ASSESSMENT – I
MATHEMATICS (GRADE X)

Maximum Marks: 80
Time allowed : 3 hours

Attempt ***all*** *questions from* ***Section A*** *and* ***any four*** *questions from* ***Section B.***

All working, including rough work, must be clearly shown and must be done on the same sheet as the rest of the answer.

Omission of essential working will result in loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A (40 Marks)
(Attempt all questions from this Section)

Question :1 Choose the correct answers to the questions from the given options: **[15]**

i) (1 + sin A) (1 – sin A) is equal to

a) $cosec^2 A$ b) $sin^2 A$ c) $sec^2 A$ d) $cos^2 A$

ii) A polynomial in 'x' is divided by (x – a) and for (x – a) to be a factor of this polynomial, the remainder should be .

a) –a b) 0 c) a d) $2a$

iii) A consumer bought a TV from a dealer at a discount of 20% on the marked price of Rs.40,000. If the rate of GST is 18%, then the tax paid by the consumer is :

a) 5760 b) 2880 c) nil d) 7200

iv) A man deposited Rs.1000 per month in a recurring deposit for 3 years at 8% p.a. The maturity value is :

a) 44,000 b) 40,000 c) 40,440 d) 44,444

v) If $2x - 5 \leq 5x + 4 < 11$, $x \in I$, then:

a) $-3 \leq x \leq 1.4$ b) $-3 \leq x \leq 2$ c) $-3 \leq x < 1$ d) $-3 \geq x$

vi) The Discriminant of the quadratic equation $3x^2 - 4x + 2 = 0$ is :

a) 8 b) -8 c) 16 d) $-\sqrt{8}$

vii) If the goods are purchased by a dealer in Jodhpur (Rajsthan) from a manufacturer in other city of Rajsthan , the type of tax applicable will be

a) SGST only b) CGST only c) IGST d) both a and b

viii) **Assertion (A)** : If the probability of India winning a T – 20 cricket match against Australia is $\frac{7}{10}$, then the probability of India losing the match against Australia is $\frac{3}{10}$.

Reason(R) : If $\bar{E}$ is the complementary event of the event E, then $P(E) + P(\bar{E}) = 1$.

a) A is true. R is false b) A is false. R is true

c) both A and R are true and R is the correct reason for A.

d) both A and R are true and R is incorrect reason for A.

ix) The quadratic equation $x^2 + x - 5 = 0$ has.

a) two distinct real roots b) two equal roots c) no real roots d) more than 2 real roots

x) If $A = \begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 0 \\ -2 & 2 \end{bmatrix}$, then $AB + BA = ?$

a) $\begin{bmatrix} 2 & 3 \\ 12 & 8 \end{bmatrix}$ b) $\begin{bmatrix} 8 & 8 \\ 12 & 12 \end{bmatrix}$ c) $\begin{bmatrix} 12 & 8 \\ 8 & 12 \end{bmatrix}$ d) $\begin{bmatrix} 4 & 12 \\ 8 & 12 \end{bmatrix}$

xi) **Statement 1 :** The quadratic equation $2x^2 - \sqrt{5}x + 1 = 0$ has no real roots.

Statement 2 : The quadratic equation $2x^2 + 3x + 1 = 0$ has equal roots.

Which of the following is valid ?

a) both the statements are true. b) both the statements are false.

c) Statement 1 is true but Statement 2 is false . d) Statement 1 is false but Statement 2 is true.

xii) Which of the following points is invariant with respect to the line $y = -2$?

(a) (3, 2) (b) (3, -2) (c) (2, 3) (d) (-2, 3)

xiii) A bag contains 3 red and 2 blue marbles. A marble is drawn at random. The probability of drawing a black ball is.

a) 0 b) $\frac{1}{5}$ c) $\frac{2}{5}$ d) $\frac{3}{5}$

xiv) Salman has some shares of Rs.50 of a company paying 15% dividend. If his annual income is Rs.3000, then the numbers of share he possesses is.

(a) 80 (b) 400 (c) 600 (d) 800

xv) If A is a square matrix such that $A^2 = A$, *then* $(I + A)^2 - 3A = ?$

a) I b) A c) $3I$ d) $4I$

Question : 2

a) The following bill shows the GST rate and the marked price of articles :

S.No.	Item	Marked Price	Quantity	Rate of GST
a)	LED TV set	Rs.12000	01	28%
b)	MP4 player	Rs. 5000	01	18%

Find the total amount to be paid(including GST) for the above bill. **[4]**

(b) Prove that :- $\frac{\sin\theta}{1-\cot\theta} + \frac{\cos\theta}{1-\tan\theta} = \cos\theta + \sin\theta$ **[4]**

c) Salman deposit Rs. 1000 every month in a recurring deposites account for 2 years. If he receives Rs. 26000 on a maturity. find :

a) the total interest Salman earns. b) the rate of interest. **[4]**

Question : 3

a) Solve the following inequation and represent the solution set on the number line. **[4]**

$$\frac{3x}{5} + 2 < x + 4 \leq \frac{x}{2} + 5,\ x \in R$$

(b) Given $A = \begin{bmatrix} 2 & -6 \\ 2 & 0 \end{bmatrix}, B = \begin{bmatrix} -3 & 2 \\ 4 & 0 \end{bmatrix}, C = \begin{bmatrix} 4 & 0 \\ 0 & 2 \end{bmatrix}$. Find the matrix X such that A+ 2X = 2B + C. **[4]**

c) Use graph paper for this question taking 2 cm = 1 unit along both axes. **[5]**

i) Plot A(1, 3) , B(1, 2) and C (3, 0).

