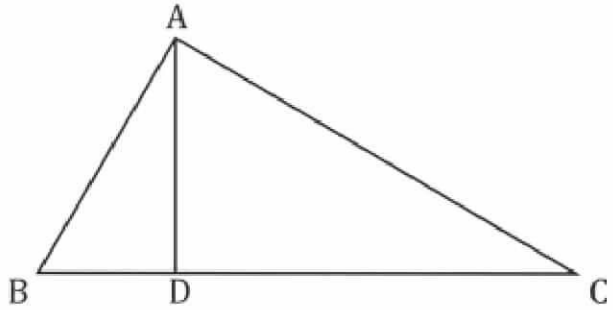
17. Sides of two similar triangles are in the ratio 4:9. Areas of these tringles are in the ratio

(A) 2:3
(B) 4:9
(C) 81:16
(D) 16:81

18. ABC and BDE are two equilateral triangles such that D is the mid-point of BC. Ratio of the areas of triangles ABC and BDE is:

(A) 2:1
(B) 1:2
(C) 4:1
(D) 1:4

19. In the figure given below, ∠BAC=90° and AD ⊥ BC. Then



(A) BD x CD = BC^2
(B) AB x AC = BC^2
(C) BD x CD = AD^2
(D) AB x AC = AD^2

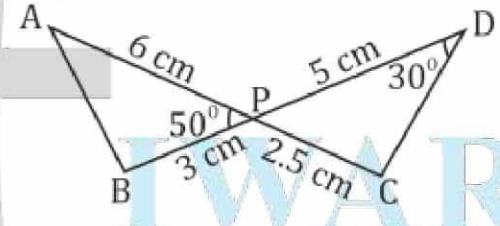
20. If ΔABC ~ΔEDF and ΔABC is not similar to ΔDEF, then which of the following is not true?
(A) BC x EF = AC x FD
(B) AB x EF = AC x DE
(C) BC x DE = AB x EF
(D) BC x DE = AB x FD

SECTION – B

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

21. If two triangles ABC and PQR, AB/QR = BC/PR = CA/PQ
Then:
(A) ΔPQR ~ΔCAB
(B) ΔPQR ~ΔABC
(C) ΔCAB ~ΔPQR
(D) ΔBCA ~ΔPQR

22. In the figure given below, two-line segments AC and BD intersect each other at the point P such that PA = 6cm, PB = 3cm, PC = 2.5cm, PD =5cm. ∠APB = 50° and ∠CDP = 30°.Then ∠PBA is equal to



(A) 50°
(B) 30°
(C) 60°
(D) 100°

23. The value of the expression [cosec (75° + θ) – sec (15° – θ) – tan (55°+ θ) + cot (35° – θ)] is
(A) –1
(B) 0
(C) 1
(D) $\frac{3}{2}$

24. If cos (α + β) =0, then sin (α - β) can be reduced to
(A) Cos β
(B) Cos 2β
(C) Sin α
(D) Sin 2α

25. The value of (1° tan 2° tan 3°.... tan 89°) is
(A) 0
(B) 1
(C) 2
(D) 1/2

26. Given that sin α = 1/2 and cos β = 1/2, then the value of (α+ β) is
(A) 0°
(B) 30°
(C) 60°
(D) 90°

27. If $\sin A + \sin^2 A = 1$, then the value of expression $(\cos^2 A + \cos^4 A)$ is

(A) 1 (B) $\frac{1}{2}$

(C) 2 (D) 3

28. If the sum of the circumference of two circles with radii R_1 and R_2 is equal to the circumference of a circle of radius R, then

(A) $R_1 + R_2 = R$

(B) $R_1 + R_2 > R$

(C) $R_1 + R_2 < R$

(D) Nothing definite can be said about the relation among R_1, R_2 and R.

29. If the sum of the areas of two circles with radii R_1 and R_2 is equal to the area of a circle of radius R, then:

(A) $R_1 + R_2 = R$ (B) $R^2_1 + R^2_2 = R^2$

(C) $R_1 + R_2 < R$ (D) $R^2_1 + R^2_2 = R^2$

30. If the circumference of a circle and the perimeter of a square are equal, then

(A) Area of the circle=Area of the square

(B) Area of the circle>Area of the square

(C) Area of the circle<Area of the square

(D) Nothing definite can be said about the relation between the areas of the circle and square.

