CBSEASSISTANCE.COM

PAPER 3
CLASS 10
MID TERM EXAMINATION

General Instructions:

1. This question paper has 5 sections A, B, C, D and E.
2. Section A has 20 questions carrying 1 mark each.
3. Section B has 5 questions carrying 2 marks each.
4. Section C has 6 questions carrying 3 marks each.
5. Section D has 4 questions carrying 5 marks each.
6. Section E has 3 case based integrated units of assessment (4 marks each) with sub – parts of the values of 1, 1 and 2 marks each respectively.
7. All questions are compulsory. However, an internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.

Section – A

Section A consists of 20 questions of 1 mark each.

1. The product of a non – zero rational and an irrational number is _____.
2. Give the condition for a pair of linear equations $a_1x + b_1y + c_1 = 0, a_2x + b_2y + c_2 = 0$ to be dependent.
3. Find the sum of the zeroes of the polynomial $3x^2 - 7x + 4$, without finding the zeroes.
4. Find the value of k, if the product of the roots of the equation $x^2 - 9x + k = 10$ is 5.
5. If one zero of the polynomial $2x^2 + 13x + k$ is the reciprocal of the other, then find the value of k.
6. In what ratio does the $y - axis$ divide the line segment joining the points $(-3, -4)$ and $(1, -2)$.

7. Find the discriminant of the quadratic equation: $9x^2 + 7x - 2 = 0$.
8. If HCF (336, 54) = 6, then LCM (336, 54) = _____.
9. The pair of equations $4x - 5y = 7,\ 12x - 15y + 21 = 0$ has _____ solutions.
10. Name the type of triangle whose vertices are given by the points $(-4, 0), (4, 0)$ and $(0, 3)$.
11. A bag contains 3 red, 5 black and 7 red balls. A ball is drawn from the bag at random. What is the probability that the ball drawn is not black?
12. The radii of the two circles are 4 cm and 3 cm respectively. Find the diameter of the circle having an area equal to the sum of the areas of the two circles.
13. If $\sin\theta + \cos\theta = \sqrt{2}\cos\theta$, then find the value of $\tan\theta$.
14. If $\sin A = \frac{1}{2}$ and $\cos B = \frac{1}{2}$, then $\cot(B - A) =$

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

15. If mean and mode of a distribution are 26.7 and 25.6 respectively. Find the median of the distribution.
16. If $u_i = \frac{x_i - 20}{10}, \Sigma f_i u_i = 30$ and $\Sigma f_i = 40$, then find the mean $\bar{x}$.
17. Write the probability of getting 53 Sundays in a non – leap year.
18. Find the distance covered by a wheel of diameter 35 cm in one revolution.

In question number 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

19. Assertion (A): The quadratic equation $25x^2 - 40x + 16 = 0$ has repeated roots.

    Reason (R): The quadratic equation $ax^2 + bx + c = 0$ has repeated roots for $D = 0$.

a. Both Assertion (A) and reason (R) are true and reason (R) is the correct explanation of Assertion (A).
b. Both Assertion (A) and Reason (R) are true and reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but reason (R) is false.
d. Assertion (A) is false but reason (R) is true.

20. Assertion (A): The point $(0, -3)$ lies on $y - axis$.

    Reason (R): The y −coordinate of the point on $y - axis$ is zero.

a. Both Assertion (A) and reason (R) are true and reason (R) is the correct explanation of Assertion (A).

b. Both Assertion (A) and Reason (R) are true and reason (R) is not the correct explanation of Assertion (A).
c. Assertion (A) is true but reason (R) is false.
d. Assertion (A) is false but reason (R) is true.

Section – B

Question numbers 21 to 25 carry two marks each.

21. If α and β are the zeroes of $x^2 + 5x + 5$, find the values of $\alpha^{-1} + \beta^{-1}$.

OR

If the sum of the zeroes of the quadratic polynomial $ky^2 + 2y - 3k$ is equal to twice their product, find the value of k.

22. If $\tan\theta = \frac{3}{4}$, the value of $\frac{4\sin\theta - 2\cos\theta}{4\sin\theta + 3\cos\theta}$.

23. The angles of a triangle are $x, y, 40°$. The difference between two angles x and y is $30°$. Find the value of x and y.

24. Determine if the points $(1, 5), (2, 3), (-2, -1)$ are collinear.

OR

Find a linear relation between x and y such that $P(x, y)$ is equidistant from the points $A(1, 4)$ and $B(-1, 2)$.

25. Solve for x: $9x^2 - 6px + (p^2 - q^2) = 0$.

Section – C

Question numbers 26 to 31 carry three marks each.

26. One number is selected from the numbers 2, 3, 3, 5, 5, 7, 9, 20 at random. Find the probability that the selected number is equal to the median of the given numbers.

OR

A bag contains 15 white and some black balls. If the probability of drawing a black ball from the bag is thrice that of drawing a white ball, find the number of black balls in the bag.

27. Find the missing frequencies the following distribution, given that the median of the distribution is ₹ 41.50 and the total number of observations is 100.

Daily earnings (in ₹)	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70

Number of persons	4	28	f_1	20	f_2	16

28. The two zeroes of the polynomial $p(x) = 2x^2 - 6x - 3$ are of the form $\frac{3\pm\sqrt{k}}{2}$, where k is a real number. Use the relationship between the zeroes and the coefficients of a polynomial to find the value of k.