ii) Reflect A and B on the x- axis and name their images as E and D respectively. Write down their coordinates .

iii) Reflect A and B through the origin and name their images as F and G respectively.

iv) Reflect A, B and C on tne y – axis and name their images as J, I and H respectively.

v) Join all the points A, B, C, D, E, F, G, H, I and J in order and name the closed figure so formed.

SECTION B (40 Marks)

*(Attempt **any four** questions from this Section)*

Question : 4

a) Use the Remainder Theorem to factorise the following expression: $2x^3 + x^2 - 13x + 6$. **[3]**

b) Solve the following equation: $x - \frac{18}{x} = 6$, give your answer correct to two significant figures. **[3]**

c) In a certain positive fraction, the denominator is greater than the numerator by 3. If 1 is subtracted from both the numerator and denominator, the fraction is decreased by $\frac{1}{14}$. Find the fraction. **[4]**

Question : 5

a) Prove that : $1 + \frac{tan^2\theta}{1+sec\theta} = \sec\theta$ **[3]**

b) Two different dice are thrown simultaneously. What is the probability that the sum of two numbers appearing on the top of dice is . (i) 8 (ii) 10 iii) atleast 10 ? **[3]**

c) Given $A = \begin{bmatrix} 2 & 0 \\ -1 & 7 \end{bmatrix}$ *and* $I = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ and $A^2 = 9A + MI$. Find matrix M. **[4]**

Question : 6

a) Show that $(2x + 7)$ is a factor of $2x^3 + 7x^2 - 4x - 14$. Hence factorise $2x^3 + 7x^2 - 4x - 14$ **[3]**

b) The angles of depression of two ships A and B as observed from the top of a light house 60 m high are 60° and 45° respectively. If the two ships are on the opposite sides of the light house, find the distance between the two ships. Give your answer correct to the nearest whole number. **[3]**

c) Solve the following inequation and write down the solution set :

$$11x - 4 < 15x + 4 \leq 13x + 14, \quad x \in W.$$

Represent the solution on the number line. **[4]**

Question :7

a) Mr. Kumar a registered dealer purchased goods worth Rs. 40000 from a dealer (within the same state). If the rate of GST is 18%,

(i) Calculate the input CGST and input SGST

(ii) If he sold these goods to Mr. Dev (within the state) for Rs. 50000, calculate Mr. Kumar's output CGST and output SGST.

(iii) Calculate the CGST and SGST payable by Mr. Kumar **[3]**

b) Mohan opened a recurring deposite account in a bank and deposited Rs. 800 per month for $1\frac{1}{2}$ years. If he received Rs. 15084 at the time of maturity, find the rate of interest per annum. **[3]**

c) Using a graph paper, plot the points A(6, 4) and B(0, 4). **[4]**

i) Reflect A and B in the origin to get images A' and B'.

ii) Write the coordinates of A' and B'

iii) State the geometrical name for the figure ABA'B'.

iv) Find its perimeter

Question :8

a) Solve the inequation $2y - 3 < y + 1 \leq 4y + 7$, where $y \in R$.
Also represent the solution set on the number line. [3]

b) A car covers a distance of 400 km at a certain speed. Had the speed been 12 km/hr more, the time taken for the journey would have been 1 hr 40 min. less. Find the original speed of the car. [3]

c) Prove that : $(\sin\theta + \cos\theta)(cosec\,\theta - \sec\theta) = cosec\,\theta.\sec\theta - 2\,tan\theta$

Question :9)

a) Prove that $\sqrt{\frac{\sec A - 1}{\sec A + 1}} + \sqrt{\frac{\sec A + 1}{\sec A - 1}} = 2$ cosec A [3]

b) A man observes the angle of elevation of the top of a building to be 30^0. He walks towards it in a horizontal line through its base. On covering 60m. the angle of elevation changes to 60^0. Find the height of the building correct to the nearest meter. [3]

c) If $\begin{bmatrix} a & 1 \\ 1 & 0 \end{bmatrix}\begin{bmatrix} 4 & 3 \\ -3 & 2 \end{bmatrix} = \begin{bmatrix} b & 11 \\ 4 & c \end{bmatrix}$. find a. b and c. [4]

Question : 10

a) Salman buys 50 shares of face value Rs. 100 available at Rs. 132. [3]

i) What is his investment ? ii) If the dividend is 7.5 % p.a., what will be his annual income

b) Solve : $x^2 + 7x - 7 = 0$ and give your answer correct to two decimal places. [3]

c) If $x = a\sec\theta + b\tan\theta$ and $y = a\tan\theta + b\,sec\,\theta$, prove that $x^2 - y^2 = a^2 - b^2$. [4]