Mathematics (Science)	10th, Lahore Board 2016	Group – I
Time:20 Min.	Objective Type	Marks : 15

Note: Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

1. 1 If $\frac{a}{b} = \frac{c}{d}$, then componendo property is :

(A) $\frac{a}{a+b} = \frac{c}{c+d}$ (B) $\frac{a}{a-b} = \frac{c}{c-d}$

(C) $\frac{ad}{bc}$ (D) $\frac{a-b}{b} = \frac{c-d}{d}$

2 Point (–1, 4) lies in the quadrant:

(A) I (B) II

(C) III (D) IV

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

(A) $\{\pm 4\}$ (B) $\{4\}$

(C) $\{\pm 2\}$ (D) $\{2\}$

4 The mode in the data 1,3,5,3,7,9 is:

(A) 1 (B) 3

(C) 5 (D) 7

5 $\sec^2\theta$ = ----------:

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

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

6 The semi circumference and the diameter of a circle both subtend a central angle of :

(A) 90° (B) 180°

(C) 270° (D) 360°

7 A complete circle is divided into :

(A) 90° (B) 180°

(C) 270° (D) 360°

8 $\sin^2\theta + \cos^2\theta =$ _____

(A) $\sin\theta$ (B) $\cos\theta$

(C) 1 (D) 2

9 If $\frac{u}{v} = \frac{v}{w} = k$, then :

(A) $u = wk^2$ (B) $u = vk^2$

(C) $u = w^2k$ (D) $u = v^2k$

10 Two tangents drawn to a circle from a point outside it are of _____ in length:

(A) Half (B) Equal

(C) Double (D) Triple

11 Angle inscribed in a semi circle is :

(A) $\frac{\pi}{2}$ (B) $\frac{\pi}{3}$

(C) $\frac{\pi}{4}$ (D) $\frac{\pi}{5}$

12 If A and B are disjoint sets, then $A \cup B$ is equal to:

(A) A (B) B

(C) ϕ (D) $B \cup A$

13 Product of cube roots of unity is:

(A) 0 (B) 1

(C) –1 (D) 3

14 $\frac{x^3+1}{(x-1)(x+2)}$ is - - - - - - is:

(A) A proper fraction (B) An improper fraction
(C) An identity (D) A constant term

15 The discriminant of $ax^2 + bx + c = 0$ is:

(A) $b^2 - 4ac$ (B) $b^2 + 4ac$
(C) $-b^2 + 4ac$ (D) $-b^2 - 4ac$

Mathematics (Science)	10th, Lahore Board 2016	Group – I
Time:2.10 hrs	Subjective Type	Marks : 60

PART-I

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

i Define radical equation.

ii Solve by factorization : $5x^2 = 15$

iii Find the discriminant of the following equation :
$6x^2 - 8x + 3 = 0$

iv Without solving, find the sum and the product of the roots of the equation: $7x^2 - 5mx + 9n = 0$

v Write quadratic equation having following roots:
2, –6

vi Find w^2, if:

$$w = \frac{-1+\sqrt{-3}}{2}$$

vii Define direct variation.

viii Find a mean proportional between :20, 45

ix If $a : b = c : d$ then prove that

$$\frac{4a+5b}{4a-5b} = \frac{4c+5d}{4c-5d}$$

3. Write short answers to any SIX (6)

questions:

i What are partial fractions?

ii Resolve into partial fractions :

$$\frac{x - 2}{(x + 2)(x + 3)}$$

iii Write all subsets of the set : {a, b}

iv If $X = \phi$, $Y = Z'$ then find $X \cap Y$

v If A = { a , b } and B = { c , d } then find B × A

vi Find the set X and Y if

$X \times Y = \{(a, a), (b, a), (c, a), (d, a)\}$

vii Define class limit.

viii Define arithmetic mean.

ix Find the arithmetic mean by direct method:

12, 14, 17, 20, 24, 29, 35, 45

Write short answers to any SIX (6) questions: **12**

i How many minutes are in two right angles?

ii Find tan θ when $\cos \theta = \frac{9}{41}$ and θ terminal side of the angle θ is in fourth quadrant.

iii If $\ell = 4cm$, $\theta = \frac{1}{4}$ rad then find r.

iv Whether the triangle with sides 8 cm, 15 cm and 17 cm is acute, obtuse or right angled?

v Differentiate between minor arc and major arc of a circle and explain with figure.

vi Define tangent of a circle.

vii Define circumference of a circle.

viii What is meant by cyclic quadrilateral?

ix Define and draw the sector of a circle.

PART-II

Note : Attempt THREE questions in all.

But question No. 9 is Compulsory.

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

(b) Find m, if the equation $x^2 + 7x + 3m - 5 = 0$ satisfy the relation $3\alpha - 2\beta = 4$.

6.(a) If a : b :: c : d (a, b, c, d) $\neq 0$ then prove that

$$\frac{a}{b} = \sqrt{\frac{a^2 + c^2}{b^2 + d^2}}$$

(b) Resolve into partial fractions:

$$\frac{7x - 9}{(x+1)(x-3)}$$

7.(a) If y = {–2, 1, 2}, then make two binary relations for y × y? Also find their domain and range. 4

(b) The following frequency distribution shows weights of boys in kilogram. Compute Median: 4

Class Interval	1-3	4-6	7-9	10-12	13-15	16-18	19-21
Frequency	2	3	5	4	6	2	1

8.(a) Verify that :

$$\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} = \frac{\sin\theta}{1-\cos\theta}$$

(b) Draw two common tangents to two intersecting circle of radii 3 cm and 4 cm.

