TEST BOOKLET NO-25012
MAIN PAPER - MATHEMATICS

Time : 1:00 hrs

Total Marks: 50

INSTRUCTIONS TO CANDIDATES

Read the instructions carefully before answering the questions: -

1. This Test Booklet consists of 16 (sixteen) pages and has 50 (Fifty) **items (questions)**.
2. IMMEDIATELY AFTER THE COMMENCEMENT OF THE EXAMINATION, YOU SHOULD CHECK THAT THIS BOOKLET *DOES NOT* HAVE ANY UNPRINTED OR TORN OR MISSING PAGES OR ITEMS ETC. IF SO, GET IT REPLACED BY A COMPLETE TEST BOOKLET.
3. **Please note that it is the candidate's responsibility to fill in the Roll Number and other required details carefully and without any omission or discrepancy at the appropriate places in the OMR Answer Sheet and the Separate Answer Booklet. Any omission/discrepancy will render the OMR Answer Sheet and the Separate Answer Booklet liable for rejection.**
4. Do not write anything else on the OMR Answer Sheet except the required information. Before you proceed to mark in the OMR Answer Sheet, please ensure that you have filled in the required particulars as per given instructions.
5. Use **only Black Ball Point Pen** to fill the OMR Answer Sheet.
6. This Test Booklet is divided into 2 (two) parts – **Part – I & Part - II**
7. Both parts are **Compulsory.**
8. **Part-I consists of Multiple Choice-based Questions.** The answers to these questions have to be marked in the **OMR Answer Sheet** provided to you.
9. **Part - II consists of Conventional Questions.** The answers to these questions have to be written in the **Separate Answer Booklet** provided to you.
10. In Part-I, each item (question) comprises of 04 (four) responses (answers). You are required to select the response which you want to mark on the OMR Answer Sheet. In case you feel that there is more than one correct response, mark the response which you consider the best. In any case, choose *ONLY ONE* response for each item.
11. After you have completed filling in all your responses on the OMR Answer Sheet and the Answer Booklet(s) and the examination has concluded, you should hand over to the Invigilator *only the OMR Answer Sheet and the Answer Booklet(s).* You are permitted to take the Test Booklet with you.
12. **Penalty for wrong answers in Multiple Choice-based Questions:**
    THERE WIL BE **PENALTY** FOR WRONG ANSWERS MARKED BY A CANDIDATE.
    (i) There are four alternatives for the answer to every question. For each question for which a wrong answer has been given by the candidate, **one-third** of the marks assigned to the question will be deducted as penalty.
    (ii) If a candidate gives more than one answer, it will be treated as a **wrong answer** even if one of the given answers happens to be correct and there will be same penalty as above to the question.
    (iii) If a question is left blank. i.e., no answer is given by the candidate, there will be **no penalty** for that question.

MULTIPLE CHOICE BASED QUESTIONS

Instructions for Questions 1 to 34:

- Choose the correct answer for the following questions
- Each question carries 1 marks   (34x 1 = 34 marks)

Q.1 **Assertion:** The linear equation $x - 2y - 3 = 0$ and $3x + 4y - 20 = 0$ have exactly one solution.

Reason: The linear equation $2x + 3y - 9 = 0$ and $4x + 6y - 18 = 0$ have a unique solution.

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, but 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.

Q.2 A vessel contains a mixture of 24 L milk and 6 L water, and second vessel contains a mixture of 15 L milk and 10 L water, then how much mixture of milk and water should be taken from the first and the second vessel separately and kept in a third vessel, so that the third vessel may contain a mixture of 25 L milk and 10 L water.

A) 15 L and 15 L
B) 20 L and 10 L
C) 20 L and 15 L
D) None of these

Q.3 When 2^{256} is divided by 17, the remainder would be -

A) 1
B) 16
C) 14
D) None of these

Q.4 The least number which when divided by 15, leaves a remainder of 5, when divided by 25, leaves a remainder of 15, and when divided by 35 leaves a remainder of 25, is

A) 515
B) 525
C) 1040
D) 1050

Q.5 The remainders on dividing given integers **a** and **b** by 7 are respectively 5 and 4. Then, the remainder when **ab** is divided by 7 is

A) 5

B) 4

C) 0

D) 6

Q.6 **Assertion:** The H.C.F. of two numbers is 16 and their product is 3072. Then their L.C.M. = 162.

