Grade 10
Unit 12

Maths

Course Outline

Summative-2

MAT

(Monthly Achievement Tests)

Short Code: 447311

Test ID: NMM10U0120

SOUVENIR INFOTECH

Guide Lines

1.Each set consists of:

50 | Warm-up/Foundation Questions

30 | Regular Questions

20 | Thinking Ability Questions

2.The time allocation and instructions regarding the questions are printed clearly in the beginning of each question types. The answers should be written or tick marked as per the instructions given. It is suggested to use pencil initially, so as to enable you to reuse the practice papers.

3. **According to the new pattern of CBSE these practice papers will be very useful especially for syllabus related Quiz, Debates, Visuals related checking and Orals etc.,**

4.After marking the answers, the scores of students can be checked and for marks obtained guidelines are given along with the question solving instructions. Follow those instructions and if, you are fully satisfied with your performance then check for your expected grades as per the CBSE guidelines as given on the back of each set.

5.Remember that this is only a guideline not the finally worked out result. You can further improve your performance by increase your practice.

6.For your convenience please follow following essential examiner's advices:

a.Answer all the questions
b.Read all the Options carefully
c.Understand and use correct scientific language in your responses.

We from SOUVENIR INFOTECH **wish skillful learning for your bright future.**

Before going for the test, look at least :

1. First of all go through the syllabus of the test according to the **Course Outline** provided at the front page of each MAT.
2. After going through the syllabus once or twice or even more time as per your satisfaction, first of all do the Warm-up questions. If you score A+ grade in those 50 questions go to the next level otherwise go through the chapter again.
3. The box for **Specific Information** is very useful as it adds to your concept building. Try to fill specific information in the proper way so that you will get the maximum benefit of it.
4. **Let's Chat** portion will help you to prepare for oral assessment. Through this you can increase your capacity to interact on a particular topic related to your syllabus.
5. The **Extra Diet** portion is also there to enhance you knowledge through visulization of concept. This portion provides you added knowledge on various related concepts.
6. The information related to time factor is there to enhance your time management skills.
7. From the examiners point of view it is always advised to use Pencil for initial efforts. The use of pen is fruitful only when the final effort comes.

Examiner's Tips:

- Read the question carefully. Make sure you understand exactly what is required.
- If you find that you are unable to do a part of a question, do not give up. The next part may be easier and may provide a clue to what you might have done in the part you found difficult.
- Note the number of marks per question as guide to the depth of response needed.
- Underline or note the key words that tell you what is required.
- Underline or note data as you read the question.
- Structure your answer carefully.
- Show all steps in calculations. Include equations you use and show the substitution of data. remember to work according to units given.
- Make sure that your answers contain suitable significant figures (wherever necessary) and must include units in numericals.
- Draw diagrams and graphs carefully.
- Read data from graphs carefully; note scales and prefixes on axes.
- Keep your eye on the clock but don't panic.
- If you have time at the end, use it. Check that your descriptions and explanations make sense. Consider whether there is anything you could add to an explanation or description. Repeat calculations to ensure that you have not made a mistake.

50 Warm-up/Foundation Questions

Opening Window

To enlighten your fundamental/basic topic knowledge.

A+. If you score 45 or above marks, move to the next section confidently.

A. If you score between 40 and 45 marks, it is satisfactory. Bit more knowledge will bring excellent result.

B. If you score below 40, kindly go through the topic more seriously.

Section A (50 marks) **Time given – 50 minutes + 5 minutes for revision**

Questions 1 to 50 carry 1 mark each.

For questions 1 to 20 four options are given one of them is the correct answer make your choice and write its name (a, b, c or d) in the answer box provided.

1. Which of the following are quadratic equation in x ?

   (a) $x^2 - x + 3 = 0$ (b) $x^2 - 3x - \sqrt{x} + 4 = 0$

   (c) $x + \frac{2}{x} = x^2$ (d) $x^2 - 1/x^2 = 5$

   T – 1 min
   S – Quadratic equation

   Ans.

2. How many terms are there in the AP 7, 10, 13 ..... 151 ?

   (a) 50 (b) 55

   (c) 45 (d) 49

   T – 1 min
   S – AP

   Ans.

3. If $A(3,8), B(-4,2)$ and $C(5,-1)$ are the vertices of ΔABC. Then its area is

   (a) $28\frac{1}{2}$ sq units (b) $37\frac{1}{2}$ sq. units

   (c) 57 sq. units (d) 75 sq. units

   T – 1 min
   S – Coordinate geometry

   Ans.

