BOARD OF INTERMEDIATE AND SECONDARY EDUCATION, MULTAN

OBJECTIVE KEY FOR INTER (PART I / II) Annual Examination, 2016.

Name of Subject: Mathematics   Session: 2016

Group: 1st

Q. Nos.	Paper Code 6191	Paper Code 6193	Paper Code 6195	Paper Code 6197
1.	C	B	D	B
2.	C	D	C	A
3.	A	A	C	D
4.	C	B	C	A
5.	A	C	C	B
6.	D	B	B	B
7.	C	A	D	C
8.	C	D	A	A
9.	C	A	B	C
10.	C	B	C	A
11.	B	B	B	D
12.	D	C	A	C
13.	A	A	D	C
14.	B	C	A	C
15.	C	A	B	C
16.	B	D	B	B
17.	A	C	C	D
18.	D	C	A	A
19.	A	C	C	B
20.	B	C	A	C

Group: 2nd

Q. Nos.	Paper Code 6192	Paper Code 6194	Paper Code 6196	Paper Code 6198
1.	D	D	A	B
2.	B	C	B	D
3.	C	A	D	A
4.	A/D	B	A	C
5.	C	D	C	B
6.	B	D	D	A
7.	D	B	C	B
8.	A	C	A	D
9.	C	A/D	B	A
10.	B	C	D	C
11.	A	B	D	D
12.	B	D	B	C
13.	D	A	C	A
14.	A	C	A/D	B
15.	C	B	C	D
16.	D	A	B	D
17.	C	B	D	B
18.	A	D	A	C
19.	B	A	C	A/D
20.	D	C	B	C

2016 (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. **$8 \times 2 = 16$**

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

(ii) Write $\{x \mid x \in N \wedge 4 < x < 12\}$ in descriptive and tabular form.

(iii) Factorize $a^2 + 4b^2$

(iv) Define Group.

(v) Write Reflexive Property of Equality of Real Numbers.

(vi) Construct the truth table of $p \wedge q$ of two statements p and q.

(vii) Discuss the nature of the roots of equation $x^2 + 2x + 3 = 0$

(viii) Find two consecutive numbers whose product is 132.

(ix) Write any two properties of determinants of square matrices.

(x) Find the matrix X if $\begin{bmatrix} 5 & 2 \\ -2 & 1 \end{bmatrix} X = \begin{bmatrix} 2 & 1 \\ 5 & 10 \end{bmatrix}$

(xi) Find the value of k if the polynomial $x^3 + kx^2 - 7x + 6$ has a remainder of -4 when divided by $(x+2)$.

(xii) If the matrices A and B are symmetric and $AB = BA$, show that AB is symmetric.

3. Attempt any eight parts. **$8 \times 2 = 16$**

(i) Resolve into partial fractions $\dfrac{1}{x^2 - 1}$

(ii) Write the 1st three terms of the sequence if $a_n = \dfrac{n}{2n+1}$

(iii) Find A.M between $3\sqrt{5}$ and $5\sqrt{5}$.

(iv) Find the 12th term of G.P if $1+i,\ 2i,\ -2+2i, ----$

(v) Find the 9th term of the H.P $\dfrac{1}{3}, \dfrac{1}{5}, \dfrac{1}{7}, -----$

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

(vii) Find the value of n when ${}^nC_5 = {}^nC_4$

(viii) Show that ${}^nP_r = n \,.\, {}^{n-1}P_{r-1}$

(ix) Expand up to three terms $(1+2x)^{-1}$

(x) Using Binomial theorem find the value up to three place of decimals of $\sqrt{99}$

(xi) Expand and simplify $(2+\sqrt{3})^5 + (2-\sqrt{3})^5$

(xii) Define Mutually Exclusive Events.

P.T.O.

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

(i) Find r, when $\ell = 5cm$, $\theta = \frac{1}{2}$ radian.

(ii) Prove that $Sin^2 \frac{\pi}{6} + Sin^2 \frac{\pi}{3} + \tan^2 \frac{\pi}{4} = 2$

(iii) Prove $Cos^2\theta - Sin^2\theta = \frac{1 - \tan^2\theta}{1 + \tan^2\theta}$

(iv) If α, β, γ are the angles of a triangle ABC, then prove that $Cos(\alpha + \beta) = -Cos\gamma$

(v) Prove that $Cos(\alpha + 45^o) = \frac{1}{\sqrt{2}}(Cos\alpha - Sin\alpha)$

(vi) Express $Sin 5\theta Cos 2\theta$ as sum or difference.

(vii) Find the period of $Cot 8x$.

(viii) Solve the right triangle, in which $\gamma = 90^o$, $\alpha = 37^o 20'$, $a = 243$

(ix) With usual notations, prove that $R = \frac{abc}{4\Delta}$

(x) Show that $r_1 = S.\tan\frac{\alpha}{2}$

(xi) Without using calculator, show that $Cos^{-1}\frac{12}{13} = Sin^{-1}\frac{5}{13}$

(xii) Find the solutions of $Sin x = -\frac{\sqrt{3}}{2}$ in $[0, 2\pi]$

(xiii) Find the solutions of $\tan^2\theta = \frac{1}{3}$ in $[0, \pi]$

SECTION-II

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

5.(a) Solve the following systems of linear equations by Cramer's rule:- 5
$2x + 2y + z = 3$, $3x - 2y - 2z = 1$, $5x + y - 3z = 2$

(b) Show that the roots of the following equation:- 5
$(x - a)(x - b) + (x - b)(x - c) + (x - c)(x - a) = 0$ are real.

