2017 (A) Roll No: _____

INTERMEDIATE PART-I (11th CLASS)

MATHEMATICS PAPER-I GROUP-I TIME ALLOWED: 2.30 Hours

SUBJECTIVE MAXIMUM MARKS: 80

NOTE: - Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. **8 × 2 = 16**

(i) Simplify by justifying each step $\dfrac{\frac{1}{a}-\frac{1}{b}}{1-\frac{1}{a}.\frac{1}{b}}$

(ii) Simplify $(5,-4)\div(-3,-8)$

(iii) Simplify $\dfrac{2}{\sqrt{5}+\sqrt{-8}}$ by expressing in the form $a+bi$

(iv) Write down power set of the set $\{a,\{b,c\}\}$.

(v) Construct truth table for statement. $\sim(p\to q)\longleftrightarrow(p\wedge\sim q)$

(vi) Show that the set N with respect of "+" is a semi-group where N is natural number.

(vii) Solve the systems of linear equations $3x_1-x_2=1$ and $x_1+x_2=3$

(viii) Without expansion verify that $\begin{vmatrix}-a & 0 & c\\ 0 & a & -b\\ b & -c & 0\end{vmatrix}=0$

(ix) Define rank of a matrix.

(x) If ω is a root of $x^2+x+1=0$ show that its other root is ω^2.

(xi) If α, β are roots of $ax^2+bx+c=0$, $a\neq 0$. Then find the values of $\dfrac{\alpha^2}{\beta}+\dfrac{\beta^2}{\alpha}$

(xii) Show that roots of the equation $px^2-(p-q)x-q=0$ will be rational.

3. Attempt any eight parts. **8 × 2 = 16**

(i) Define Partial Fractions.

(ii) If $a=\dfrac{2}{5}$, $b=\dfrac{8}{5}$ then find the arithmetic mean A and the geometric mean G.

(iii) Show that the reciprocals of the terms of G.P, $a_1, a_1r^2, a_1r^4,$ _____ form another G.P.

(iv) Find A.M between $1-x+x^2$ and $1+x+x^2$.

(v) Write the next term of the sequence 1, 6, 20, 56, _____.

(vi) Convert $\dfrac{(n+1)(n)(n-1)}{3.2.1}$ in the factorial form.

(vii) Prove that $n.{}^{n-1}p_{r-1}={}^{n}p_r$.

(viii) A die is rolled. Find the probability of the event when number of dots on the top is less than 5.

(ix) Find the value of n when ${}^{n}C_{10}=\dfrac{12\times 11}{2!}$.

(x) State Binomial Theorem.

(xi) If x is so small that its square and higher powers can be neglected, then show that $\dfrac{\sqrt{1+2x}}{\sqrt{1-x}}\approx 1+\dfrac{3}{2}x$

(xii) Expand the series $(1+x)^{\frac{-1}{3}}$ upto 3 terms.

P.T.O.

4. Attempt any nine parts. **$9 \times 2 = 18$**

(i) Find ℓ, when $\theta = \pi$ radian, $r = 6cm$

(ii) Verify $2Sin45^0 + \frac{1}{2}Cosec\,45^o = \frac{3}{\sqrt{2}}$

(iii) Prove the identity $Sec\theta\ Cosec\theta\ Sin\theta\ Cos\theta = 1$

(iv) Prove that $Sin(180^o + \alpha)\ Sin(90^o - \alpha) = -Sin\alpha\ Cos\alpha$

(v) Show that $Sin\left(\theta + \frac{\pi}{6}\right) + Cos\left(\theta + \frac{\pi}{3}\right) = Cos\theta$

(vi) Express $Sin(x + 30^o) + Sin(x - 30^o)$ as product.

(vii) Find the period of $Cos2x$.

(viii) A vertical pole is $8m$ high and the length of its shadow is $6m$.
What is the Angle of Elevation of the Sun at that moment?

(ix) Find the smallest angle of the ΔABC if $a = 37.34$ $b = 3.24$ $c = 35.06$

(x) In a triangle ABC, $\beta = 60^o$, $\gamma = 15^o$ and $b = \sqrt{6}$ then find α, c.

