Grade 10
Unit 05

Maths

Course Outline

- Summative-1

MAT

(Monthly Achievement Tests)

Short Code: 447311

Test ID: NMM10U050

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. $\sqrt{3}$ is

T – 1 min
S – Real number

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

Ans.

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

T – 1 min
S – Polynomial

(a) 3 (b) –3
(c) –1/2 (d) –13/2

Ans.

3. Find x and y $10x + 3y = 75, 6x - 5y = 11$.

T – 1 min
S – Linear equation

(a) $x = 6, y = -5$ (b) $x = -6, y = 5$
(c) $x = 6, y = 5$ (d) $x = -6, y = -5$

Ans.

4. $\sin 0° =$

T – 1 min
S – Trigonometry

(a) 0 (b) 1
(c) –1 (d) 1/2

Ans.

5. $1 - 2\sin^2 30°$ is equal to

T – 1 min
S – Trigonometry

(a) –1/2 (b) 1/2
(c) 1 (d) –1

Ans.

6. If the bisector of an angle of a triangle bisects the opposite side, then the triangle is
(a) scalene (b) equilateral
(c) isosceles (d) right angled

T – 1 min
S – Triangle
Ans.

7. $\Delta ABC \sim \Delta DEF$ such that $AB = 9.1$ cm and $DE = 6.5$. If the perimeter of ΔDEF is 25 cm, then what is the perimeter of ΔABC?
(a) 35 cm (b) 28 cm
(c) 42 cm (d) 40 cm

T – 1 min
S – Triangle
Ans.

8. The line segments joining the midpoints of the adjacent sides of a quadrilateral form a
(a) parallelogram (b) square
(c) rhombus (d) rectangle

T – 1 min
S – Triangle
Ans.

9. $\sin(90° - \theta)$
(a) $\cos\theta$ (b) $-\cos\theta$
(c) $\sin\theta$ (d) $-\sin\theta$

T – 1 min
S – Trigonometry
Ans.

10. π is
(a) rational (b) irrational
(c) natural number (d) none of these

T – 1 min
S – Real numbers
Ans.

11. $\frac{1}{\sqrt{2}}$ is
(a) rational (b) irrational
(c) natural (d) none of these

T – 1 min
S – Real numbers
Ans.

12. Which of the following is polynomial ?
(a) $x^2 - 2x + 3\sqrt{x} + 1$ (b) $\sqrt{y} + \frac{1}{\sqrt{y}}$
(c) $x^{3/2} - x + x^{1/2}$ (d) none of these

T – 1 min
S – Polynomial
Ans.

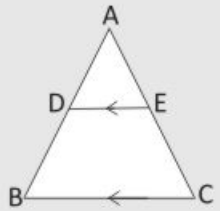
13. The value of k for which the system of equations $5x - 3y = 0$, $2x + ky = 0$ has a non-zero solution, is
(a) $k = 6/5$ (b) $k = 5/6$
(c) $k = \frac{-5}{6}$ (d) $k = -6/5$

T – 1 min
S – Linear equation
Ans.

14. In the given figure, in ΔABC, $DE \| BC$, so that $AD = (7x - 4)$ cm, $AE = (5x - 2)$ cm, $DB = (3x + 4)$ cm and $EC = 3x$ cm. The value of x is

(a) $x = 3$ (b) $x = 5$

(c) $x = 4$ (d) $x = 2.5$



T – 1 min
S – Triangle

Ans.

15. Mean $\bar{x}$ is written as

(a) $\bar{x} = \dfrac{\sum_{i=1}^{n} f_i x_i}{\sum_{i=1}^{n} f_i}$ (b) $\bar{x} = \dfrac{\sum_{i=1}^{n} f_i}{\sum_{i=1}^{n} f_i x_i}$

(c) $\bar{x} = \dfrac{\sum_{i=1}^{n} x_i}{\Sigma f_i}$ d) none of these

T – 1 min
S – Statistics

Ans.

16. ABC is an isosceles triangle right angled at B. Two equilateral triangles are constructed with sides BC and AC, then

(a) area of ΔBCD = area of ΔACE

(b) area of $\Delta BCD = \frac{1}{2}$ area of ΔACE

(c) area of $\Delta BCD = \frac{1}{2}$ area of ΔACE

(d) none of the above

T – 1 min
S – Triangles

Ans.

17. If a diagonal of a quadrilateral divide each other proportionally, then it is a

(a) trapezium (b) square

(c) rhombus (d) rectangle

T – 1 min
S – Triangles

Ans.

18. Solve for x and y: $11x + 15y + 23 = 0$ and $7x - 2y - 20 = 0$

(a) $(-2, -3)$ (b) $(-2, 3)$

(c) $(2, -3)$ (d) $(2, 3)$

T – 1 min
S – Linear equation

Ans.