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

OR

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

Mathematics (Science)	10th, Lahore Board 2016	Group – II

e:20 Min.	Objective Type	Marks : 15

Four possible answers A, B, C and D to each question are given. The choice which you think is correct, fill that circle in front of that question with Marker or Pen ink in the answer-book. Cutting or filling two or more circles will result in zero mark in that question.

Solution set of equation $5x^2 - 125 = 0$ is:

(A) {5} (B) {10}

(C) {–5} (D) {±5}

The discriminant of equation $ax^2+bx+c = 0$ is:

(A) $b^2 - 4ac$ (B) $b^2 + 4ac$

(C) $-b^2 + 4ac$ (D) $-b^2 - 4ac$

Two square roots of unity are :

(A) 1, –1 (B) 1, ω

(C) 1, $-\omega$ (D) ω , ω^2

In a proportional a : b :: c : d, b and c are called:

(A) Extremes (B) Fourth proportional

(C) Means (D) Third proportional

If $y^2 \propto \frac{1}{x^3}$, then :

(A) $y^2 = \frac{k}{x^3}$ (B) $y^2 = \frac{1}{x^3}$

(C) $y^2 = x^2$ (D) $y^2 = k x^3$

$(x+3)^2 = x^2 + 6x + 9$ is a:

(A) Linear equation (B) Equation

(C) In-equation (D) Identity

If set A has 3 elements and set B has 4 elements then A × B will have elements :

(A) 3 (B) 4

(C) 12 (D) 7

8 The number of elements of the power set {a, b} are :

(A) 1 (B) 2

(C) 3 (D) 4

9 The mode in the data 1,3,5,3,7,9 is:

(A) 1 (B) 3

(C) 5 (D) 7

10 $\sin^2\theta + \cos^2\theta =$ – – – – – – – –

(A) $\sin\theta$ (B) $\cos\theta$

(C) 1 (D) 2

11 The symbol of a triangle is denoted by:

(A) Δ (B) $<$

(C) $\perp$ (D) $\odot$

12 A line which has two points common with a circle are called:

(A) Sin of circle (B) Cosine of circle

(C) Tangent of circle (D) Secant of circle

13 Point (–1, 4) lies in the quadrant:

(A) I (B) II

(C) III (D) IV

14 How many tangents can be drawn from a point outside the circle:

(A) 1 (B) 2

(C) 3 (D) 4

15 How many common tangents can be drawn for two disjoint circles:

(A) 2 (B) 3

(C) 4 (D) 1

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PART-I

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

Evaluate : $(1-\omega-\omega^2)^7$

Solve by factorization: $4 - 32x = 17x^2$

Find the discriminant of given quadratic equation:

$$9x^2 - 30x + 25 = 0$$

Define reciprocal equation.

Find 'k' if sum of squares of the roots of the equation $4k\,x^2 + 3kx - 8 = 0$ is '2'.

If α, β are the roots of the equation $4x^2 - 5x + 6 = 0$, then find the value of $\frac{1}{\alpha} + \frac{1}{\beta}$

In a class of 60 students, 25 students are girls and remaining students are boys. Compute the ratio of "boys to girls".

Find the cost of 8 kg of mangoes, if 5 kg of mangoes cost Rs. 250.

Define proportion.

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

Resolve the fraction into proper fraction :

$$\frac{3x^2 - 2x - 1}{x^2 - x + 1}$$

Define rational fraction.

What is meant by union of two sets?

If $A = \{2,3,5,7\}$ and $B = \{3,5,8\}$, find $A - B$

Define a subset.

Write De Morgan's Laws.

Define mode.

Define standard deviation.

Write two properties of arithmetic mean.

4. **Write short answers to any Six questions:** (6) 12

i. Write relation between degree and radian.

ii. Find ℓ if $\theta = 180°$, $r = 4.9$ cm.

iii. Prove that:

$$\frac{\tan x}{\sec x} = \sin x$$

iv. What is projection of a point?

v. What is sector of a circle?

vi. What is secant?

vii. What is segment of a circle?

viii. What is central angle?

ix. Define triangle.

PART-II

Note : Attempt THREE questions in all. But question No. 9 is Compulsory.

5.(a) Solve the equation:

$$\sqrt{x+5} + \sqrt{x+21} = \sqrt{x+60}$$

(b) If α, β are the roots of the equation $x^2 - 3x + 6 = 0$, form an equation whose roots are $2\alpha + 1$, $2\beta + 1$.

6.(a) Find fourth proportional to :

$x^2 - 11x + 24$, $x - 3$, $5x^4 - 4x^3$

(b) Resolve into partial fractions:

$$\frac{x^2 + 7x + 11}{(x+2)^2(x+3)}$$

7.(a) If $U = \{1,2, 3, 4, 5, 6, 7, 8, 9, 10\}$, $A = \{1, 3, 5, 7, 9\}$, $B = \{2, 3, 5, 7\}$ then prove that $(A \cap B)' = A' \cup B'$

(b) Find standard deviation 'S' :

12, 6, 7, 3, 15, 10, 18, 5

Verify the identity:

$$\frac{\sin\theta + \cos\theta}{\cos\theta} = 1 + \tan\theta$$

Circumscribe a circle about a triangle ΔABC with sides: 4

$\overline{AB} = 6\,cm,\ \overline{BC} = 3\,cm,\ \overline{CA} = 4\ cm$

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

OR

Prove that the angle

In a semi-circle is a right angle.

In a segment greater than a semi circle is less than a right angle.

In a segment less than a semi-circle is greater than a right angle.