Grade 10
Unit 03

Maths

Course Outline

Formative 1

- Real numbers
- Polynomials
- Linear equations
- Triangles

MAT
(Monthly Achievement Tests)

Short Code: 447311

Test ID: NMM10U030

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. 2.13113111311113 is

T – 1 min
S – Real number

(a) rational (b) irrational
(c) integer (d) none of these

Ans.

2. $1.2\overline{348}$ is

T – 1 min
S – Real number

(a) an integer (b) an irrational number
(c) a rational number (d) none of these

Ans.

3. Every positive odd integer is of the form of

T – 1 min
S – Real number

(a) $2q$ (b) $2q + 2$
(c) $2q + 1$ (d) None of these

Ans.

4. Find the HCF of 236 and 422.

T – 1 min
S – Real number

(a) 6 (b) 4
(c) 8 (d) 2

Ans.

5. Positive odd integer is

T – 1 min
S – Real number

(a) $6q + 1$ (b) $6q + 6$
(c) $6q + 4$ (d) None of these

Ans.

6. The series of a well defined steps which gives a procedure for solving a type of problem is

(a) lemma (b) algorithm

(c) logarithm (d) none of these

T – 1 min
S – Real number

Ans.

7. LCM $(P, q, r) = ?$

(a) $\dfrac{P \cdot q \cdot r \text{ HCF } (P, q, r)}{\text{HCF}(P, q) \cdot \text{HCF } (q, r) \cdot \text{HCF } (P, r)}$

(b) $\dfrac{P \cdot q \cdot r \text{ HCF } (P, q)}{\text{HCF}(P, qr) \cdot \text{HCF } (q, r) \cdot \text{HCF } (P, r)}$

(c) $\dfrac{P \cdot q \cdot r \text{ HCF } (q, r)}{\text{HCF}(P, q, r) \cdot \text{HCF } (P, q) \cdot \text{HCF } (P, r)}$

(d) None of these

T – 1 min
S – Real number

Ans.

8. Which of the following is not a polynomial?

(a) $\sqrt{3}x^2 - 2\sqrt{3}\,x + 3$

(b) $\dfrac{3}{2}x^3 - 5x^2 - \dfrac{1}{\sqrt{2}}x - 1$

(c) $x + \dfrac{1}{x}$

(d) $5x^2 - 3x + \sqrt{2}$

T – 1 min
S – Polynomial

Ans.

9. The sum and product of the zeros of a quadratic polynomial are 2 and –15 respectively. The quadratic polynomial is

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

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

T – 1 min
S – Polynomial

Ans.

10. Zeros of $p(x) = x^2 - 2x - 3$ are

(a) 1 and -3 (b) -3 and -1

(c) 3 and -1 (d) 3 and 1

T – 1 min
S – Polynomial

Ans.

11. The total surface area of a cube is 864 cm^2. Its volume is

(a) 3456 cm^3 (b) 432 cm^3

(c) 1728 cm^3 (d) 3456 cm^3

T – 1 min
S – Polynomial

Ans.

12. If α, β, γ be the zeros of the polynomial $p(x)$ such that $(\alpha+\beta+\gamma)=3$, $\alpha\beta+\beta\gamma+\gamma x=-10$ and $\alpha\beta\gamma=-24$ then $p(x)$ is

(a) $x^3+3x^2-10x+24$ (b) $x^3+3x^2+10x-24$

(c) $x^3-3x^2-10x-24$ (d) None of these

T – 1 min
S – Polynomial

Ans.

13. If α, β, γ are the zeros of the polynomial x^3-6x^2-x+30, then the value of $\alpha\beta+\beta\gamma+\alpha\gamma$ is

(a) – 1 (b) 1

(c) – 5 (d) 5

T – 1 min
S – Polynomial

Ans.

14. $a+b=2$ and $a-b=0$ then $a=$

(a) 1 (b) 2

(c) 0 (d) –1

T – 1 min
S – Linear equation

Ans.

15. $x+y=6$ and $y-x=0$ then $y=$

(a) 3 (b) 0

(c) –3 (d) 1

T – 1 min
S – Linear equation

Ans.

