

Mathematics (Science)	10th Lahore Board 2017	Paper: II
Time: 20 min.	OBJECTIVE (Group-I)	Marks: 15

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting or filling two or more circles will result in zero mark in that question. Attempt as many questions as given in objective type question paper and leave others blank.

1.1. An equation which remains unchanged when x is replaced by $\frac{1}{x}$ is called a/an:

- (A) Exponential equation (B) Reciprocal equation
(C) Radical equation (D) Quadratic equation

2. If α, β are the roots of $3x^2 + 5x - 2$, then $\alpha + \beta$ is:

- (A) $\frac{5}{3}$ (B) $\frac{3}{5}$
(C) $-\frac{5}{3}$ (D) $-\frac{2}{3}$

3. Cube roots of -1 are:

- (A) $-1, -\omega, -\omega^2$ (B) $-1, \omega, -\omega^2$
(C) $-1, -\omega, \omega^2$ (D) $1, -\omega, -\omega^2$

4. The fourth proportional w of $x : y :: v : w$ is:

- (A) $\frac{xy}{v}$ (B) $\frac{vy}{x}$

(C) xyv

(D) $\frac{x}{vy}$

5. If $a:b = x:y$, then alternando property is:

(A) $\frac{a}{x} = \frac{a}{y}$

(B) $\frac{a}{b} = \frac{x}{y}$

(C) $\frac{a+b}{b} = \frac{x+y}{y}$

(D) $\frac{a-b}{x} = \frac{x-y}{y}$

6. $\frac{3\pi}{4}$ radian =

(A) 115°

(B) 150°

(C) 30°

(D) 135°

7. The set having only one element is called:

(A) Null set

(B) Power set

(C) Singleton set

(D) Subset

8. If $A \subseteq B$ then $A - B$ is equal to:

(A) A

(B) B

(C) $A - B$

(D) ϕ

9. A frequency polygon is a many sided _____:

(A) Closed figure

(B) Circle

(C) Rectangle

(D) Square

10. $\sec^2 \theta =$ _____:

(A) $1 - \sin^2 \theta$

(B) $1 + \tan^2 \theta$

(C) $1 + \cos^2 \theta$

(D) $1 - \tan^2 \theta$

11. Radii of a circle are:

(A) Double of the diameter

(B) All unequal

(C) Half of any chord

(D) Four points

12. A tangent line intersects the circle at _____:

(A) Three points

(B) Two points

(C) Single point

(D) Four points

13. The arcs opposite to incongruent central angles of a

circle are always _____:

- (A) Congruent (B) Parallel
(C) Perpendicular (D) Incongruent

14. The length of the diameter of a circle is how many times the radius of the circle:

- (A) 1 (B) 2
(C) 3 (D) 4

15. The tangent and radius of a circle at the point of contact are _____:

- (A) Parallel (B) Not perpendicular
(C) Perpendicular (D) Not parallel

Mathematics (Science)	10th Lahore Board 2017	Paper: II
Time: 2: 10 Hrs.	SUBJECTIVE	Marks: 60

(Group-I) (SECTION - I)

2. Write short answers to any SIX (6) questions: (2×6=12)

- Write the name of any two methods for solving a quadratic equation.
- Solve: $x^2 + 2x - 2 = 0$
- Evaluate: $(1 - 3W - 3W^2)^5$
- Evaluate: $W^{37} + W^{38} - 5$
- Without solving find the sum and the product of roots of quadratic equation: $3x^2 + 7x - 11 = 0$
- Write the quadratic equation having the roots: $-1, -7$
- Define direct variation.
- Find the fourth proportional to 8, 7, 6.
- Find x if $6 : x :: 3 : 5$

3. Write short answers to any SIX questions: (2×6=12)

- i. Define a rational fraction.
 - ii. Resolve $\frac{1}{x^2 - 1}$ into partial fraction.
 - iii. Define Subset.
 - iv. If $L = \{a, b, c\}$, $M = \{3, 4\}$ then find $L \times M$
 - v. Find domain and range of the binary relation,
 $R = \{(1, 1), (2, 2), (3, 3), (4, 4)\}$
 - vi. If $(2a + 5, 3) = (7, b - 4)$, find a, b .
 - vii. Write two properties of arithmetic mean.
 - viii. Define mode.
 - ix. The sugar contents for a random sample of 6 packs of juices of a certain brand are found to be 2.3, 2.7, 2.5, 2.9, 3.1 and 1.9 milligram, find the median.
- 4** Write short answers to any SIX (6) questions:

(2×6=12)

- i. Define radian measure of an angle.
- ii. Convert 15° to radian.
- iii. Find 'r', when $l = 56$ cm, $\theta = 45^\circ$
- iv. What is meant by zero dimension?
- v. Define chord of a circle.
- vi. Define tangent to a circle.
- vii. What is meant by sector of a circle.
- viii. Define circumangle.
- ix. Define inscribed circle.

(SECTION - II)

Note: Attempt Three questions in all.

- 5.** (a) Solve the equation by completing square: (4)
 $11x^2 - 34x + 3 = 0$
- (b) If α, β are the roots of equation $lx^2 + mx + n = 0$

0, ($l \neq 0$) then find the value of $\frac{1}{\alpha^2} + \frac{1}{\beta^2}$. (4)

6 (a) Using theorem of componendo-dividendo find the value of: $\frac{x+2y}{x-2y} + \frac{x+2z}{x-2z}$ if $x = \frac{4yz}{y+z}$ (4)

(b) Resolve into partial fractions: $\frac{x-11}{(x-4)(x+3)}$ (4)

7 (a) If $U = \{1, 2, 3, \dots, 10\}$, $A = \{1, 3, 5, 7, 9\}$ and $B = \{1, 4, 7, 10\}$ then verify that $A - B = A \cap B'$ (4)

(b) Calculate the variance for the data: (4)
10, 8, 9, 7, 5, 12, 8, 6, 8, 2

8 (a) Prove that: $\sin \theta (\tan \theta + \cot \theta) = \sec \theta$ (4)

(b) Draw two perpendicular tangents to a circle of radius 3 cm. (4)

9 Prove that if two chords of a circle are congruent then they will be equidistant from the centre. (8)

OR Prove that the measure of a central angle of a minor arc of a circle, is double that of the angle subtended by the corresponding major arc.

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(Group-II)

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number. Use marker or pen to fill the circles. Cutting

or filling two or more circles will result in zero mark in that question.

1.1. Find x in proportion $4:x :: 5:15$:

- (A) $\frac{75}{4}$ (B) $\frac{4}{3}$
(C) $\frac{3}{4}$ (D) 12

2. The different number of ways to describe a set is:

- (A) 1 (B) 3
(C) 2 (D) 4

3. The solution set of equation $4x^2 - 16 = 0$ is:

- (A) $\{\pm 4\}$ (B) $\{4\}$
(C) $\{\pm 2\}$ (D) ± 2

4. The extent of variation between two extreme observations of a data set is measured by:

- (A) Range (B) Average
(C) Quartiles (D) Median

5. $\frac{3\pi}{4}$ radian =

- (A) 115° (B) 150°
(C) 30° (D) 135°

6. $\sec^2 \theta =$ _____:

- (A) $1 - \sin^2 \theta$ (B) $1 + \tan^2 \theta$
(C) $1 + \cos^2 \theta$ (D) $1 - \tan^2 \theta$