19. Express $0.2\overline{54}$ as a fraction in simplest form

(a) $\frac{14}{55}$ (b) $\frac{14}{50}$

(c) $\frac{11}{30}$ (d) $\frac{16}{99}$

T – 1 min
S – Real numbers

Ans.

20. Find the LCM of 24, 36, 40.

(a) 540 (b) 360

(c) 1260 (d) 2520

T – 1 min
S – Real numbers

Ans.

Fill in the Blanks

21. HCF $(a, b) \times$ LCM $(a, b) =$ _____.

T – 1 min
S – Real numbers

Ans.

22. Polynomials of degree 3 is called _____.

T – 1 min
S – Polynomial

Ans.

23. $p(x) = g(x)q(x) +$ _____.

T – 1 min
S – Polynomial

Ans.

24. $\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$. In this case, the pair of linear equation is _____.

T – 1 min
S – Linear equation

Ans.

25. All the congruent figures are _____.

T – 1 min
S – Triangles

Ans.

26. The sum of two rationals is always _____ .

T – 1 min
S – Real numbers

Ans.

27. $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$. In this case the pair of linear equations is _____ and consistent.

T – 1 min
S – Linear equation

Ans.

28. _____ $= g(x) \times q(x) + r(x)$.

T – 1 min
S – Polynomial

Ans.

29. All the congruent figures are similar but the _____ is not true.

T – 1 min
S – Triangles

Ans.

30. $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, the pair of linear equations is _____.

T – 1 min
S – Linear equation

Ans.

True or False

31. LCM is the product of the greatest power of each prime factor, involved in the numbers.

T – 1 min
S – Real numbers

Ans.

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

T – 1 min
S – Real numbers

Ans.

33. $2y^2 - 3y + 4$ is a polynomial.

T – 1 min
S – Polynomial

Ans.

34. $x + 5 = 0$ is a linear equation.

T – 1 min
S – Linear equation

Ans.

35. Two polygon of the same number of sides are similar, if their corresponding angles are equal.

T – 1 min
S – Triangles

Ans.

36. $\tan 45° = \frac{1}{\sqrt{2}}$

T – 1 min
S – Polynomial

Ans.

37. $\tan A = \frac{\cos A}{\sin A}$

T – 1 min
S – Statistics

Ans.

38. Area of a triangle $= \frac{1}{2} \times$ Base $\times$ Diagonal.

T – 1 min
S – Real numbers

Ans.

39. The product of a rational and an irrational, is irrational.

T – 1 min
S – Trigonometry

Ans.

40. Class mark $= \frac{\text{Upper class limit} - \text{Lower class limit}}{2}$.

T – 1 min
S – Real numbers

Ans.

Simple questions

41. Write 234 as a product of prime factors.

T – 1 min
S – Real numbers

Ans.

42. If $\sec A = \frac{13}{5}$ and $A + B = 90°$, then what is the value of cosec B ?

T – 1 min
S – Trigonometry

Ans.

43. Which measure of central tendency is given by the *x*-coordinate of the point of intersection of the more than ogine and less than ogine ?

T – 1 min
S – Trigonometry

Ans.

44. Write 98 as a product of its prime factors.

T – 1 min
S – Trigonometry

Ans.

45. $\tan 45^\circ = \frac{1}{\sqrt{2}}$

T – 1 min
S – Trigonometry

Ans.

46. What is the maximum value of $\frac{1}{\sec\theta}$?

T – 1 min
S – Real numbers

Ans.

47. State Euclid's division lemma.

T – 1 min
S – Statistics

Ans.

Solve the following

48. If $\tan A = \frac{3}{4}$ and $A + B = 90^\circ$, then what is the value of $\cot B$?

T – 1 min
S – Trigonometry

Ans.

49. Write the condition to be satisfied by q so that a rational number $\frac{p}{q}$ has a decimal expansion which is non terminating repeating (recurring).

T – 1 min
S – Real numbers

Ans.

50. $\sin^2 A = \frac{1}{2}$ find the value of $\cos^2 A$

T – 1 min
S – Trigonometry

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

T – 1 min
S – Real numbers

Ans.

52. What is the maximum value of $\frac{1}{\sec\theta}$?

T – 1 min
S – Real numbers

Ans.

53. If $\tan A = \frac{3}{4}$ and $A + B = 90^\circ$ then what is the value of $\cot B$?

T – 1 min
S – Real numbers

Ans.

54. If $\sin\theta = a/b$ find the value of $\sin\theta + \tan\theta$.

T – 1 min
S – Trigonometry

Ans.