16. Solve for x

$ax+by=a-b$

$bx-ay=a+b$

(a) 1 (b) – 1

(c) 2 (d) – 2

T – 1 min
S – Linear equation

Ans.

17. Solve for y

$6x+3y=6xy$

$2x+4y=5xy$

(a) 1 (b) 2

(c) 4 (d) – 2

T – 1 min
S – Linear equation

Ans.

18. Find the H.C.F of 18 and 24

(a) 6

(b) 12

(c) 72

(d) 24

T – 1 min
S – Real numbers

Ans.

19. Find the LCM of 18 and 24

(a) 72 (b) 6

(C) 12 (d) 24

T – 1 min
S – Real numbers

Ans.

20. Solve for x

$mx + ny = n - m$

$nx - my = -(m + n)$

(a) $2m$ (b) $1m$

(c) $-2m$ (d) none of these

T – 1 min
S – Linear equation

Ans.

Fill in the Blanks

21. Euclid's division algorithm is stated for only _____ .

T – 1 min
S – Real number

Ans.

22. $4y^2 - 3y + 8$ is a polynomial in y of degree _____ .

T – 1 min
S – Polynomial

Ans.

23. $\alpha + \beta =$ _____ .

T – 1 min
S – Polynomial

Ans.

24. $\frac{1}{5^2}$ is _____.

T – 1 min
S – Trigonometry

Ans.

25. $2\sqrt{3}$ is _____.

T – 1 min
S – Trigonometry

Ans.

26. $\frac{1}{\sqrt{2}}$ is _____.

T – 1 min
S – Trigonometry

Ans.

27. A pair of linear equation which has no solution is called an _____ pair of linear equation.

T – 1 min
S – Linear equation

Ans.

28. $2x + 3y = 5$ is an example of _____.

T – 1 min
S – Linear equation

Ans.

29. The line segments joining the mid-points of the adjacent sides of a quadrilateral, form a _____.

T – 1 min
S – Triangles

Ans.

30. When $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, there are _____ solution.

T – 1 min
S – Linear equation

Ans.

True or False

31. Euclid's division algorithm is based on Euclid's division lemma.

T – 1 min
S – Real numbers

Ans.

32. $\sqrt{3}$ is rational number.

T – 1 min
S – Real numbers

Ans.

33. HCF $(P, q, r) \times$ LCM $(P, q, r) = P \times q \times r$

T – 1 min
S – Real numbers

Ans.

34. An algorithm is a series of well defined steps which gives a procedure for solving a type of problem.

T – 1 min
S – Real numbers

Ans.

35. $3+2\sqrt{5}$ is a whole number.

T – 1 min
S – Real numbers

Ans.

36. The polynomial of degree 1 is called a linear polynomial.

T – 1 min
S – Polynomial

Ans.

37. All isosceles triangles are similar.

T – 1 min
S – Triangles

Ans.

38. A pair of linear equation which has infinitely many distinct common solution, such a pair is called dependepent pair of equation.

T – 1 min
S – Linear equation

Ans.

39. The distance of a point from the *y*-axis is called abscissa.

T – 1 min
S – Triangles

Ans.

40. Two polygons of the same number of side are similar.

T – 1 min
S – Triangles

Ans.

Simple Questions

41. Find the HCF of 36, 72 using prime factorisation.

T – 1 min
S – Real numbers

Ans.

42. Find the LCM of 144, 198.

T – 1 min
S – Real numbers

Ans.

43. Find the quadratic polynomial whose zeros are $\frac{2}{3}$ and $-\frac{1}{4}$.

T	– 1 min
S	– Polynomial

Ans.

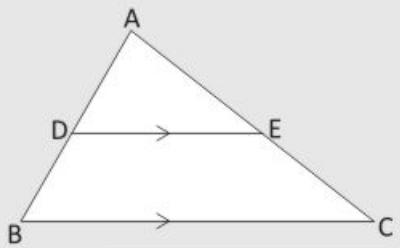
44. Find the quadratic polynomial the sum and product of whose zeros are $\frac{5}{2}$ and 1 respectively.

T	– 1 min
S	– Polynomial

Ans.