4. If $P(-1,1)$ is the middle point of the line segment joining $A(-3,b)$ and $B(1,b+4)$ then the value of b is

   (a) 1 (b) -1

   (c) 2 (d) 0

   T – 1 min
   S – Coordinate geometry

   Ans.

5. The length of each side of an equilateral triangle is $2\sqrt{3}$ cm. Its altitude is

   (a) 3/2 cm (b) 3 cm

   (c) $\frac{\sqrt{3}}{4}$ cm (d) $\frac{\sqrt{3}}{2}$ cm

   T – 1 min
   S – Area of related to circle

   Ans.

6. The circumference of a circle exceeds its diameter by 16.8 cm. Find the circumference of the circle.

(a) 24.64 cm (b) 24.54 cm

(c) 23.64 cm (d) 23.54 cm

T – 1 min
S – Area of related to circle

Ans.

7. The point at which the tangent line meets the circle is called

(a) point of contact (b) tangent line

(c) centre (d) chord of contact

T – 1 min
S – Circle

Ans.

8. In a throw of a die, the probability of getting a prime number is

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

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

T – 1 min
S – Probability

Ans.

9. One card is drawn at random from a well-shuffled deck of 52 cards. What is the probability of getting an ace ?

(a) $\frac{1}{26}$ (b) $\frac{1}{4}$

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

T – 1 min
S – Probability

Ans.

10. Solve x for $x^2 - 8x + 16 = 0$

(a) 3 (b) 1

(c) 4 (d) 2

T – 1 min
S – Probability

Ans.

11. The quadratic polynomial whose zeros are –3 and 5

(a) $x^2 + 2x + 15 = 0$ (b) $x^2 - 2x - 15 = 0$

(c) $x^2 + 2x - 15 = 0$ (d) $x^2 - 2x + 15 = 0$

T – 1 min
S – Quadratic equation

Ans.

12. The first term of an AP is 6 and its common difference is 5. What will be the 10th term?

(a) 51 (b) 50

(c) 61 (d) 62

T – 1 min
S – AP

Ans.

13. Two vertices of ΔABC are $A(-1,4)$ and $B(5,2)$ and its centroid is $G(0,-3)$. The coordinates of C are

(a) (4, 3) (b) (4, 15)

(c) $(-4,-15)$ (d) $(-15,-4)$

T – 1 min
S – Coordinate geometry

Ans.

14. P is a point on x-axis at a distance of 3 units from y-axis to its right. The coordinates of P are

(a) (3, 0) (b) (0, 3)

(c) (3, 3) (d) $(-3,3)$

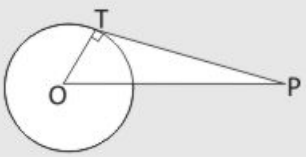
T – 1 min
S – Coordinate geometry

Ans.

15. In the given figure, PT is a tangent to the circle with centre O. If $OT = 6$ cm and $OP = 10$ cm then the length of tangent PT is

(a) 8 cm (b) 12 cm

(c) 10 cm (d) 16 cm



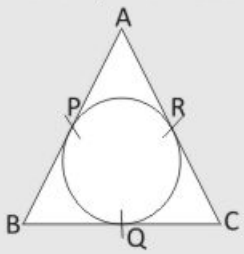
T – 1 min
S – Circle

Ans.

16. In the given figure, ΔABC is circumscribed touching the circle at P, Q, R. If $AP = 4$ cm, $BP = 6$ cm, $AC = 12$ cm and $BC = x$ cm, then x

(a) 10 cm (b) 6 cm

(c) 14 cm (d) 18 cm



T – 1 min
S – Circle

Ans.

17. In a throw of a pair of dice, what is the probability of getting two numbers whose sum is 10 ?

(a) 5.18 (b) 1/6

(c) 1/12 (d) 1/4

T – 1 min
S – Probability

Ans.

18. The radii of the base of a cylinder and a cone are in the ratio between their volume is

(a) 9 : 8 (b) 8 : 4

(c) 8 : 9 (d) 4 : 9

T – 1 min
S – Volume and surface area of solids

Ans.

19. The area of the base of rectangular tank is 6500 cm^2 and the volume of water contained in it is 2.6 m^3. The depth of water in the tank is

(A) 3.5 m (b) 4 m

(c) 5 m (d) 8 m

T – 1 min
S – Volume and suface area of solids

Ans.

