Roll No. | | | | | | |

Answer Sheet No. 31

Sig. of Candidate. _____

Sig. of Invigilator. _____

MATHEMATICS SSC–I

SECTION – A (Marks 15)

Time allowed: 20 Minutes (Science Group) | Version No. | 1 | 0 | 9 | 1 |

NOTE: Section–A is compulsory. All parts of this section are to be answered on the separately provided OMR Answer Sheet which should be completed in the first 20 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Choose the correct option i.e. A / B / C / D by filling the relevant bubble for each question on the OMR Answer Sheet according to the syllabus and instructions given. Each part carries one mark.

1) The value of X is _____, if $\begin{bmatrix} 2 & 1 \\ 3 & -3 \end{bmatrix} + X = \begin{bmatrix} 4 & -2 \\ -1 & -2 \end{bmatrix}$.

A. $\begin{bmatrix} 2 & -3 \\ -4 & -1 \end{bmatrix}$ B. $\begin{bmatrix} 2 & -1 \\ 4 & -3 \end{bmatrix}$ C. $\begin{bmatrix} -2 & -1 \\ 4 & -3 \end{bmatrix}$ D. $\begin{bmatrix} 2 & -3 \\ -4 & 1 \end{bmatrix}$

2) What will be added to complete the square of $9a^2 - 12ab$

A. $-16b^2$ B. $16b^2$ C. $-4b^2$ D. $4b^2$

3) A non- terminating, non-recurring decimal represents:

A. A natural number B. A rational number
C. An irrational number D. A prime number

4) log e = _____, where $e \approx 2.718$

A. 0 B. 0.4343 C. $\propto$ D. 1

5) If $x, y, z \in R, z < 0$, then $x < y \Rightarrow$:

A. $xz < yz$ B. $xz > yz$ C. $xz = yz$ D. $xz \leq yz$

6) Which of the following is the solution of the inequality $3 - 4x \leq 11$

A. $-8 \leq x$ B. $-2 \leq x$ C. $-\frac{14}{4} \leq x$ D. $-2 \geq x$

7) What should be added to complete the square of $x^4 + 64$?

A. $8x^2$ B. $-8x^2$ C. $16x^2$ D. $4x^2$

8) The y-coordinate of a point (x, y) is called:

A. Abscissa B. Mantissa C. Ordinate D. Base

9) The square root of $x^4 + \frac{1}{x^4} + 2$ is.

A. $\pm\left(x^2 - \frac{1}{x^2}\right)$ B. $\pm\left(x^2 + \frac{1}{x^2}\right)^2$ C. $\pm\left(x^2 + \frac{1}{x^2}\right)$ D. $\pm\left(x^2 - \frac{1}{x^2}\right)^2$

10) The altitudes of a triangle are always:

A. Congruent B. Collinear C. Concurrent D. Mutually perpendicular

11) Quadrilateral having each angle equal to $90°$ is called.

A. Rhombus B. Rectangle C. Parallelogram D. Trapezium

12) The right bisectors of the three sides of a triangle are always:

A. Congruent B. Collinear C. Concurrent D. Parallel

13) Point $(2, -3)$ lies in _____ quadrant.

A. I B. II C. III D. IV

14) Mid-point of the points $(2, -2)$ and $(-2, 2)$ is:

A. $(2, 2)$ B. $(-2, -2)$ C. $(1, 1)$ D. $(0, 0)$

15) The medians of a triangle cut each other in the ratio:

A. 4 : 1 B. 3 : 1 C. 2 : 1 D. 1 : 1

For Examiner's use only:

Total Marks: 15

Marks Obtained: _____

MATHEMATICS SSC–I
(Science Group)

32

Time allowed: 2:40 Hours **Total Marks Sections B and C: 60**

NOTE: **Attempt any nine parts from Section 'B' and any three questions from Section 'C' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet–B if required. Write your answers neatly and legibly. Logbook and graph paper will be provided on demand.**

SECTION – B (Marks 36)

Q. 2 **Attempt any NINE parts. All parts carry equal marks.** **(9 x 4 = 36)**

(i) For the Matrices $A=\begin{pmatrix}-1 & 3\\ 2 & 0\end{pmatrix}$, $B=\begin{pmatrix}1 & 2\\ -3 & -5\end{pmatrix}$. Verify whether $(AB)'=B'A'$

(ii) Solve the equation for real x and y. $(3-2i)(x+yi)=2(x-2yi)+2i-1$

(iii) Calculate using logarithm $\log_3 2\times\log_2 81$ (Note: Application of laws of logarithm is necessary)

(iv) Show that. $\left(\frac{x^a}{x^b}\right)^{a+b}\times\left(\frac{x^b}{x^c}\right)^{b+c}\times\left(\frac{x^c}{x^a}\right)^{c+a}=1$

(v) If $x=\frac{\sqrt{5}-\sqrt{2}}{\sqrt{5}+\sqrt{2}}$, find the value of $x^2+\frac{1}{x^2}$

(vi) Determine the value of 'k' if $P(x)=kx^3+4x^2+3x-4$ and $Q(x)=x^3-4x+k$ leave the same remainder when divided by $(x-3)$

(vii) The L.C.M and H.C.F of two polynomials $P(x)$ and $Q(x)$ are $2(x^4-1)$ and $(x+1)(x^2+1)$ respectively. If $P(x)=x^3+x^2+x+1$, find $Q(x)$.

(viii) Solve for x $\left|\frac{3-5x}{4}\right|-\frac{1}{3}=\frac{2}{3}$

(ix) Solve the pair of equations in x and y graphically $x-2y=-1, x-y+1=0$ (Note: Candidates can make their own grid on the answer sheet.)

(x) Use distance formula to verify that the points $A(0,7), B(3,-5)$ and $C(-2,15)$ are Collinear.

(xi) Verify that a^2+b^2, a^2-b^2 and $2ab$ are the measures of the sides of a right-angle triangle. Where a and b are any two real numbers $(a>b)$

(xii) Construct the triangle ΔPQR, for $m\overline{PQ}=4.5cm, m\overline{QR}=3.9cm$ and $m\angle R=45°$

(xiii) Solve the inequality: $-5\le\frac{4-3x}{2}<1$

(xiv) To make the expression $9x^4-12x^3+22x^2-13x+12$ a perfect square, what should be added to it?

SECTION – C (Marks 24)

Note: **Attempt any THREE questions. All questions carry equal marks.** **(3 x 8 = 24)**

Q. 3 Prove that mid-point of the hypotenuse of a right angle triangle is equidistant from its three vertices $P(-2,5), Q(1,3)$ and $R(-1,0)$

Q. 4 Prove that in any two corresponding triangles, if one side and any two angles of one triangle are congruent to the corresponding side and angles of the other, then the triangles are congruent $(A.S.A\cong A.S.A)$

Q. 5 Prove that, any point on the right bisector of a line segment is equidistant from its end points.

Q. 6 Construct a triangle XYZ. Draw its three medians and show that they are concurrent. $m\overline{YZ}=4.1cm, m\angle Y=60°$ and $m\angle X=75°$.

Q. 7 Solve by using Matrix inversion Method. $2x-2y=4, -5x-2y=10$