(xi) Show that $Sin^{-1}(-x) = -Sin^{-1}x$

(xii) Solve the equation $Sin^2x + Cosx = 1$ when $x \in [0, 2\pi]$

(xiii) Find solution of $4Cos^2x - 3 = 0$ when $x \in [0, \pi]$

SECTION-II

NOTE: - Attempt any three questions. **$3 \times 10 = 30$**

5.(a) Consider the set $S = \{1, -1, i, -i\}$ set up the multiplication table and show S is an abelian group under multiplication. 5

(b) Solve the systems of linear equations $x + y = 2$, $2x - z = 1$, $2y - 3z = -1$ 5

6.(a) When the polynomial $x^3 + 2x^2 + kx + 4$ is divided by $x - 2$, the remainder is 14. Find the value of k. 5

(b) Resolve $\frac{1}{(x-1)(2x-1)(3x-1)}$ into Partial Fractions. 5

7.(a) Insert seven A.Ms between 4 and 8. 5

(b) Find the coefficient of x^n in the expansion of $\frac{(1+x)^3}{(1-x)^2}$ 5

8.(a) If $Cosec\theta = \frac{m^2+1}{2m}$ and $m > 0$ $\left(0 < \theta < \frac{\pi}{2}\right)$ find the values of the remaining trigonometric functions. 5

(b) Prove the following identity $\sqrt{\frac{1+Sin\alpha}{1-Sin\alpha}} = \frac{Sin\frac{\alpha}{2} + Cos\frac{\alpha}{2}}{Sin\frac{\alpha}{2} - Cos\frac{\alpha}{2}}$ 5

9.(a) Prove that in an equilateral triangle $r : R : r_1 = 1 : 2 : 3$ 5

(b) Prove that $Sin^{-1}\left(\frac{77}{85}\right) - Sin^{-1}\left(\frac{3}{5}\right) = Cos^{-1}\left(\frac{15}{17}\right)$ 5

Paper Code Number: 2191

2017 (A) Roll No: _____

INTERMEDIATE PART-I (11th CLASS)

MATHEMATICS PAPER-I GROUP-I

TIME ALLOWED: 30 Minutes

OBJECTIVE

MAXIMUM MARKS: 20

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. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) i^{14} equals to:- (A) 1 (B) -1 (C) i (D) $-i$

(2) $p \to q$ is called converse of:- (A) $\sim p \to q$ (B) $p \to q$ (C) $q \to p$ (D) $\sim q \to p$

(3) If $A = \begin{bmatrix} d & b \\ -c & a \end{bmatrix}$ then adj. (A) = _____

(A) $\begin{bmatrix} a & -b \\ c & d \end{bmatrix}$ (B) $\begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$ (C) $\begin{bmatrix} d & b \\ c & a \end{bmatrix}$ (D) $\begin{bmatrix} d & -b \\ c & a \end{bmatrix}$

(4) The rank of the matrix $[1 \quad 0 \quad 3]$ is:- (A) Zero (B) 1 (C) 2 (D) 3

(5) Four fourth roots of unity are:- (A) $\pm 1, \pm i$ (B) $\pm 2, \pm 2i$ (C) $\pm 3, \pm 3i$ (D) $\pm 4, \pm 4i$

(6) If ω is the complex cube roots of unity, then ω^2 = _____.

(A) ω (B) ω^{-1} (C) $\frac{1}{\omega^2}$ (D) ω^3

(7) Partial fractions of $\frac{x^2+1}{x^2-1}$ are of the form:-

(A) $\frac{A}{x+1} + \frac{B}{x-1}$ (B) $\frac{Ax+B}{x^2-1}$ (C) $\frac{A+B}{x^2-1}$ (D) $1 + \frac{A}{x+1} + \frac{B}{x-1}$

(8) The fifth term of the sequence $a_n = 2n+1$ is:- (A) 7 (B) 9 (C) 11 (D) 13

(9) Geometric mean between $-2i$ and $8i$ is:- (A) ± 3 (B) ± 2 (C) ± 1 (D) ± 4

(10) The value of $5p_2$ is:- (A) 5 (B) 10 (C) 15 (D) 20

(11) If $^nC_8 = {}^nC_{12}$, then "n" equals to:- (A) 4 (B) 8 (C) 20 (D) 12

(12) 2^{nd} term in $(1-x)^{-1}$ is:- (A) 1 (B) x (C) $2x$ (D) $3x$

(13) If $n^2 > n+3$, then it is true for:- (A) $n = 0$ (B) $n < 1$ (C) $n \geq 2$ (D) $n \geq 3$