31. The area of the circle that can be inscribed in a square of side 6 cm is

(A) 36π cm^2 (B) 18π cm^2

(C) 12π cm^2 (D) 9π cm^2

32. If an event that cannot occur, then its probability is

(A) 1 (B) $\frac{3}{4}$

(C) $\frac{1}{2}$ (D) 0

33. Which of the following cannot be the probability of an event?

(A) $\frac{1}{3}$ (B) 0.1

(C) 3% (D) $\frac{17}{16}$

34. An event is very unlikely to happen. Its probability is closest to

(A) 0.0001 (B) 0.001

(C) 0.01 (D) 0.1

35. If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then it

(A) Has no linear term and the constant term is negative

(B) Has no linear term and the constant term is positive

(C) Can have a linear term but the constant term is negative

(D) Can have a linear term but the constant term is positive

36. The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is:
(A) 10 (B) 100
(C) 504 (D) 2520

37. Graphically, the pair of equations

$$6x - 3y + 10 = 0$$
$$2x - y + 9 = 0$$

Represents two lines which are
(A) Intersecting at exactly one point (B) Intersecting at exactly two points
(C) Coincident (D) Parallel.

38. The perimeter of a triangle with vertex (0, 4), (0, 0) and (3, 0) is
(A) 5 (B) 12
(C) 11 (D) $7+\sqrt{5}$

39. If $\cos 9\alpha = \sin \alpha$ and $9\alpha < 90°$, then the value of $\tan 5\alpha$ is
(A) $\frac{1}{\sqrt{3}}$ (B) $\sqrt{3}$
(C) 1 (D) 0

40. If Δ ABC is right angled at C, then the value of cos (A + B) is
(A) 0 (B) 1
(C) $\frac{1}{2}$ (D) $\frac{\sqrt{3}}{2}$

SECTION – C

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

Q. 41 – Q. 45 are based on Case Study – 1.

Case Study – 1:

A Seminar is being conducted by an Educational Organisation, where the participants will be educated of different subjects. The number of participants in Hindi, English, and Mathematics are 60, 84, and 108 respectively.

41. In each room the same number of participants are to be seated and all of them being in the same subject, hence maximum number participants that can accommodated in each room are:
(A) 14 (B) 12
(C) 16 (D) 18

42. What is the minimum number of rooms required during the event?
(A) 11 (B) 31
(C) 41 (D) 21

43. The LCM of 60, 84, and 108 is:
(A) 3780 (B) 3680
(C) 4780 (D) 4680

44. The product of HCF and LCM of 60, 84, and 108 is
(A) 55360 (B) 35360
(C) 45500 (D) 45360

45. 108 can be expressed as a product of its primes as

(A) $2^3 \times 3^2$ (B) $2^3 \times 3^3$

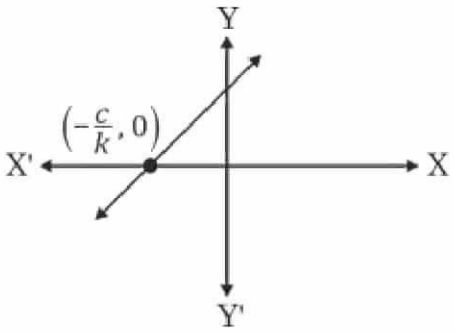
(C) $2^2 \times 3^2$ (D) $2^2 \times 3^3$

Q. 46 – Q. 50 are based on Case Study – 2.

Case Study – 2:

For a linear polynomial kx + c, k ≠ 0, the graph of y = kx + c is a straight line which intersects the x-axis at exactly one point, namely, (-c/k, 0).

Therefore, the linear polynomial kx + c, k ≠ 0, has exactly one zero, namely, the X-coordinate of the point where the graph of y = kx + c intersects the X-axis.

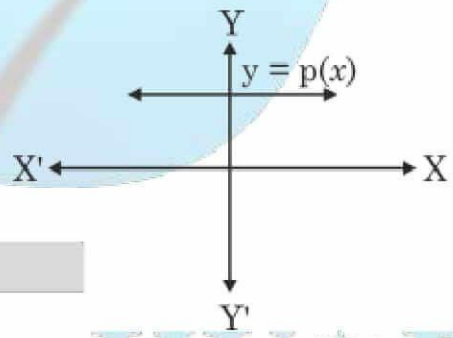


46. If a linear polynomial is 2x + 3, then the zero of 2x + 3 is

(A) $\frac{3}{2}$ (B) $-\frac{3}{2}$

(C) $\frac{2}{3}$ (D) $-\frac{2}{3}$

47. The graph of y = p(x) is given in figure below for some polynomial p(x). The number of zero/zeroes of p(x) is/are:



(A) 1 (B) 2

(C) 3 (D) 0

48. If α and β are the zeroes of the quadratic polynomial $x^2 - 5x + k$ such that α - β = 1, then the value of k is:

(A) 4 (B) 5

(C) 6 (D) 3

49. If α and β are the zeroes of the quadratic polynomial $p(x) = 4x^2 + 5x + 1$, then the product of zeroes is

(A) –1 (B) $\frac{1}{4}$

(C) –2 (D) $-\frac{5}{4}$

50. If the product of the zeroes of the quadratic polynomial $p(x) = ax^2 - 6x - 6$ is 4, then the value of "a" is

(A) $-\frac{3}{2}$ (B) $\frac{3}{2}$

(C) $\frac{2}{3}$ (D) $-\frac{2}{3}$