29. Find the mode of for the following data:

Marks	Number of students
Less than 10	0
Less than 20	10
Less than 50	25
Less than 70	40
Less than 90	65
Less than 110	87
Less than 130	96
Less than 150	100

OR

The monthly expenditure on milk in 200 families of a Housing Society is given below. Using the Step Deviation method, find the mean expenditure.

ff	No. of families
1000 – 1500	24
1500 – 2000	40
2000 – 2500	33
2500 – 3000	28
3000 – 3500	30
3500 – 4000	22
4000 – 4500	16
4500 – 5000	7

30. If $\sqrt{3}\sin\theta = \cos\theta$, find the value of $\frac{\sin\theta.\tan\theta.(1+\cot\theta)}{\sin\theta+\cos\theta}$.

31. Prove that $\sqrt{3} + \sqrt{4}$ is an irrational number.

Section – D

Question numbers 32 to 35 carry 5 marks each.

32. Solve graphically $2x + 3y = 12$ and $2y - 1 = x$. Determine the coordinates of the vertices of the triangle formed by the lines represented by these equations with the $x - axis$.

OR

There are two classrooms A and B. If 10 students are shifted from room A to room B, the resulting number of students in the two classrooms become equal. If 5 students are shifted from room B to A, the resulting number of students in room A becomes double the number of students left in room B. Find the original number of students in the two classrooms separately.

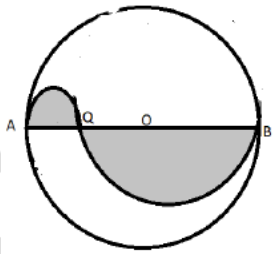
33. If $cosec\ \theta - \sin\theta = m$ and $\sec\theta - \cos\theta = n$, prove that $(m^2n)^{\frac{2}{3}} + (mn^2)^{\frac{2}{3}} = 1$.

OR

Prove that $\frac{1}{cosec\ A - \cot A} - \frac{1}{\sin A} = \frac{1}{\sin A} - \frac{1}{cosec\ A + \cot A}$.

34. If (a, b) is the mid – point of the line segment joining the points $A(10, -6)$ and $B(k, 4)$ and $a - 2b = 18$, find the value of k and the distance AB.

35. Find the area of the shaded region from the figure if the diameter of the circle with centre O is 28 cm and AQ = $\frac{1}{4}$ AB.



Section – E

Case Study Questions

Question numbers 36 to 38 carry 4 marks each with sub – parts of 1, 2 and 1 mark each.

36. Rahul goes to a fete in Mussorie. There he saw a game having prizes – wall clocks, power banks, puppets and water bottles. The game consists of a box having card inside it, bearing the numbers 1 to 200, one on each card. A

person has to select a card at random. Now winning of prizes has the following conditions:

Wall clock – If the number on the selected card is a perfect square.

Power bank – If the number on the selected card is a multiple of 3.

Puppet – If the number on the selected card is divisible by 10.

Water bottle – If the number on the selected card is a prime number more than 100 but less than 150.

Better luck next time – If the number on the selected card is a perfect cube.

Based on the above information, answer the following questions:

(i) Find the number of cards bearing a perfect square number.

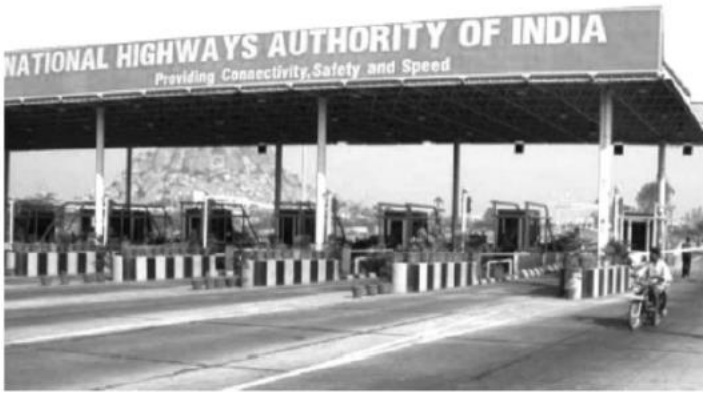
(ii) Find the probability of winning a water bottle.

OR

Find the probability of winning a power bank.

(iii) Find the number of cards bearing a perfect cube.

37. On a particular day, National Highway Authority of India (NHAI) checked the toll tax collection of a particular toll plaza for 229 vehicles in Rajasthan. The median tax collected is ₹ 46.



The following table shows the toll tax paid by drivers and the number of vehicles on that particular day.

Toll tax (in ₹)	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80

No. of vehicles	12	30	x	65	y	25	18

Based on the information, answer the following questions:

(i) What is the median class?

(ii) What is the sum of the missing frequencies x and y?

OR

Write the formula to find the median of the grouped data. Hence, find the correct numeric expression for finding the media.

(iii) What is the relation between mean, median and mode?

38. Nisha is Asha's daughter. Asha maintains a rigorous skin care regime. So, many times she gets mistaken for being Nisha's elder sister. At present Asha's age (in years) is 2 more than the square of her daughter Nisha's age. When Nisha grows to her mother's present age, Asha's age would be one year less than 10 times the present age of Nisha. Study the Asha – Nisha case and answer the following questions:

(i) If present age of Nisha is y years, then what is Asha's present age?

(ii) After how many years, Nisha grows to Asha's age (present age of Nisha is y years)?

OR

What is Asha's age when Nisha grows to Asha's age?

(iii) Form the quadratic equation according to the conditions in the question.