Reason: If a, b are two positive integers, then H.C.F. × L.C.M. = a × b.

A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation
   of assertion.
B) Both assertion (A) and reason (R) are true but 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.

Q.7 **Assertion:** $\sqrt{a}$ is an irrational number where a is a prime number

Reason: Squareroot of any prime number is an irrational number

A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation
   of assertion.
B) Both assertion (A) and reason (R) are true but 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.

Q.8 If four numbers in A.P. are such that their sum is 50 and the greatest number is 4 times the least, then the numbers are-

A) 5, 10, 15, 20

B) 4, 10, 16, 22

C) 3, 7, 11, 15

D) None of these

Q.9 If a, b, c, d, e, f are in an A.P., then e – c is equal to:

A) 2(c – a)

B) 2(d – c)

C) 2(f – d)

D) (d – c)

Q.10 **Assertion:** Let the positive numbers a, b, c be in an A.P., then $\frac{1}{bc}, \frac{1}{ac}, \frac{1}{ab}$ are also in an A.P.

Reason: If each term of an A.P. is divided by abc, then the resulting sequence is also in an A.P.

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 but 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

Q.11 The nth term of the AP a, 3a, 5a, ... is

A) na

B) (2n - 1)a

C) (2n + 1)a

D) 2na

Q.12 If one of the zeroes of a quadratic polynomial of the form $x^2 + ax + b$ is the negative of the other, then which of the following is correct?

A) Polynomial has linear factors

B) Constant term of polynomial is negative

C) Both (A) and (B) are correct

D) Neither (A) nor (B) is correct

Q.13 X-axis divides the line segment joining the points A(2, −3) and B(5, 6) in the ratio:

A) $2:3$

B) $3:5$

C) $1:2$

D) $2:1$

Q.14 If three points (0, 0), (3, $\sqrt{3}$) and (3, λ) form an equilateral triangle, then λ equals:

A) 2

B) -3

C) -4

D) None of these

Q.15 $\triangle ABC$ is an equilateral triangle with length of each side as $2p$. If $AD \perp BC$, then the value of AD is:

A) $\sqrt{3}$

B) $\sqrt{3}p$

C) 2p

D) 4p

Q.16 **Assertion:** In $\triangle ABC$, $AB = 24$cm, $BC = 10$cm and $AC = 26$cm, then $\triangle ABC$ is a right-angled triangle.

Reason: If in two triangles, their corresponding angles are equal, then the triangles are similar.

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, but 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.

Q.17 If the angle of depression of an object from a 75m high tower is $30°$, then the distance of the object from the tower is-

A) $25\sqrt{3}$ m

B) $50\sqrt{3}$ m

C) $75\sqrt{3}$ m

D) 150 m

Q.18 A tree is broken by the wind. The top struck the ground at an angle of $30°$ and at distance of 10m from its root. The whole height of the tree- ($\sqrt{3} = 1.732$)

A) $10\sqrt{3}$ m

B) $3\sqrt{10}$ m

C) $20\sqrt{3}$ m

D) $3\sqrt{20}$ m

Q.19 **Assertion:** The sum of the series with the nth term, $t_n = (9 - 5n)$ is 465, when no. of terms $n = 15$.

Reason: Given series is in A.P. and sum of n terms of an A.P. is, $S_n = \frac{n}{2}[2a + (n - 1)d]$.

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, but 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

Q.20 Tangents AP and AQ are drawn to circle with center O from an external point A, then $\angle PAQ$ is equal to:

A) $2\angle OPQ$

B) $\dfrac{\angle OPQ}{2}$

C) $\dfrac{\angle OPQ}{3}$

D) $\dfrac{\angle OPQ}{4}$

Q.21 For which value(s) of p, will the lines represented by the following pair of linear equations be parallel

$3x - y - 5 = 0$

$6x - 2y - p = 0$

A) all real values except 10

B) 10

C) $\dfrac{5}{2}$

D) $\dfrac{1}{2}$

Q.22 The probability expressed as a percentage of a particular occurrence can never be