(14) $\frac{3\pi}{10}$ radian equals to:- (A) 110° (B) 130° (C) 45° (D) 54°

(15) $\sin\left(\alpha - \frac{\pi}{2}\right)$ = _____. (A) $\cos\alpha$ (B) $-\cos\alpha$ (C) $\sin\alpha$ (D) $\operatorname{cosec}\alpha$

(16) The period of $\sin 2x$ is:- (A) $\frac{\pi}{3}$ (B) $\frac{\pi}{2}$ (C) $\frac{2\pi}{3}$ (D) π

(17) With usual notations $2s - b$ = _____ (A) $a - c$ (B) $a + c$ (C) $a + 2b + c$ (D) $a + b$

(18) $\cos\frac{\gamma}{2}$ = _____

(A) $\sqrt{\frac{s(s-a)}{bc}}$ (B) $\sqrt{\frac{s(s-b)}{ca}}$ (C) $\sqrt{\frac{s(s-c)}{ab}}$ (D) $\sqrt{\frac{ab}{s(s-c)}}$

(19) $\tan^{-1}(-1)$ = _____ (A) $\frac{\pi}{6}$ (B) $\frac{-\pi}{4}$ (C) $\frac{\pi}{2}$ (D) π

(20) $\cos x = \frac{1}{\sqrt{2}}$, then reference angle is:- (A) $\frac{\pi}{6}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{3}$ (D) $\frac{\pi}{2}$

2017 (A) Roll No: _____

INTERMEDIATE PART-I (11th CLASS)

MATHEMATICS PAPER-I GROUP-II TIME ALLOWED: 2.30 Hours

SUBJECTIVE MAXIMUM MARKS: 80

NOTE: - Write same question number and its part number on answer book, as given in the question paper.

SECTION-I

2. Attempt any eight parts. **8 × 2 = 16**

(i) Does the set $\{0, -1\}$ have closure property with respect to (i) addition and (ii) multiplication

(ii) Show that for all $\forall\, z \in C$ where $z + (\bar{z})^2$ is a real number.

(iii) Construct the truth table for $(p \wedge \sim p) \longrightarrow q$.

(iv) For $A = \{1, 2, 3, 4\}$ find $\{(x, y) \mid x + y > 5\}$ relation in A. Also state the range of the relation.

(v) Show that subtraction is non-commutative and non-associative on N.

(vi) Define the multiplication of two matrices.

(vii) If $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$ then find x and y.

(viii) If $A = \begin{bmatrix} 3 & 2 & -1 \\ 2 & 1 & 3 \end{bmatrix}$ find $A^t A$.

(ix) Factorize $9a^2 + 16b^2$.

(x) Evaluate $(-1 + \sqrt{-3})^5 + (-1 - \sqrt{-3})^5$

(xi) If α, β are the roots of $x^2 - px - p - c = 0$ prove that $(1 + \alpha)(1 + \beta)) = 1 - C$

(xii) Show that the roots of the equation $(p + q)x^2 - px - q = 0$ will be rational.

3. Attempt any eight parts. **8 × 2 = 16**

(i) Resolve $\frac{1}{x^2 - 1}$ into Partial Fractions.

(ii) Find A.M. between $1 - x + x^2$ and $1 + x + x^2$.

(iii) Define Geometric Mean between a and b.

(iv) Find the harmonic mean between 3 and 7.

(v) Find the 12th term of the harmonic sequence $\frac{1}{3}, \frac{2}{9}, \frac{1}{6}, \_\_\_\_$.

(vi) Find the value of n when ${}^{n}p_2 = 30$.

(vii) Find the value of n when ${}^{n}C_{12} = {}^{n}C_{6}$.

(viii) Define Sample Space and Events.

(ix) State Fundamental Principle of Counting.

(x) Prove that $n! > 2^n - 1$ for $n = 4, 5$.

(xi) Using Binomial Theorem expand $\left(\frac{x}{2y} - \frac{2y}{x}\right)^8$ to two terms.

(xii) Expand $(8 - 2x)^{-1}$ upto 2 terms.

4. Attempt any nine parts. **$9 \times 2 = 18$**

(i) Find ℓ when $\theta = 65°20'$, $r = 18\,mm$

(ii) If $Cot\theta = \frac{15}{8}$ and the terminal arm of the angle is not in quadrant I.
Find the values of $Cos\theta$ and $Cosec\theta$.

