

Time Allowed: 3 Hrs

Note: There are Three Sections in this paper i.e. A, B and C. Attempt Section A and return it to the Superintendent within the given time. No marks will be awarded for Cutting, Erasing and Overwriting.

Mobile Phone is strictly prohibited in Examination Hall.

Time: 20 Minutes

SECTION "A"

Marks: 15

Q 1. Choose the correct option and shade one of (A, B, C, D) in the given Bubble Answer Sheet.

- i. The process of dividing the range on the number of groups is used to find:
☒ A Tally marks ☐ B Width ☐ C Class limits ☐ D Class boundaries
- ii. In a histogram, the horizontal axis represents:
☐ A Frequencies ☒ B Class marks ☐ C Class intervals ☐ D Cumulative Frequency
- iii. The measure of the radians in one complete rotation is:
☒ A 2π ☐ B 3π ☐ C $2\pi/3$ ☐ D $3\pi/2$
- iv. If $\frac{\pi}{2} < \theta < \pi$ then θ lies in the:
☐ A 1st quadrant ☐ B 2nd quadrant ☒ C 3rd quadrant ☐ D 4th quadrant
- v. If two chords of a circle are equidistant from the center, then the chords are:
☐ A Parallel ☐ B Tangent to the circle ☒ C Congruent ☐ D Perpendicular to each other
- vi. The equation $(x - k^2)^2 = 0$ is:
☐ A Linear equation ☒ B Quadratic equation ☐ C Cubic equation ☐ D Quartic equation
- vii. $x = 1$ or $x = \frac{4}{3}$ are the roots of the quadratic equation:
☐ A $x^2 - 4x + 3 = 0$ ☐ B $x^2 + 3x + 4 = 0$ ☐ C $3x^2 + 5x + 4 = 0$ ☒ D $3x^2 - 7x + 4 = 0$
- viii. The discriminant of the quadratic equation $2x^2 - 3x + \frac{1}{4} = 0$ is:
☐ A 0 ☐ B 4 ☒ C 6 ☐ D 7
- ix. The sum of the roots of the quadratic equation $2x^2 + 6x + 7 = 0$ is:
☐ A 2 ☐ B -3 ☒ C 3 ☐ D 8
- x. If y varies directly as x and $y = 9$ when $x = 3$, so the value of k is:
☐ A 2 ☒ B 3 ☒ C 4 ☐ D 36
- xi. The mean proportion of 2 and 8 is:
☐ A 4 ☐ B 6 ☒ C 8 ☐ D 16
- xii. A rational fraction $\frac{3x^3+2}{2x+1}$ is:
☒ A Proper fraction ☐ B Improper fraction ☐ C Mixed fraction ☐ D Undefined
- xiii. If $A = N$ & $B = W$ then $A \cap B$ is equal to:
☒ A Set of Natural Number ☐ B Set of Integers ☐ C Set of Rational Numbers ☐ D Set of Whole Numbers
- xiv. If two ordered pairs $(2x, x + y)$ and $(2, 4)$ are equal, then the value of y is:
☐ A 2 ☒ B -2 ☐ C 3 ☐ D 4
- xv. If $A = \{2, 3, 4\}$ and $B = \{d, e, f\}$ then the number of elements in $A \times B$ are:
☐ A 6 ☒ B 9 ☐ C 12 ☐ D 15

EXPLANATION (i)
SSC-(P-II)
MATHEMATICS – 10th

Time: 2 Hours 40 Minutes

SECTION "B"

Marks: 36

Q.2. Attempt any NINE (09) Parts of the following. All parts carry equal marks.

i. Solve $9^{2x} - 12 \cdot 3^x + 27 = 0$ using quadratic formula.

ii. Solve the equation: $\sqrt{2x+3} = 5 - \sqrt{x+2}$

1+1+2

iii. Find the quadratic equation whose roots are $\frac{1}{2}$ and 3.

2+2

iv. Find the value of k so that the sum of the roots of the quadratic equation $x^2 - 4kx + k + 3 = 0$ is equal to twice the product of its roots.

1+1+2

v. Solve the equation: $\frac{\sqrt{5x+1} + \sqrt{2x}}{\sqrt{5x+1} - \sqrt{2x}} = \frac{4}{2}$

1+2+1

vi. Resolve $\frac{5x-2}{(x-2)(x+4)}$ into partial fractions.

1+2+1

vii. If $X = \{1, 2, 3, 4\}$ & $Y = \{a, b, c, d\}$ then write:

2+2

i. a one-one function from X to Y

ii. bijective function from Y to X

viii. Find the Standard Deviation for the data: 5, 10, 15, 20, 25

1+2+1

ix. Find the area of sector of a circle whose radius is 8m, with central angle 60° .

1+2+1

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

1+2+1

xi. If two circles with radii $3x$ cm and 5 cm respectively touch each other externally, find the value of x if the distance between their centers is 17 cm.

1+2+1

xii. Prove that if two arcs of a circle are congruent then the corresponding chords are equal.

1+2+1

SECTION "C"

Marks: 24

Note: Attempt any THREE (03) questions. All questions carry equal marks.

Q.3. Using Apollonius' theorem, find the length of the medians of the triangle, having length of their sides are $AB=5$ cm, $BC=12$ cm and $AC=13$ cm.

1+3+3+1

Q.4. In a circle with center O , the perpendicular distances of chords PQ and RS from the center are each 5 cm. If the length of chord $PQ = (2x + 3)$ cm and the length of chord $RS = (x + 9)$ cm, find the value of x and explain with help of figure.

1+1+4+2

Q.5. Prove that any two angles in the same segment of a circle are equal.

1+1+4+2

Q.6. Inscribe a circle in a triangle ABC whose sides are 4 cm, 6 cm and 8 cm.

1+4+2+1