A) less than 100

B) less than 0

C) greater than 1

D) anything but a whole number

Q.23 The point which lies on the perpendicular bisector of the line segment joining the points $A(-2, -5)$ and $B(2, 5)$ is:

A) $(0, 0)$

B) $(0, 2)$

C) $(2, 0)$

D) $(-2, 0)$

Q.24 The product of a non-zero rational and an irrational number is-

A) always irrational

B) always rational

C) can be rational or irrational

D) will be equal to one

Q. 25 If one root of the equation $ax^2 + bx + c = 0$ is three times the other, then $b^2 : ac =$

A) 3:1

B) 3:16

C) 16:3

D) 16:1

Q.26 If the sum of the roots of the equation $x^2 - x = k(2x - 1)$ is zero, then $k =$

A) -2

B) 2

C) $-\dfrac{1}{2}$

D) $\dfrac{1}{2}$

Q.27 The distance of the point $P(4, -3)$ from the origin is

A)   1 unit
B)   7 units
C)   5 units
D)   3 units

Q.28 Ordinate of all the points on y-axis is

A) 0
B) 1
C) -1
D) Any number

Q.29 **Assertion (A):** The point $(-1, 6)$ divides the line segment joining the points $(-3, 10)$ and $(6, -8)$ in the ratio 2:7.

Reason (R): Three points A, B and C are collinear if area of triangle ABC is equal to 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, but 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

Q.30 The mean and median of the data a, b and c are 50 and 35 respectively, where $a<b<c$. If $c-a=55$, then $(b-a)$ is

A) 8

B) 7

C) 3

D) 5

Q.31 Mean of a certain number of observations is $\overline{x}$. If each observation is divided by $m(m \neq 0)$ and increased by n, then the mean of new observation is

A) $\dfrac{\overline{x}}{m}+n$

B) $\dfrac{\overline{x}}{n}+m$

C) $\overline{x} + \dfrac{n}{m}$

D) $\overline{x} + \dfrac{m}{n}$

Q.32 **Assertion (A):** The mode of the number of calls received on 7 consecutive days 11 13 13 17 19 23 25 is 13.

Reason (R): Mode is the value that appears most frequently.

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

Q.33 **Assertion (A) :** The following number of goals were scored by a team in a series of 10 matches:2, 3, 4, 5, 0, 1, 3, 3, 4, 3 . The mean, median and mode of these scores are 2.8 , 3 and 3 respectively.

Reason (R): The Mean, Median and Mode are related in the following manner Median $= \frac{1}{3}$ (Mode + 2Mean)

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, but 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

Q.34 **Assertion (A):** Sum of first n terms in an A.P. is given by the formula:

$$S_n = \frac{n\,[2a+(n-1)d]}{2}$$

Reason (R): Sum of first 15 terms of $2 + 5 + \ldots$ is 345

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, but 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

CONVENTIONAL QUESTIONS

The answers to these questions have to be written in the **Separate Answer Booklet** provided to you.

Instructions for Questions 35 to 50:

- All questions are compulsory
- Each question carries 1 marks   (16 x 1 = 16 marks)

Q.35 The following question contains quadratic polynomials and their zeroes in two columns, which are to be matched. Statements (A, B, C, D) in column – I are to be matched with statements (p, q, r, s) in column – II.

Column -I (Zeroes)		Column-II (Quadratic Polynomials)	
A	3 and -5	(p)	$x^2 - 25$
B	$5 + \sqrt{2}$ and $5 - \sqrt{2}$	(q)	$x^2 + 2x - 15$
C	-9 and 1/9	(r)	$x^2 + (80/9) x - 1$
D	5 and -5	(s)	$x^2 - 10x + 23$

Q.36 The following question contains polynomials with divisors and their remainders in two columns, which are to be matched. Statements (A, B, C, D) in column – I are to be matched with statements (p, q, r, s) in column – II.