(iii) Verify $Cos2\theta = 2\,Cos^2\theta - 1$ when $\theta = 30°, 45°$

(iv) Prove that $\sin 780° \sin 480° + \cos 120° \sin 30° = \frac{1}{2}$

(v) Prove that $1 + \tan\alpha \tan 2\alpha = \sec 2\alpha$

(vi) Prove that $\sin\left(\frac{\pi}{4} - \theta\right) \sin\left(\frac{\pi}{4} + \theta\right) = \frac{1}{2}\cos 2\theta$

(vii) Define Period of a Trigonometric Function.

(viii) Solve the triangle ABC if $a = \sqrt{3} - 1$, $b = \sqrt{3} + 1$, $\gamma = 60°$, then find the angles α, β.

(ix) Show that $\frac{1}{r} = \frac{1}{r_1} + \frac{1}{r_2} + \frac{1}{r_3}$

(x) Find the area of the triangle ABC if $a = 32.65$, $b = 42.81$, $c = 64.92$

(xi) Show that $\sin^{-1}(-x) = -\sin^{-1}x$

(xii) Solve the Trigonometric equation $\sin x + \cos x = 0$, $x \in [0, \pi]$

(xiii) Find the solution set of $Cosec\theta = 2$, $\theta \in [0, 2\pi]$

SECTION-II

NOTE: - Attempt any three questions. **$3 \times 10 = 30$**

5.(a) Show that the set $\{1, \omega, \omega^2\}$, when $\omega^3 = 1$, is an Abelian group w.r.t Ordinary Multiplication. 5

(b) Find the value of λ for which the following systems have non-trivial solutions.
Also solve the system for the value of λ, if $x + y - z = 0$, $2x + y - \lambda z = 0$, $x + 2y - 2z = 0$ 5

6.(a) Solve the following equation $\sqrt{2x^2 - 5x - 3} + 3\sqrt{2x + 1} = \sqrt{2x^2 + 25x + 12}$ 5

(b) Resolve into Partial Fractions $\frac{4x^3}{(x^2 - 1)(x + 1)^2}$ 5

7.(a) Sum the series $2 + (1 - i) + \left(\frac{1}{i}\right) +$ _____ to 8 terms. 5

(b) Use Binomial theorem to show that $1 + \frac{1}{4} + \frac{1.3}{4.8} + \frac{1.3.5}{4.8.12} +$ _____ $= \sqrt{2}$ 5

8.(a) Two cities A and B lie on the equator such that their longitudes are $45°E$ and $25°W$ respectively. Find the distance between the two cities taking radius of the earth as 6400 kms. 5

(b) Find $Sin(\alpha + \beta)$ given that $\tan\alpha = \frac{3}{4}$, $Cos\beta = \frac{5}{13}$ and neither the terminal side of the angle of measure α nor β is in the I quadrant. 5

9.(a) Find R, r, r_1, r_2 and r_3 if measures of the sides of triangle ABC, with usual notations are $a = 13$, $b = 14$, $c = 15$ 5

(b) Prove that $2\tan^{-1}\frac{2}{3} = Sin^{-1}\frac{12}{13}$ 5

Paper Code Number: 2192

2017 (A) Roll No: _____

INTERMEDIATE PART-I (11th CLASS)

MATHEMATICS PAPER-I GROUP-II

TIME ALLOWED: 30 Minutes

OBJECTIVE

MAXIMUM MARKS: 20

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. No credit will be awarded in case BUBBLES are not filled. Do not solve question on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) π is a:- (A) Whole number (B) Natural number (C) Rational number (D) Irrational number

(2) If a, b are elements of a group G then $(ab)^{-1}$ is equal to:-

(A) $a^{-1}b^{-1}$ (B) ab^{-1} (C) $a^{-1}b$ (D) $b^{-1}a^{-1}$

(3) $\begin{bmatrix} 1 & 0 \\ 0 & 0 \end{bmatrix}$ is a:- (A) Scalar Matrix (B) Diagonal Matrix (C) Identity Matrix (D) Zero Matrix

(4) A square matrix A is a Skew Hermitian if $(\overline{A})^t =$ _____. (A) A (B) $\overline{A}$ (C) A^t (D) $-A$