45. In the given figure, in ΔABC, $DE \| BC$ so that $AD = 2.4$ cm, $AE = 3.2$ cm and $EC = 4.8$ cm, find AB

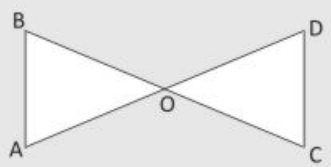
T	– 1 min
S	– Triangles



Ans.

46. In the given figure, $\Delta AOB \sim \Delta DOC$. Prove that $AB \| CD$.

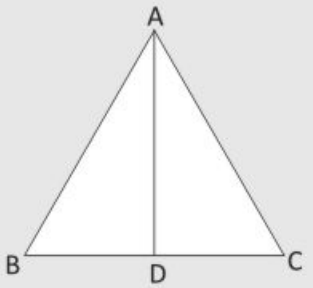
T	– 1 min
S	– Triangles



Ans.

47. In $\Delta ABC, AD$ is the internal bisector of $\angle A$. If $BD = 5$ cm, $BC = 7.5$ cm then find $AB : AC$.

T – 1 min
S – Triangles



Ans.

Q. 48 - Q 49. Solve each of the following

48. $x + y = 3$
$2x + 5y = 12$

T – 1 min
S – Linear equation

Ans.

49. $x + 2y + 2 = 0$
$3x + 2y - 2 = 0$

T – 1 min
S – Linear equation

Ans.

50. Solve the following system of equation using substitution method.
$x - y = 1$ and $3x + 2y = 12$

T – 1 min
S – Linear equation

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. If a is rational number and $\sqrt{b}$ is irrational number then prove that $a + \sqrt{b}$ is irrational number.

T – 1 min
S – Real numbers

Ans.

For questions 52-54. Express each number as a product of its prime factors.

52. 11475

T – 1 min
S – Real numbers

Ans.

53. 7429

T – 1 min
S – Real numbers

Ans.

54. 312

T – 1 min
S – Real numbers

Ans.

For questions 55-57. Find LCM and HCF using prime factorisation method.

55. 12, 15 and 21

T – 1 min
S – Real numbers

Ans.

56. 12, 24 and 32

T – 1 min
S – Real numbers

Ans.

57. 9, 81 and 729

T – 1 min
S – Real numbers

Ans.

58. $f(x) = x^2 + 7x + 12$. Find the product of the polynomials.

T – 1 min
S – Polynomial

Ans.

59. Find a quadratic polynomial, the sum and product of whose zeros are -2 and 3.

T – 1 min
S – Polynomial

Ans.

Solve for x and y.

60. $\frac{ax}{b}-\frac{by}{a}=a+b,\ ax-bx=2ab$

T – 1 min
S – Linear equation

Ans.

61. $3x+y+1=0$
$2x-3y+8=0$

T – 1 min
S – Linear equation

Ans.

62. $2x-5y+4=0$
$2x+y-8=0$

T – 1 min
S – Linear equation

Ans.

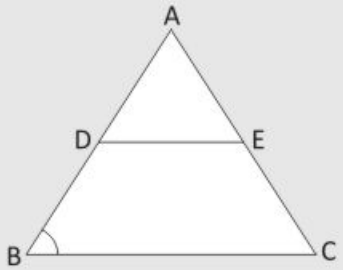
63. Solve for x and y.
$\frac{4}{x}+3y=14,\ \frac{3}{x}-4y=23$, where $x\neq 0$

T – 1 min
S – Linear equation

Ans.

64. In the ΔABC, $\angle B = \angle C$ and $BD = CE$. Prove that $DE \parallel BC$.

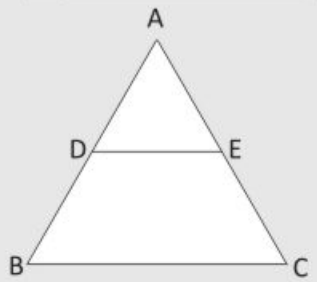
T	– 1 min
S	– Triangles



Ans.

65. Prove that a line drawn through the midpoint of one side of a triangle parallel to another side bisects the third side.

T	– 1 min
S	– Triangles



Ans.

66. The perimeters of two similar triangles are 25 cm and 15 cm respectively. If one side of the first triangle is 9 cm, find the corresponding side of the second triangle.