Column -I (Polynomials)		Column-II (Remainder)	
A	$\dfrac{x^3 - 3x^2 + x + 2}{x^2 - x + 1}$	(p)	$x + 7$
B	$\dfrac{x^3 - 3x^2 + 5x - 3}{x + 2}$	(q)	$- 39 x - 125$
C	$\dfrac{x^4 - 6x^3 + 16x^2 - 25x + 10}{x^2 + 2x + 5}$	(r)	$- 33$
D	$\dfrac{x^3 - 3x^2 + 4x + 5}{x^2 - x + 1}$	(s)	$- 2x + 4$

Q.37 Directions: The following question contains statements given in two columns which have to be matched. Statements (A, B, C) in Column-I have to be matched with statements (p, q, r) in Column-II.
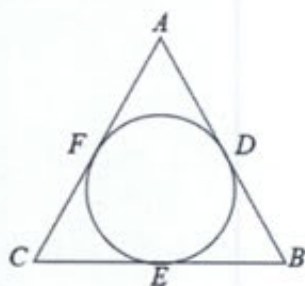
Column -I		Column-II	
A	A line segment which joins any two points on a circle	(p)	Secant
B	A line which intersects the circle in two points	(q)	Tangent
C	A line that intersects the circle at only one point	(r)	Chord

Q.38 Directions: Each question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in Column-I have to be matched with statements (p, q, r, s) in Column-II.

A circle is inscribed in a $\triangle ABC$ having sides $AB = 8\,cm$, $BC = 10\,cm$ and $CA = 12\,cm$ as shown in figure. Observe the diagram and match the columns.

Column -I		Column-II	
A	AD	(p)	15 cm
B	BE	(q)	7 cm
C	CF	(r)	3 cm
D	AD + BE + CF	(s)	5 cm

Q.39 **Direction :** The following question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in column-I have to be matched with statements (p, q, r, s) in column-II.

Column-II gives roots of quadratic equations given in Column-I.

Column -I		Column-II	
A	$6x^2 + x - 12 = 0$	(p)	(-6, 4)
B	$8x^2 + 16x + 10 = 202$	(q)	(9 , 36)
C	$x^2 - 45x + 324 = 0$	(r)	(3, $-\dfrac{1}{2}$)
D	$2x^2 - 5x - 3 = 0$	(s)	($-\dfrac{3}{2}$, $\dfrac{4}{3}$)

Q.40 **Directions:** The following question contains statements given in two columns which are to be matched. Statements (A, B, C, D) in column I have to be matched with statements (p, q, r, s) in column II.

Column -I		Column-II	
A	$5x + 4y = 14$ $y - 2x = 1$	(p)	Infinite solutions
B	$6x - 3y + 10 = 0$ $2x - y + 9 = 0$	(q)	Consistent
C	$3x - 2y = 4$ $9x - 6y = 12$	(r)	No solution
D	$2x - 3y = 8$ $4x - 6y = 9$	(s)	Inconsistent

Q.41 Following question contains statements given in two columns which have to be matched. Statements (A, B, C, D) in Column-I have to be matched with statements (p, q, r, s) in Column-II.

Column -I (A.P.)		Column-II (n^{th} term)	
A	119,136, 153, 170, ...	(p)	$13 - 3n$
B	7, 11, 15, 19, ...	(q)	$9 - 5n$
C	4, -1, -6, -11, ...	(r)	$3 + 4n$
D	10, 7, 4 , 3, ...	(s)	$17n + 102$

Q.42 The following question contains statements given in two columns which have to be matched. Statements (A, B, C) in Column-I have to be matched with statements (p, q, r) in Column-II.

Column -I		Column-II	
A	HCF of the smallest composite number and the smallest prime number	(p)	6
B	HCF of 336 and 54	(q)	5
C	HCF of 475 and 495	(r)	2

Q.43. Find all the zeroes of $f(x) = x^2 - 2x$.

Q.44. Explain why 13233343563715 is a composite number?

Q. 45. For what value of k, $k + 9$, $2k - 1$ and $2k + 7$ are the consecutive terms of an AP ?

Q. 46. Cards marked with numbers 3,4,5, ... 50 are placed in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the selected card bears a perfect square number.

Q. 47. A Dice is thrown once. Find the probability of getting a prime number.

Q. 48. If three different coins are tossed together, then find the probability of getting two heads.

Q. 49. Determine the value of k for which the given system of equations has a unique solution.

$$x - ky = 2$$

$$3x + 2y = -5$$

Q. 50. Convert the following distribution to more than type, cumulative frequency distribution

Class	50 - 60	60- 70	70 - 80	80 - 90	90 - 100
Frequency	12	18	10	15	5

....X...