7. The distance of any point of the circle to its centre is called:

- (A) Diameter (B) A chord
(C) Radius (D) An arc

8. The portion of a circle between two radii and an arc is called:

- (A) Sector
(B) Segment
(C) Chord
(D) Diameter
9. The third proportional of x^2 and y^2 is:
- (A) $\frac{y^2}{x^2}$
(B) x^2y^2
(C) $\frac{y^4}{x^2}$
(D) $\frac{y^2}{x^4}$
10. Tangents drawn at the ends of diameter of a circle are _____ to each other:
- (A) Parallel
(B) Non-parallel
(C) Collinear
(D) Perpendicular
11. How many common tangents can be drawn for two touching circles:
- (A) 2
(B) 1
(C) 4
(D) 3
12. If $A \subseteq B$ then $A - B$ is equal to:
- (A) A
(B) ϕ
(C) B
(D) $A - B$
13. If α, β are the roots of $x^2 - x - 1 = 0$, then product of the roots 2α and 2β is:
- (A) -2
(B) 2
(C) 4
(D) -4
14. The set having only one element is called:
- (A) Null set
(B) Power set
(C) Singleton set
(D) Subset
15. Cube roots of -1 are:
- (A) $-1, -\omega, -\omega^2$
(B) $-1, \omega, -\omega^2$
(C) $-1, -\omega, \omega^2$
(D) $1, -\omega, -\omega^2$

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(SECTION - I) (Group-II)

2 Write short answers to any SIX questions: (2×6=12)

- i. Define radical equation.
- ii. Write the equation in standard form: $\frac{x}{x+1} + \frac{x+1}{x} = 6$
- iii. Define simultaneous equations.
- iv. Evaluate: $(9 - 4\omega - 4\omega^2)^3$
- v. Without solving, find the sum and the product of the roots of quadratic equation:
 $(l + m)x^2 + (m + n)x + n - l = 0$
- vi. Use synthetic division to find the quotient and the remainder, when $(x^2 + 7x - 1) \div (x + 1)$.
- vii. Define direct variation.
- viii. Find fourth proportional: $4x^4 ; 2x^3, 18x^5$
- ix. If $3(4x - 5y) = 2x - 7y$, find the ration $x : y$.

3 Write short answers to any SIX (6) questions: (2×6=12)

- i. Define a rational fraction.
- ii. How can we make partial fractions of $\frac{7x-9}{(x+1)(x-3)}$
- iii. Define complement of a set.
- iv. Find a and b if $(a - 4, b - 2) = (2, 1)$
- v. Define domain and range of a relation.
- vi. Find $A \cap B$ if $A = \{2, 3, 5, 7\}$, and $B = \{3, 5, 8\}$
- vii. The marks of seven students in Mathematics are as follows. Find Arithmetic Mean:

45, 60, 74, 58, 65, 63, 49

Find geometric mean of 2, 4 and 8.

Define mode.

Write short answers to any SIX (6) questions:

(2×6=12)

Define radian.

Express 225° into radian.

In a circle of radius 12 m, find the length of an arc which subtends a central angle $\theta = 1.5$ radian.

Define projection of a point.

Define radial segment.

Define the tangent to a circle.

Define sector of a circle.

Define central angle.

Define geometry.

(SECTION - II)

Note: Attempt Three questions in all.

5 (a) Solve the equation: $2x + 5 = \sqrt{7x + 16}$ (4)

(b) Use synthetic division to find the values of ℓ and m , if $(x + 3)$ and $(x - 2)$ are the factors of the polynomial $x^3 + 4x^2 + 2lx + m$. (4)

6 (a) If $\frac{a}{b} = \frac{c}{d} = \frac{e}{f}$ ($a, b, c, d, e, f, \neq 0$), then show that:

$$\frac{a}{b} = \sqrt{\frac{a^2 + c^2 + e^2}{b^2 + d^2 + f^2}} \quad (4)$$

(b) Resolve into partial fractions: $\frac{x-11}{(x-4)(x+3)}$ (4)

7 (a) If $U = \{1, 2, 3, 4, \dots, 10\}$, $A = \{1, 3, 5, 7, 9\}$,

$B = \{1, 4, 7, 10\}$ then prove that $B - A = B \cap A'$

- (b) The marks of six students in mathematics are as follows. Determine variance: (4)

Students	1	2	3	4	5	6
Marks	60	70	30	90	80	42

8 (a) Prove that: $\frac{1 + \sin \theta}{1 - \sin \theta} - \frac{1 - \sin \theta}{1 + \sin \theta} = 4 \tan \theta \sec \theta$

- (b) Inscribe a circle in an equilateral triangle ABC with each side of length 5 cm. (4)

9 Prove that two chords of a circle which are equidistant from the centre, are congruent. (8)

OR Prove that the opposite angles of any quadrilateral inscribed in a circle are supplementary.