55. If $\cot\theta = \frac{7}{8}$ what is the value of $\frac{(1+\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(1-\cos\theta)}$?

T – 1 min
S – Trigonometry

Ans.

56. 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.

57. If A, B and C are interior angle of a triangle ABC, then show that $\sin\left(\frac{B+C}{2}\right) = \cos\frac{A}{2}$.

T – 1 min
S – Trigonometry

Ans.

58. The perimeters of two similar triangle ABC and PQR are respectively 36 cm and 24 cm, if $PQ = 10\,cm$ find AB.

T – 1 min
S – Triangles

Ans.

59. Explain, why $7 \times 11 \times 13 + 13$ is a composite number?

T – 1 min
S – Real numbers

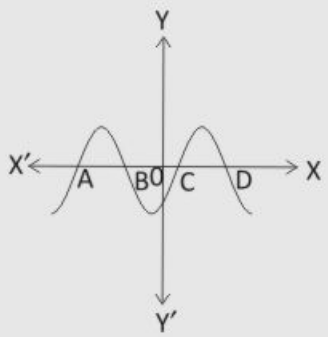
Ans.

60. Given that $\cot\theta = \frac{1}{\sqrt{5}}$. What is the value $\frac{sec^2\theta - cosec^2\theta}{sec^2\theta + cosec^2\theta}$?

T – 1 min
S – Trigonometry

Ans.

61. The graph of $y = f(x)$ is shown below, find the number of zeroes of $f(x)$.



T – 1 min
S – Polynomials

Ans.

62. Given that HCF (306, 657) = 9, find LCM (306, 657).

T – 1 min
S – Real numbers

Ans.

63. For what values of k, the following pairs of linear equations have no solution ?

$(3k + 1)x + 3y - 2 = 0$

$(k^2 + 1)x + (k - 2)y - 5 = 0$?

T – 1 min
S – Linear equation

Ans.

64. If $\sec\alpha = \frac{5}{4}$, find the value of $\frac{\tan\alpha}{1 + \tan^2\alpha}$.

T – 1 min
S – Trigonometry

Ans.

65. Evaluate $\frac{\sin^2 63° + \sin^2 27°}{\cos^2 17° + \cos^2 73°} = \frac{\sin^2(90° - 27°) + \sin^2 27°}{\cos^2 17° + \cos^2(90° - 17)}$

T – 1 min
S – Trigonometry

Ans.

66. Find the LCM and HCF of 510 and 92 by the prime factorisation method.

T	– 1 min
S	– Real numbers

Ans.

67. If m is a prime number, then prove that $\sqrt{m}$ is irrational.

T	– 1 min
S	– Real numbers

Ans.

68. Write the formula for finding the median for a grouped or continuous frequency distribution.

T	– 1 min
S	– Statistics

Ans.

69. In $\Delta ABC, \angle A = 90^\circ$ and $AD \perp BC$. Prove that $AB^2 + CD^2 = BD^2 + AC^2$

T	– 1 min
S	– Triangle

Ans.

70. Check whether 6^n can end with the digit 0 for any natural number n.

T – 1 min
S – Real number

Ans.

71. Prove the following identity $(\text{cosec}\,\theta - \cot\theta)^2 = \dfrac{1-\cos\theta}{1+\cos\theta}$.

T – 1 min
S – Trigonometry

Ans.

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

T – 1 min
S – Irrational

Ans.

73. If $\sec\alpha = 5/4$, find the value of $\dfrac{\tan\alpha}{1+\tan^2\alpha}$.

T – 1 min
S – Trigonometry

Ans.

74. Meena went to a bank to withdraw Rs 2000. She asked the cashier to give her Rs 50 and Rs 100 notes only. Meena got 25 notes in all. Find how many notes of Rs 50 and Rs. 100 she received?

T	– 1 min
S	– Linear equation

Ans.

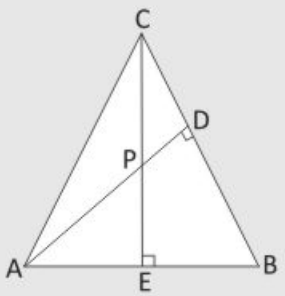
75. An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

T	– 1 min
S	– Real numbers

Ans.

76. In figure, altitudes AD and CE of ΔABC intersect each other at the point P. Show that (i) $\Delta AEP \sim \Delta CDP$ (ii) $\Delta ABD \sim \Delta CBE$.

T	– 1 min
S	– Triangles



Ans.

77. Show that $2\sqrt{3}$ is irrational.

T	– 1 min
S	– Real numbers

Ans.

78. Express the given number as a fraction in simplest form $0.\overline{365}$.

T	– 1 min
S	– Real numbers

Ans.