(5) Product of all the fourth roots of unity is:- (A) 1 (B) -1 (C) 0 (D) 4

(6) The four fourth roots of 16 are:-

(A) $-1, 1, i, -i$ (B) $-2, 2, 2i, -2i$ (C) $-3, 3, 3i, -3i$ (D) $-4, 4, 4i, -4i$

(7) The fraction $\frac{x-3}{x+1}$ is:- (A) Improper (B) Proper (C) Identity (D) Equivalent

(8) The nth term of A.P with usual notation is:-

(A) $a+(n-1)d$ (B) $\frac{n}{2}(a+d)$ (C) $a+nd$ (D) $a+(n+1)d$

(9) The arithmetic mean between $2+\sqrt{2}$ and $2-\sqrt{2}$ is:- (A) 2 (B) $\sqrt{2}$ (C) 0 (D) 4

(10) The value of ${}^{20}P_3$ is:- (A) 4068 (B) 6840 (C) 20! (D) 17!

(11) If $S=\{1, 2, 3, 4\}$, $A=\{1, 2\}$ then $P(A)$ is:- (A) 2 (B) 4 (C) 1 (D) 1/2

(12) n^2-n+41 represents a prime number for all $n \in N$ where:-

(A) $n \geq 100$ (B) $n \geq 200$ (C) $n \leq 40$ (D) $n \leq 50$

(13) The number of terms in the expansion of $(a+b)^5$ are:- (A) 6 (B) 5 (C) 2 (D) 7

(14) $Sin390^\circ$ is equal to:- (A) $Sin30^\circ$ (B) $Cos30^\circ$ (C) Zero (D) $Sin60^\circ$

(15) $Sin2\theta$ is equal to:- (A) $\frac{2\tan\theta}{1-\tan^2\theta}$ (B) $\frac{2\tan\theta}{1+\tan^2\theta}$ (C) $\frac{1-\tan^2\theta}{1+\tan^2\theta}$ (D) $\tan\theta$

(16) The period of $Cot\left(\frac{x}{3}\right)$ is:- (A) π (B) 2π (C) 3π (D) $\frac{\pi}{3}$

(17) If a, b, c have their usual meanings then $\frac{a+b+c}{2}$ is equal to:-

(A) $2S$ (B) S (C) $Cos\alpha$ (D) $\frac{S}{2}$

(18) In right triangle no angle is greater than:- (A) 90° (B) 30° (C) 60° (D) 45°

(19) Range of the function $y = Sin^{-1}x$ is:-

(A) $-\frac{\pi}{2} \leq y \leq \frac{\pi}{2}$ (B) $0 \leq y \leq \pi$ (C) $-1 \leq x \leq 1$ (D) $-1 \leq y \leq 1$

(20) The solution of the equation $Sec\theta = -2$ is in quadrants:-

(A) I, II (B) II, III (C) III, IV (D) I, IV

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, MULTAN

OBJECTIVE KEY FOR INTER (PART-I / II) Annual Examination, 2017.

Name of Subject Mathematics Session _____

Group: 1st

Q. Nos.	Paper Code 2191	Paper Code 2193	Paper Code 2195	Paper Code 2197
1.	B	D	C	B
2.	C	B	B	D
3.	A	C	D	C
4.	B	B	D	D
5.	A	B	B	D
6.	B	B	D	C
7.	D	C	B	B
8.	C	A	C	D
9.	D	B	B	D
10.	D	A	B	B
11.	C	B	B	D
12.	B	D	C	B
13.	D	C	A	C
14.	D	D	B	B
15.	B	D	A	B
16.	D	C	B	B
17.	B	B	D	C
18.	C	D	C	A
19.	B	D	D	B
20.	B	B	D	A

Group: 2nd

Q. Nos.	Paper Code 2192	Paper Code 2194	Paper Code 2196	Paper Code 2198
1.	D	D	B	C
2.	D	C	A	B
3.	B	A	A	A
4.	D	A	A	A
5.	B	B	B	B
6.	B	C	D	D
7.	A	B	C	D
8.	A	A	A	B
9.	A	A	A	D
10.	B	B	B	B
11.	D	D	C	B
12.	C	D	B	A
13.	A	B	A	A
14.	A	D	A	A
15.	B	B	B	B
16.	C	B	D	D
17.	B	A	D	C
18.	A	A	B	A
19.	A	A	D	A
20.	B	B	B	B