20. The circumference of two circles are in the ratio 2 : 3. The ratio between their area is

(a) 2 : 3 (b) 4 : 9

(c) 9 : 4 (d) none of these

T – 1 min
S – Area of recleced to circle

Ans.

Fill in the blanks

21. The formula for finding the roots of a quadratic equation is known as the _____.

T – 1 min
S – Area of recleced to circle

Ans.

22. Fourth term of the AP is _____.

T – 1 min
S – AP

Ans.

23. Distance formula _____ .

T – 1 min
S – Coordinate geometry

Ans.

24. A tangent to a circle intersects if in _____ point.

T – 1 min
S – Circle

Ans.

25. Probability of an event E + _____ = 1

T – 1 min
S – Circle

Ans.

26. Length of an arc of a sector of angle θ = _____ .

T – 1 min
S – Area of related to circle

Ans.

27. The common point of a tangent to a circle and the circle is called _____.

T – 1 min
S – Circle

Ans.

28. All circles are _____.

T – 1 min
S – Circle

Ans.

29. The nth term of AP is _____.

T – 1 min
S – AP

Ans.

30. $b^2 - 4ac = 0$. The equation has _____ roots.

T – 1 min
S – Quadratic equations

Ans.

True or False

31. $ax^2 + bx + c = 0, a \neq 0$ is called the standard form of quadratic equation.

T – 1 min
S – Quadratic equations

Ans.

32. $a, ad, a + 2d$ $3ad$ ..... general form of AP.

T – 1 min
S – Quadratic equations

Ans.

33. The coordinates of a point on the x-axis is $(0, x)$.

T – 1 min
S – Coordinate geometry

Ans.

34. The tangent at any point of a circle is perpendicular to the radius through the point of contact.

T – 1 min
S – Circle

Ans.

35. Area of the sector of angle $\theta = \frac{\theta}{360} \times \pi r$.

T – 1 min
S – Circle

Ans.

36. Curved surface area of the $Tr\,(l + r)$ sq units.

T – 1 min
S – Statistics

Ans.

37. A tangent to a circle interescts it in two points.

T – 1 min
S – Circle

Ans.

38. The sum of the probabilities of all the elementary events of **an** experiment is 1.

T – 1 min
S – Probability

Ans.

39. If l is the last term of the finite AP and a is the first term of nth term, then sum of all terms of the AP is given by $S = \frac{n}{2}(a + l)$

T – 1 min
S – AP

Ans.

40. Circumference $= 2\pi r$
Where r = radius of the circle

T – 1 min
S – Circle

Ans.

Simple Questions

41. For what values of k, the quadratic equation $x^2 - kx + 4 = 0$ has equal roots ?

T – 1 min
S – Quadratic equations

Ans.

42. What is the distance between two parallel tangents to a circle of the radius 4 cm ?

T – 1 min
S – Area related to circle

Ans.

43. A bag contains 5 red and 4 black balls. A ball is drawn at random from the bag. What is the probability of getting a black ball ?

T – 1 min
S – Probability

Ans.

44. State the fundamental theorem of arithmetic ?

T – 1 min
S – Arithmetic Progression

Ans.

45. What is the nature of roots of the quadratic equation $4x^2 - 12x - 9 = 0$?

T – 1 min
S – Quadratic equations

Ans.

46. A bag contains 5 red and 4 black balls. A ball is drawn at random from the bag. What is the probability of getting a black ball ?

T	– 1 min
S	– Probability

Ans.

47. What is the ratio of the areas of a circle and an equilateral triangle whose diameter and a side are respectively equal ?

T	– 1 min
S	– Area related to circle

Ans.

48. The sum and product of the zeroes of a quadratic polynomial are $\sqrt{2}$ and 1/3 respectively. What is the quadratic polynomial?

T	– 1 min
S	– Quadratic equations

Ans.

49. If $2x, x+10, 3x+2$ are in AP, find the value of x.

T	– 1 min
S	– AP

Ans.

50. A solid sphere of radius r is melted and cast into the shape of a solid cone of height r, find the radius of the base of the cone.

T	– 1 min
S	– Volume and surface area of solids

Ans.

30 Regular Questions

Opening Window

To enlighten your regular knowledge of topic. If you score more than 55 marks here, you have achieved this level brilliantly. Move to the next level of test papers.

Section B (60 marks) **Time given – 45 minutes + 5 minutes for revision**

Questions 51 to 80 carry 2 marks each.

51. Find the value of k for which $x = 2$ is a solution of the equation $kx^2 + 2x - 3 = 0$

T – 1 min
S – Quadratic polynomials

Ans.