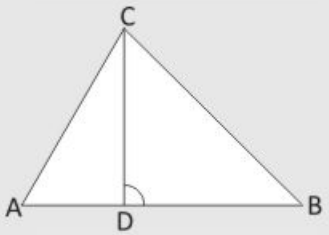
T	– 2 min
S	– Triangles

Ans.

67. In figure $\angle ACB = 90°$ and $CD \perp AB$.

Prove that $\frac{BC^2}{AC^2} = \frac{BD}{AD}$

T – 2 min
S – Triangles



Ans.

68. Without drawing the graphs, state whether the following pair of linear equations will represent intersecting lines, concident lines or parallel lines : $6x - 3y + 10 = 0, 2x - y + 9 = 0$. Justify your answer.

T – 2 min
S – Linear equation

Ans.

69. Find the value of α and β for which the following system of linear equations has infinitely many solutions.

$2x + 3y = 7$

$2\alpha x + (\alpha + \beta) y = 28$

T – 2 min
S – Linear equation

Ans.

70. Solve x and y.

$6x + 3y = 7xy$, $3x + 9y = 11xy$. $(x \neq 0, y \neq 0)$

T – 2 min
S – Linear equation

Ans.

71. A two digit number is 4 more than 6 times the sum of its digits. If 18 is subtracted from the number, the digits are reversed. Find the number.

T	– 2 min
S	– Linear equation

Ans.

72. Find the value of k for which the system of equations $x-2y=3, 3x+ky=1$ has a unique solution.

T	– 2 min
S	– Linear equation

Ans.

73. Prove that the line segment joining the midpoints of any two sides of a triangle is parallel to the third side.

T	– 2 min
S	– Triangles

Ans.

74. The sum of two number is 1000 and the difference between their squares is 256000. Find the numbers.

T	– 2 min
S	– Linear equation

Ans.

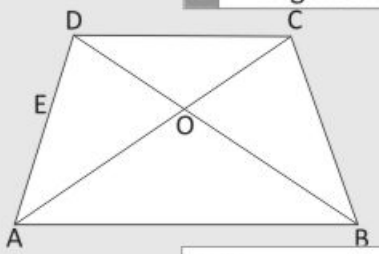
75. Evaluate $2\sin^2 30° - 3\cos^2 45° + \tan^2 60° + 3\sin^2 90°$.

T	– 2 min
S	– Trigonometry

Ans.

76. $ABCD$ is a trapezium in which $AB \| DC$ and its diagonals intersect each other at the point O. Prove that $\frac{AO}{OC} = \frac{BO}{OD}$.

T – 2 min
S – Trigonometry



Ans.

77. Find a quadratic polynomials, the sum and product of whose zeros are –5 and 6 respectively.

T – 2 min
S – Polynomial

Ans.

78. If one zero of the polynomials $(a^2 + a)\, x^2 + 13x + 6a$ is reciprocal of the other, find the value of a.

T – 2 min
S – Polynomial

Ans.

For Questions 79–80. Find the zeros of the quadratic polynomial and verify the relation between its zeros and coefficients.

79. $x^2 + 3x - 10$.

T – 2 min
S – Polynomial

Ans.

80. $x^2 - 5$

T – 2 min
S – Polynomial

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**

For questions 81-83. Find the HCF of the following using Euclid's division algorithm.

81. 867, 255

T – 2 min
S – Real numbers

Ans.

82. 140, 156

T – 2 min
S – Real numbers

Ans.

83. 420, 60

T – 2 min
S – Real numbers

Ans.

84. Show that $3\sqrt{5}$ is irrational.

T – 2 min
S – Real numbers

Ans.

85. Show that any number of the form 4^n, can never end with the digit *O*.

T – 2 min
S – Real numbers

Ans.

86. Show that $\frac{1}{\sqrt{2}}$ is irrational.

T – 2 min
S – Real numbers

Ans.

For question 87. Find the LCM and HCF of the following pairs of integers and verify that LCM × HCF = product of two numbers.

87. 32, 96

T – 2 min
S – Real numbers

Ans.

88. Divide the following and verify the division algorithm. $13 - 17x - 5x^2$ by $3 - 5x$.

T – 2 min
S – Polynomial

Ans.

