MODEL PAPER MATHEMATICS CLASS 10

NOTE: Attempt all questions of Section-A by filling the corresponding bubble on the **MCQs RESPONSE SHEET.** It is mandatory to return the attempted MCQs sheet to the Superintended within given time.

SECTION –A

Time: 20 Minutes **Marks:** 15

1. The quadratic equation in the following is:

A. $x^4 + 11x^2 + 9 = 0$

B. $x^3 + 11x^2 + 9 = 0$

C. $x^3 + 11x + 9 = 0$

D. $x^2 + 11x + 9 = 0$

2. The solution set of $2x^2 - 9x + 5 = 0$ is:

A. $\left\{\frac{-9\pm\sqrt{41}}{4}\right\}$

B. $\left\{\frac{9\pm\sqrt{41}}{4}\right\}$

C. $\left\{\frac{-9\pm\sqrt{41}}{2}\right\}$

D. $\left\{\frac{-9\pm\sqrt{41}}{2}\right\}$

3. $\frac{1}{\alpha} + \frac{1}{\beta} =$

A. $\frac{1}{\alpha\beta}$

B. $\frac{1}{\alpha+\beta}$

C. $\frac{\alpha\beta}{\alpha+\beta}$

D. $\frac{\alpha+\beta}{\alpha\beta}$

4. The discriminant of equation $x^2 + 6x + 2 = 0$ is equal to:

A. 8

B. 28

C. 36

D. 44

5. Direct variation between p and q can be expressed as:

A. $p = q$

B. $p = \frac{1}{q}$

C. $p \propto q$

D. $p \propto \frac{1}{q}$

6. In continued proportion $p:q = q:r, r$ is called as:

A. first proportional to p, q.

B. second proportional to p, q.

C. third proportional to p, q.

D. fourth proportional to p, q.

7. $\frac{x^2+1}{x+1}$ is an example of:

A. proper fraction only

B. improper fraction only

C. both proper and rational fraction

D. both improper and irrational fraction

8. The set of the whole numbers (W) in the following is:

A. $\{0,1,2,3, \ldots \ldots \ldots\}$

B. $\{0, \pm 2, \pm 4, \ldots \ldots \ldots\}$

C. $\{1,2,3, \ldots \ldots \ldots\}$

D. $\{0, \pm 1, \pm 2, \pm 3, \ldots \ldots \ldots\}$

9. The range of $R = \{(1,2), (2,2), (3,1), (4,4)\}$ is:

A. $\{1,3,4\}$

B. $\{1,2,4\}$

C. $\{2,3,4\}$

D. $\{1,2,3,4\}$

10. If $A = \{1,2,3,4\}$ and $B = \{5,6,7,8\}$, then which of the following binary relations is a function from B to A?

A. $R = \{(1,5), (2,6), (3,7), (4,8)\}$

B. $R = \{(1,6), (2,5), (4,8), (4,7)\}$

C. $R = \{(5,1), (6,2), (7,3), (8,4)\}$

D. $R = \{(5,2), (6,1), (8,4), (8,3)\}$

11. The value that appears more times in a data is called:

A. mean

B. median

C. mode

D. variance

12. In the given set of data, $71, 73, 79, 77, 76, 75, 80$, the median is:

A. 73

B. 76

C. 77

D. 79

13. In radians, $45°$ is equal to:

A. $\frac{\pi}{2}$

B. $\frac{\pi}{3}$

C. $\frac{\pi}{4}$

D. $\frac{\pi}{6}$

14. $1 + cot^2\theta =$

A. $sin^2\theta$

B. $cos^2\theta$

C. $tan^2\theta$

D. $cosec^2\theta$

15. The number of circles that can pass through three non-collinear points is:

A. 0

B. 1

C. 2

D. 3

SECTION-B

Time: 2 Hours 40 Minutes **Marks:** 36

1. Attempt any **NINE** of the following short questions. Each question carries 4 marks.

i. Derive quadratic formula for $ax^2 + bx + c = 0$ where $a \neq 0$, by using completing square method.

ii. Solve $4.2^{2x} - 10.2^x + 4 = 0$.

iii. Find the cube roots of 64.

iv. If α, β are roots of $x^2 - 4x + 2 = 0$, find the equation whose roots are $\frac{\alpha}{\beta}, \frac{\beta}{\alpha}$.

v. Find the mean proportional of $a^2 - b^2$ and $\frac{a+b}{a-b}$.

vi. Resolve into partial fraction $\frac{4x+2}{(x+2)(2x-1)}$.

vii. If $U = \{1,2,3, \ldots \ldots, 10\}$, $A = \{2,4,6,8,10\}$ and $B = \{1,3,5,7,9\}$, then verify $(A \cup B)' = A' \cap B'$.

viii. A set of data contains the values as $105,80,90,75,100,105\ and\ 110$. Show that $Mode > Median > Mean$.

ix. An arc of a circle subtends an angle of 2 radians at the center. If the area of sector formed is $64cm^2$, find the radius of the circle.

x. Prove that: $cosx - cosx\ sin^2x = cos^3x$.

xi. $\overline{AB}$ and $\overline{AC}$ are tangent segments to the circle with centre O. If $m\overline{OB} = 6cm$ and $m\overline{OA} = 10cm$, then find $m\overline{AB}$ and $m\overline{AC}$.

xii. Prove that equal chords of a circle subtend equal angles at the center. Prove for only one circle.

SECTION-C

Marks: 24

NOTE: Attempt any **THREE** of the following questions. Each question carries 8 marks.

2. In $\Delta ABC, m\overline{AB} = 8cm, m\overline{BC} = 12cm,\ m\angle B = 100^o$. The projection of $\overline{BC}$ on $\overline{AB}$ is $6cm$. Find $m\overline{AC}$.

3. Prove that If two chords of a circle are congruent then they will be equidistant from the center.

4. Prove that the angle in a semi-circle is a right angle.

5. Construct a triangle with sides 4 cm, 4.5 cm and 5 cm. Also draws its circumcircle.