52. What is the ratio of the areas of a circle and an equilateral triangle whose diameter and a side are respectively equal ?

T – 1 min
S – Area related to circle

Ans.

53. For what values of K the quadratic equation $2x^2 + kx + 3 = 0$ has equal roots ?

T – 1 min
S – Quadratic equation

Ans.

54. The sum and product of the zeros of a quadratic polynomial are 2 and $\frac{1}{3}$, respectively. What is the quadratic polynomial ?

T – 1 min
S – Quadratic equation

Ans.

55. If $2x, x+10, 3x+2$ are in AP, find the value of x.

T	– 1 min
S	– AP

Ans.

56. What is the nature of roots of the quadratic equation $2x^2 - 4x + 3 = 0$?

T	– 1 min
S	– Quadratic equation

Ans.

57. For what value of k, the quadratic equation $2x^2 - kx + 8 = 0$ has equal roots ?

T	– 1 min
S	– Quadratic equation

Ans.

58. If the sum of 'n' terms of an AP be $3n^2 - n$ and its common difference is 6, then find the first term.

T	– 1 min
S	– AP

Ans.

59. If the surface areas of two spheres are in the ratio 4 : 9 then, find the ratio of their volume.

T	– 1 min
S	– Volume and surface area of solids

Ans.

60. If the sum of the squares of zeroes of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40. Find the value of k.

T	– 1 min
S	– Quadratic polynomials

Ans.

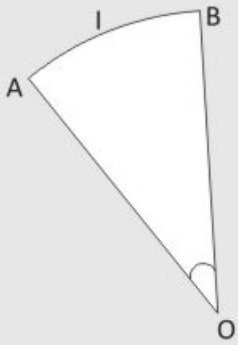
61. If $5\tan\alpha = 4$, then, find the value of $\frac{5\sin\alpha - 3\cos\alpha}{5\sin\alpha + 2\cos\alpha}$.

T	– 1 min
S	– Trigonometry

Ans.

62. If the following figure is a sector of *c* circle of radius 21 cm find the perimeter of this sector.

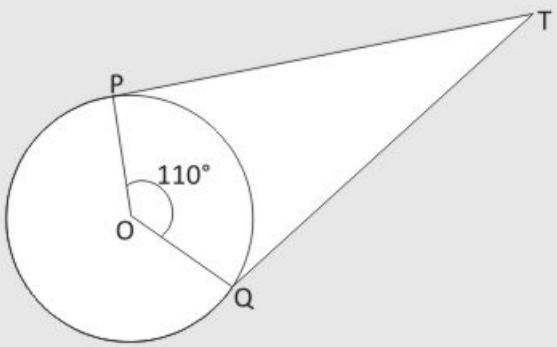
T	– 1 min
S	– Area related to circle



Ans.

63. In figure, if *TP* and *TQ* are two tangents to a circle with centre O so that $\angle POQ = 110^\circ$, then find $\angle PTQ$.

T	– 1 min
S	– Circle



Ans.

64. Which term of a sequence $20, 19\frac{1}{4}, 18\frac{1}{2}, 17\frac{3}{4}$ ..... is the first negative term?

T – 1 min
S – AP

Ans.

65. Find the arithmetic mean of 1, 2, 3, ... *n*.

T – 1 min
S – AP

Ans.

66. Prove that the point $(a, 0)\ (0, b)$ and $(1, 1)$ are collinear if, $\frac{1}{a} + \frac{1}{b} = 1$

T – 2 min
S – Coordinate geometry

Ans.

67. An arc of a circle is of length 5π cm and the sector it bound has an area $20\pi\ cm^2$. Find the radius of the circle.

T – 2 min
S – Area related to circle

Ans.

68. A cone and a hemisphere have equal bases and equal volumes. Find the ratio of their heights.

T	– 2 min
S	– Volume of solids

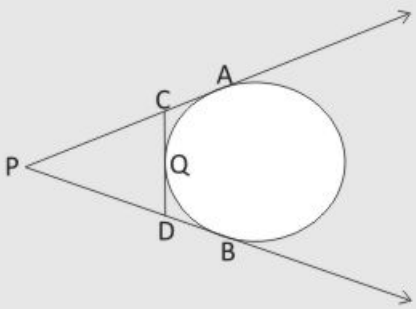
Ans.

69. A king, queen and jack of clubs are removed from a deck of 52 playing cards and then well shuffled one card is selected from the remaining cards. Find the probability of getting a king.