89. Find all the zeros of $2x^4 - 9x^3 + 5x^2 + 3x - 1$, if two of its zeros are $(2+\sqrt{3})$ and $(2-\sqrt{5})$.

T	– 2 min
S	– Polynomial

Ans.

90. $\frac{x}{a} + \frac{y}{b} = a + b,\ \frac{x}{a^2} + \frac{y}{b^2} = 2$

T	– 2 min
S	– Polynomial

Ans.

91. Show that the system of equations $4x + 6y = 7,\ 12x + 18y = 21$ has infinitely many solution.

T	– 2 min
S	– Polynomial

Ans.

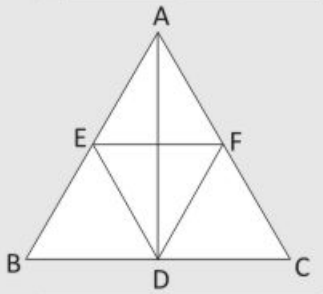
92. Find the value of k, for which the system of equations $3x + 5y = 0,\ kx + 10y = 0$ has a nonzero solution.

T	– 2 min
S	– Polynomial

Ans.

93. In the given figure, AD is a median of ΔABC. The bisectors of $\angle ADB$ and $\angle ADC$ meet AB and AC at E and F respectively. Prove that $EF \| BC$.

T – 2 min
S – Triangle



Ans.

94. The areas of two similar triangles ΔABC and ΔPQR are 25 cm^2 and 49 cm^2 respectively. If $QR = 9.8$ cm, Find BC.

T – 2 min
S – Triangle

Ans.

95. Solve the following:

$x + y = 5$

$3x + 5y = 8$

T – 2 min
S – Linear equation

Ans.

96. The monthly incomes of A and B are in the ratio 8 : 7 and their expenditures are in the ratio 19 : 16. If each saves Rs. 2500 per month. Find the monthly income of each.

T	– 3 min
S	– Linear equation

Ans.

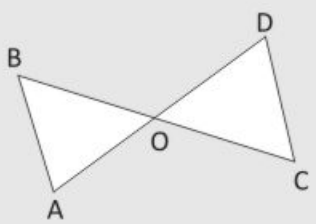
97. In a ΔABC, $\angle C = 3\angle B = 2(\angle A + \angle B)$ Find the angles.

T	– 3 min
S	– Linear equation

Ans.

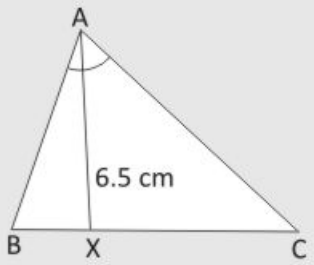
98. In the given figure, $AB \| CD$. Prove that $\Delta AOB \sim \Delta DOC$.

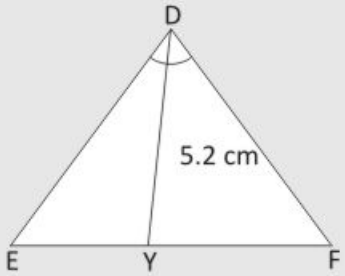
T	– 3 min
S	– Triangle



Ans.

99. In the figure given below, $\Delta ABC \sim \Delta DEF$ in which AX and DY are the bisectors of $\angle A$ and $\angle D$ respectively. If $AX = 6.5$ cm and $DY = 5.2$ cm. Find the ratio of the area of ΔABC and ΔDEF.





T	– 3 min
S	– Triangle

Ans.

100. BL and CM are medians of a ΔABC, right angled at A. Prove that $4(BL^2 + CM^2) = 5BC^2$.

T	– 3 min
S	– Triangle

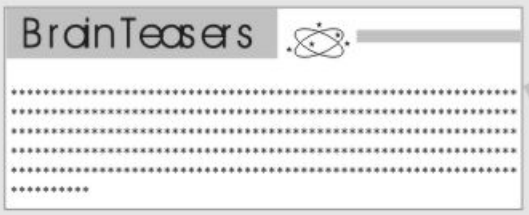
Ans.

Tools at a glance

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

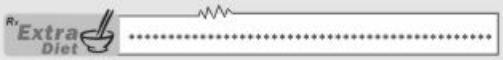
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

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