SEMESTER I
THE FIRST PRE-BOARD EXAMINATION 2022-23
Class X
MATHEMATICS

Time: Two hours (*inclusive of reading time*) **Maximum marks: 40**

Instructions:

- *This paper comprises of four sections – A, B, C, D. Sections A, B and C contain MULTIPLE CHOICE QUESTIONS and Section D contains 2 SUBJECTIVE QUESTIONS.*
- *For each question in Sections A, B and C, 4 OPTIONS ARE GIVEN out of which ONLY ONE is correct. Choose the option that you think is correct.*
- *Then on the OMR sheet given to you, find the corresponding question number and DARKEN the circle containing your choice. DARKEN ONLY ONE CIRCLE for each question. If you darken more than ONE circle, your answer will be considered invalid.*
- *For the 2 SUBJECTIVE QUESTIONS in Section D, show the COMPLETE WORKING on the SEPARATE ANSWER SCRIPT provided. OMISSION OF ESSENTIAL WORKING will result in loss of marks.*
- *Mark your answers in the OMR sheet using HB/2B Pencil only.*
- *If you want to change your answer, carefully erase the previous mark completely and DARKEN the new option.*
- *Before you begin the test, read the instructions on the OMR SHEET carefully and fill the details.*
- *All questions of all the four sections are compulsory.*
- *The marks intended for questions are given in brackets [ ].*

Section A [12 Marks] [12 × 1]

(1) If $A = \begin{bmatrix} 2 & 1 \\ -1 & 0 \end{bmatrix}$, then 3A is:

(a) $\begin{bmatrix} 6 & 3 \\ -3 & 3 \end{bmatrix}$ (b) $\begin{bmatrix} 6 & 3 \\ -1 & 0 \end{bmatrix}$ (c) $\begin{bmatrix} 6 & 1 \\ -3 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 6 & 3 \\ -3 & 0 \end{bmatrix}$

(2) Identify the types of taxes under GST levied on intra-state sales.

(a) CGST only (b) SGST only (c) IGST only (d) Both CGST and SGST

(3) The mean proportion between 4 and 49 is:

(a) 14 (b) 45 (c) 53 (d) 196

(4) Ankur deposited Rs 1000 every month in a recurring deposit account for 3 years at 8% p.a. simple interest. If he received Rs 40440 at the time of maturity, the interest received by him is:

(a) Rs 4440 (b) Rs 8640 (c) Rs 37440 (d) Rs 39440

(5) If $x \in$ W, then the solution set of the inequation $1 < 2x - 1 \leq 3$ is:

(a) {2} (b) {1, 2} (c) {2, 3} (d) {0, 1, 2}

(6) The roots of the quadratic equation $x^2 - 6x + 9 = 0$ are:

(a) real and distinct (b) real and equal

(c) distinct but not real (d) equal but not real

(7) If a polynomial $2x^3 - 7x^2 + 3$ is divided by $(x - 2)$, then the remainder is:

(a) -41 (b) -15 (c) -9 (d) 9

(8) If matrix A is of order 2×2 and matrix B is of order 2×1, then the order of the matrix AB is:

(a) 1×2 (b) 2×1 (c) 2×2 (d) 2×3

(9) If 9, 15, 25 and x are in continued proportion, then 'x' is equal to:

(a) 7 (b) 15 (c) $5\frac{2}{5}$ (d) $41\frac{2}{3}$

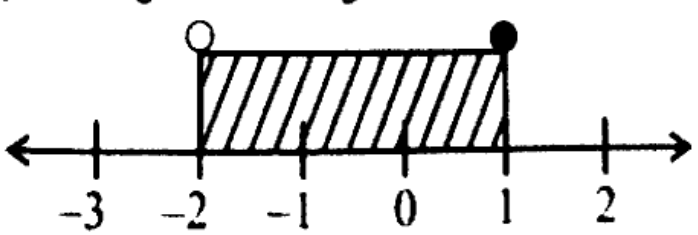
(10) The roots of the quadratic equation $x^2 - 2x - 3 = 0$ are:

(a) $-3, -1$ (b) $-3, 1$ (c) $-1, 3$ (d) 1, 3

(11) If $(x + 1)$ is a factor of the polynomial $x^3 + 2x^2 - 5x + k$, then 'k' is equal to:

(a) -6 (b) -2 (c) 2 (d) 6

(12) The solution set representing the following number line is:



(a) $\{x : x \in R, -2 \leq x \leq 1\}$ (b) $\{x : x \in R, -2 \leq x < 1\}$

(c) $\{x : x \in R, -2 < x \leq 1\}$ (d) $\{x : x \in R, -2 < x < 1\}$

Section B [12 Marks]

[6 × 2]

(13) Mr. Singh deposited Rs 600 every month in a recurring deposit account in a bank for 2 years. If the bank pays interest at the rate of 12% per annum, then the amount he gets on maturity is:

(a) Rs 744 (b) Rs 1218 (c) Rs 1800 (d) Rs 16200

(14) If $(x + 2)$ is a factor of the polynomial $x^3 + 3x^2 - 4x - 12$, then its factors are:

(a) $(x + 2)(x - 2)(x + 3)$ (b) $(x + 2)(x - 2)(x - 3)$

(c) $(x + 2)(x - 1)(x + 6)$ (d) $(x + 2)(x + 1)(x - 6)$

(15) The solution set of the linear inequation $-1 < 3 - 2x \leq 7, x \in I$ is:

(a) $\{x : x \in R, -2 \leq x < 2\}$ (b) $\{-2, -1, 0, 1\}$

(c) $\{-2, -1, 0, 1, 2\}$ (d) $\{-2, -1, 0\}$

(16) If $m : n = 9 : 14$, then by the properties of proportion, the value of $\frac{7m + 3n}{7m - 3n}$ is:

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

(17) If $A = \begin{bmatrix} -3 & 2 \\ 1 & 5 \end{bmatrix}$ and I is the identity matrix of order 2, then $A^2 - 4I$ is:

(a) $\begin{bmatrix} -11 & 4 \\ 2 & 23 \end{bmatrix}$ (b) $\begin{bmatrix} 7 & 0 \\ -2 & 23 \end{bmatrix}$ (c) $\begin{bmatrix} 7 & 4 \\ 2 & 23 \end{bmatrix}$ (d) $\begin{bmatrix} 5 & 4 \\ 1 & 21 \end{bmatrix}$

(18) A retailer purchases a watch for Rs 2500 from a wholesaler and sells it to a consumer at 16% profit. If the sales are intra-state and the rate of GST is 12%, the cost of the watch to the consumer inclusive of tax is:

(a) Rs 2848 (b) Rs 3074 (c) Rs 3200 (d) Rs 3248

[2 × 4]

Section C [8 Marks]

(19) A cottage industry in Shikohabad produces a certain number of pottery articles in a day. On 30th August, the Small-Scale Industry Day (SSI Day), it was observed that the cost of production of each article (in Rs) was 3 more than twice the number of articles produced on that day.

(i) Considering the number of articles produced on SSI Day as 'x', the cost of production of each article was:

(a) Rs $(x + 3)$ (b) Rs $(2x + 3)$ (c) Rs $x(2x + 3)$ (d) Rs $2(x + 3)$

(ii) If the total cost of production on SSI Day was Rs 90, then the quadratic equation formed is:

(a) $2x^2 + 3x + 90 = 0$ (b) $x^2 + 3x - 45 = 0$
(c) $x^2 + 3x - 90 = 0$ (d) $2x^2 + 3x - 90 = 0$

(iii) The number of articles produced on SSI Day was:
(a) 6 (b) 7 (c) 8 (d) 9

(iv) The cost of production of each article on that day was:
(a) Rs 9 (b) Rs 12 (c) Rs 15 (d) Rs 19

(20) The n^{th} term of an arithmetic progression (A.P.) is given by $(5n + 3)$.

(i) The first three terms of this A.P. are:

(a) 2, 7, 12 (b) 3, 8, 13 (c) 8, 11, 14 (d) 8, 13, 18

(ii) The common difference of this A.P. is:
(a) -5 (b) 3 (c) 5 (d) 8

(iii) Which of the following is NOT a term of this A.P.?
(a) 23 (b) 25 (c) 28 (d) 33

(iv) The sum of first 20 terms of this A.P. is:
(a) 103 (b) 1030 (c) 1110 (d) 1160

Section D [8 Marks]

(21) If $x = \frac{6ab}{a+b}$, using properties of proportion, find the value of $\frac{x+3a}{x-3a} + \frac{x+3b}{x-3b}$. [4]

(22) A car covers a distance of 390 km in 'x' hours. If the speed of the car had been 4 km/h more, it would have taken 2 hours less for the journey. Find 'x'. [4]