T	– 2 min
S	– Probability

Ans.

70. In the figure given below. *PA* and *PB* are tangents to the circle drawn from an external point *P*. *CD* is a third tangent touching the circle at *Q*. If $PB = 12$ cm and $CQ = 3$ *cm*. What is the length of *PC*?



T	– 2 min
S	– Circle

Ans.

71. Let A and B are the end points of a diameter of a circle having its centre at (1, 2). If the coordinates of $A(-3, 5)$ find the coordinates of the point B.

T	– 2 min
S	– Coordinate geometry

Ans.

72. From a point 20 m away from the foot of a tower, the angle of elevation of the top of the tower is 30°. Find the height of the tower.

T	– 2 min
S	– Applications of trigonometry

Ans.

73. A contract on construction job specifies a penalty for delay of completion beyond a certain data as follows, Rs 200 for the first day, Rs 250 for the second day, Rs 300 for the third day, etc. the penalty for each succeeding day being Rs 50 more than for the preceding day. How much money the contructor has to pay as penalty if he has delayed the work by 30 days ?

T	– 2 min
S	– AP

Ans.

74. If two cone have their volumes in the ratio 3 : 1 and their heights are in the ratio 1 : 3, then find the ratio of their radius.

T	– 2 min
S	– Volume and suface area of solids

Ans.

75. Find the zeros of the quadratic polynomial $x^2 + 7x + 12$ and verify the relationship between the zeroes and its coefficients.

T	– 2 min
S	– Quadratic equation

Ans.

76. Solve the following quadratic equation for $x : x^2 - 2(a+2)x + (a+1)(a+3) = 0$

T	– 2 min
S	– Quadratic equation

Ans.

77. What is the nature of roots of the quadratic equation $2x^2 + 5x + 5 = 0$

T	– 2 min
S	– Quadratic equation

Ans.

78. A bag contains 5 red balls, 8 white balls 4 green balls and 7 black balls. A ball is drawn at random from the bag. Find the probability that if is not green.

T	– 2 min
S	– Probability

Ans.

79. Prove that, the perpendicular at the point of contact to the tangent to a circle passes through the centre.

T	– 2 min
S	– Circle

Ans.

80. A balloon is connect to a meteorological ground station by a cable of length 215 m inclined at 60° to the horizontal. Determine the height of the balloon from the ground. Assume that there is no slack in the cable.

T	– 2 min
S	– Application of trigonometry

Ans.

20 Thinking Ability Questions

Opening Window

To enlighten your regular knowledge of topic. If you score more than 50 marks here, you have achieved this level brilliantly. Move to the next level of test papers.

Section C (60 marks) **Time given – 45 minutes + 5 minutes for revision**

81. Find the area of a quadrilateral whose vertices taken in order are $A(-5,-3)B(-4,-6)\ C(2-1)$ and $D(1,2)$.

T – 2 min
S – Coordinate geometry

Ans.

82. A plane left 30 minutes late than its scheduled time and in order to reach the destination 1500 km away in time. It had to increase the speed by 250 km/h from the usual speed. Find its usual speed.

T – 2 min
S – Quadratic equations

Ans.

83. Find the values of x for which the distance between the point $P(2,-3)$ and $Q(x,5)$ is 10 units.

T – 2 min
S – Coordinate geometry

Ans.

84. Prove that the point $A(-3,0)\ B(1-3)$ and $C(4,1)$ are the vertices of an isosceles right triangle.

T – 2 min
S – Coordinate geometry

Ans.

85. The coordinates of the vertices of ΔABC are $A(4,1)B(-3,2)$ and $C(0,k)$. Given that the area of ΔABC is 12 units, find the value of k.

T – 2 min
S – Coordinate geometry

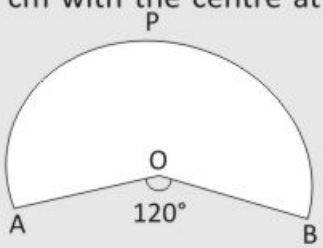
Ans.

86. Find the relation between x and y such that the point $P(x, y)$ is equidistant from the points $A(2,5)$ and $B(-3,7)$.

T	– 2 min
S	– Coordinate geometry

Ans.

87. In figure $OAPB$ is a sector of a circle of radius 3.5 cm with the centre at 'O' and $\angle AOB = 120^\circ$ find the length of $OAPBO$.



T	– 2 min
S	– Circle

Ans.