79. Find without actual division whether each of the rational numbers given below is terminating or non-terminating repeating decimal.

$$\frac{121}{2^2 \times 3^2 \times 7^5}$$

T	– 1 min
S	– Real numbers

Ans.

80. Use Euclid's algorithm to find the HCF of the following.
10224, 1608

T – 1 min
S – Real numbers

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. Prove that $\frac{1+\cos A}{\sin A}+\frac{\sin A}{1+\cos A}=2\operatorname{cosec} A$

T – 2 min
S – Trigonometry

Ans.

82. If two zeros of the polynomial $x^4+3x^3-20x^2-6x+36$ are $\sqrt{2}$ and $-\sqrt{2}$, find the other zeroes of the polynomial.

T – 2 min
S – Polynomial

Ans.

83. Show that $3+5\sqrt{2}$ is an irrational number.

T – 1 min
S – Real numbers

Ans.

84. In ΔOPQ right angled at $P, OP=7$ cm and $OQ-PQ=1$ cm. Determine the value of $\sin Q$ and $\cos Q$.

T – 1 min
S – Triangles

Ans.

85. If a line intersects sides AB and AC of a ΔABC at D and E respectively and is parallel to BC.
Prove that $\frac{AD}{AB} = \frac{AE}{AC}$

T	– 2 min
S	– Triangles

Ans.

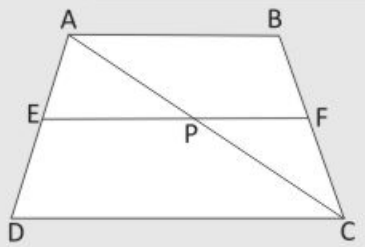
86. For which value of k will the following system of linear equations have no solution ?
$3x + y = 1$
$(2k-1)x + (k-1)y = 2k + 1$

T	– 1 min
S	– Linear equation

Ans.

87. Prove that in the figure if $ABCD$ is a trapezium with $AB \| DC \| EF$, then $\frac{AE}{ED} = \frac{BF}{FC}$.

T	– 2 min
S	– Triangles



Ans.

88. Find the zeros of the quadratic polynomic polynomial $4S^2 - 4S + 1$.

T	– 2 min
S	– Polynomial

Ans.

89. Solve $3x + 2y = 11$ and $2x + 3y = 4$.

T – 3 min
S – Polynomial

Ans.

90. $ABCD$ is a trapezium such that $AB \| CD$. Its diagonals AC and BD intersect each other at O. Prove that $\frac{AO}{OC} = \frac{BO}{OD}$.

T – 3 min
S – Polynomial

Ans.

91. 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.

92. Evaluate $\frac{\cos 45°}{\sec 30° + \operatorname{cosec} 30°}$

T – 3 min
S – Trigonometry

Ans.

93. 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 – Trigonometry

Ans.

94. Show graphically the following system of linear equations.

$x - y = 2$

$x + y = 6$

T	– 3 min
S	– Graphical Representation

Ans.

95. In ΔABC, if $\angle C = 3\angle B = 2(\angle A + \angle B)$. Find the three angles.

T	– 3 min
S	– Linear equation

Ans.

96. Prove that $3 + 2\sqrt{5}$ is irrational.

T	– 3 min
S	– Real numbers

Ans.

97. If α and β are the zeros of the quadratic polynomial $x^2 + x - 2$, find the value of $\frac{1}{\alpha} + \frac{1}{\beta} - 2\alpha\beta$.

T	– 3 min
S	– Polynomial

Ans.

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

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

Draw a less than ogive for the given data. Hence, obtain the median weight from the group and verify the result by using the formula.

T – 3 min
S – Statistics

Ans.

99. Solve for x and if $y\sqrt{2}x - \sqrt{3}y = 0, \sqrt{5}x + \sqrt{2}y = 0$.

T – 3 min
S – Linear equation

Ans.

100. Show graphically that the system of equations $3x - y = 2$ and $9x - 3y = 6$ has an infinite number of solutions.

T – 3 min
S – Linear equation

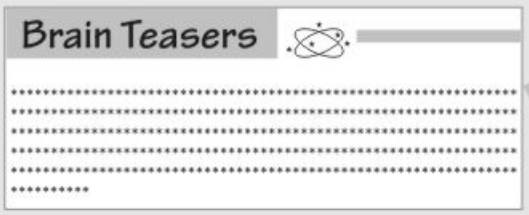
Ans.

Tools at a glance

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

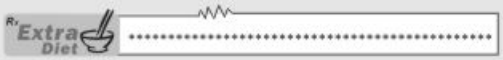
Let's Chat, the feature with suggestive topics for discussion so as to improve your capacity to debate on various topics.

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