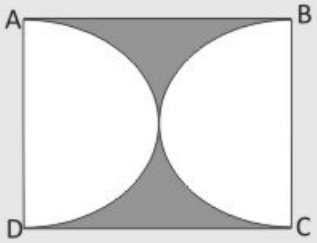
88. If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289. Find the sum of first n terms.

T	– 2 min
S	– AP

Ans.

89. Find the area of the shaded region in the figure, if *ABCD* is a square of side 14 cm and *APD* and *BPC* are semicircles.

T	– 2 min
S	– Circle



Ans.

90. Find the roots of the following equation.

$$\frac{1}{x+4}-\frac{1}{x-y}=\frac{11}{30}, x\neq -4,7$$

T	– 2 min
S	– Quadratic equation

Ans.

91. Solve for x: $\frac{6}{x}-\frac{2}{x-1}=\frac{1}{x-2}; x\neq 0,1,2$

T	– 2 min
S	– Quadratic equation

Ans.

92. The angle of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of tower from the foot of the building 60°. If the tower is 50 in high, find the height of the building.

T	– 3 min
S	– Application of trigonometry

Ans.

93. If $\tan(A+B)=\sqrt{3}$ and $\tan(A-B)=\frac{1}{\sqrt{3}}$, $0°<(A+B)\leq 90°$, $A>B$, find A and B.

T	– 3 min
S	– Trigonometry

Ans.

94. The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having area equal to the sum of the areas of the two circles.

T	– 3 min
S	– Area related to circle

Ans.

95. A 20 m deep well with diameter 14 m is dug up and the earth from digging is spread evenly to form a platform 22 m × 14 m. Find the height of the platform.

T	– 3 min
S	– Surface areas & volume

Ans.

96. Calculate the mean using step deviation method

Daily wage (in Rs)	12.5–17.5	17.5–22.5	22.5–27.5	27.5–32.5	32.5–37.5	37.5–42.5
No. of workers	2	22	19	14	3	4
				42.5–47.5	47.5–52.5	52.5–57.5
				6	1	1

T	– 3 min
S	– Statistics

Ans.

97. Show graphically the following system of linear equations.

$x - y = 2$

$x + y = 6$

T	– 3 min
S	– Graphical representation

Ans.

98. A cone of radius 10 cm is divided into two parts by drawing a plane through the midpoints of its axis parallel to its base. Compare the volumes of the two parts.

T	– 3 min
S	– Volume of cone

Ans.

99. If the roots of the equation $(b-c)x^2+(c-a)x+(a-b)=0$ are equal then prove that $2b=a+c$

T	– 3 min
S	– Quadratic equation

Ans.

100. During the medical check up of 35 students of a class, their weights were recorded as follows:

Weight (in kg)	Number of students
Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

T	– 3 min
S	– Statistics

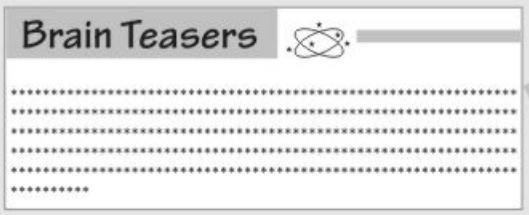
Ans.

Tools at a glance

Opening Window with instructions for your potential analysis and guideline to improve your performance.

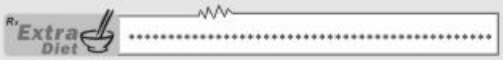
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

Box with time break-up of questions **(T)** and its concept (**S**, i.e., subject)



Brain Teasers i.e., Questions with difference to make the concepts of students crystal clear. These are the questions with higher difficulty levels to check the grip of the students over the concepts.

Extra Diet, the web link, the notation: www._____ to provide additional information regarding the concept for more clarity of thoughts.



CBSE GRADING PATTERN

As the new pattern includes **CCE** (Continuous and Comprehensive Evaluation) which will be run in two terms i.e., from April to September and October to March. Thus the school will conduct four **Formative** and two **Summative** Assessments.

However, the most generalised version of grades is given below:

MARKS PERCENTAGE	GRADE	GRADE POINT	CATEGORY
91 to 100	A1	10	Exceptional
81 to 90	A2	9	Excellent
71 to 80	B1	8	Very Good
61 to 70	B2	7	Good
51 to 60	C1	6	Ordinary (Fair)
41 to 50	C2	5	Average
33 to 40	D	4	Below Average
21 to 32	E1	3	Improvement Needed
Below 20	E2	Below 2	Unsatisfactory