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

(b) Find four terms of A.P whose sum is 32 and sum of whose squares is 276. 5

7.(a) In how many ways can be letters of the word MISSISSIPPI be arranged when all the letters are to be used? 5

(b) If x is very nearly equal to 1, then prove that $px^p - qx^q \approx (p - q)x^{p+q}$ 5

8.(a) Prove that $\frac{\tan\theta + \sec\theta - 1}{\tan\theta - \sec\theta + 1} = \tan\theta + \sec\theta$ 5

(b) Prove that $\sin 10^o \sin 30^o \sin 50^o \sin 70^o = \frac{1}{16}$ 5

9.(a) Prove that $\frac{1}{r^2} + \frac{1}{r_1^2} + \frac{1}{r_2^2} + \frac{1}{r_3^2} = \frac{a^2 + b^2 + c^2}{\Delta^2}$ 5

(b) Prove that $\sin^{-1}\frac{3}{5} + \sin^{-1}\frac{8}{17} = \sin^{-1}\frac{77}{85}$ 5

Paper Code Number: 6191

2016 (A) Roll No: ______________

INTERMEDIATE PART-I (11th CLASS)

MATHEMATICS PAPER-I GROUP-I

OBJECTIVE

TIME ALLOWED: 30 Minutes
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) The modulus of $1 - i\sqrt{3}$ is equal to:- (A) -2 (B) 2 (C) $-\sqrt{2}$ (D) $\sqrt{10}$

(2) Tabular form of a set $\{x \mid x \in Q \wedge x^2 = 2\}$ is equal to:-
(A) $\{\sqrt{2}, -\sqrt{2}\}$ (B) $\{4\}$ (C) $\{\ \}$ (D) $\{2, -2\}$

(3) If $A = \begin{bmatrix} a & b & c \\ d & e & f \\ a & b & c \end{bmatrix}$, then det A is equal to:- (A) 0 (B) 1 (C) $(a-b)(c-a)$ (D) $a^2 - ab + ac + b^2$

(4) The cofactor of an element a_{ij} denoted by A_{ij} is equal to:-
(A) $(-1)^{i-j} M_{ij}$ (B) $(-1)^{i+j} M_{i+j}$ (C) $(-1)^{i+j} M_{ij}$ (D) $(1)^{i+j} M_{ij}$

(5) A quadratic equation $ax^2 + bx + c = 0$, becomes liner equation if:-
(A) $a = 0$ (B) $b = 0$ (C) $c = 0$ (D) $a = b$

(6) Complex cube roots of -1 are:- (A) w, w^2 (B) $1, w, w^2$ (C) $-1, -w, -w^2$ (D) $-w, -w^2$

(7) Partial fractions of $\dfrac{x^2+1}{x^3+1}$ is equal to:-
(A) $\dfrac{A}{x+1} + \dfrac{B}{x^2+1}$ (B) $\dfrac{A}{x+1} + \dfrac{Bx+C}{x^2+x+1}$ (C) $\dfrac{A}{x+1} + \dfrac{Bx+C}{x^2-x+1}$ (D) $\dfrac{A}{x+1} + \dfrac{B+C}{x^2-x+1}$

(8) If a, G, b be the $G.P.$ where a, b are numbers then $G.M.$ is equal to:-
(A) $\sqrt{ab}$ (B) $-\sqrt{ab}$ (C) $\pm\sqrt{ab}$ (D) ab

(9) Reciprocal term of $A.P.$ is:- (A) $A.P.$ (B) $G.P.$ (C) $H.P.$ (D) None of these

(10) If S is a sample space and $E = S$ is an event then $P(E)$ is equal to:-
(A) $[0, 1]$ (B) 0 (C) 1 (D) $(0, 2)$

(11) If ${}^nC_r = {}^nC_q$, which of the following must be true?
(A) $r \neq q$ (B) $r + q = n$ (C) $r - q = n$ (D) $q = 0$

(12) $1 + 2x + 3x^2 + 4x^3 + ----\infty$ is the expansion of:-
(A) $(1+x)^{-2}$ (B) $(1+x)^2$ (C) $(1-x)^2$ (D) $(1-x)^{-2}$

(13) Sum of exponent of a and b in $(a+b)^n$ in every term is:-
(A) n (B) $2n$ (C) $\dfrac{n}{2}$ (D) $n+1$

(14) The 60th part of 1 – degree is called one:-
(A) Second (B) Minute (C) Degree (D) Radian

(15) $\dfrac{2\tan\theta}{1+\tan^2\theta}$ is equal to:- (A) $\tan 2\theta$ (B) $Cot 2\theta$ (C) $Sin 2\theta$ (D) $Cos 2\theta$

(16) Range of $\tan x$ is equal to:- (A) Q (B) IR (C) $\mathbb{Z}$ (D) N

(17) If ABC be any triangle and $\gamma = 90^o$, then:-
(A) $a^2 + b^2 = c^2$ (B) $a^2 + c^2 = b^2$ (C) $b^2 + c^2 = a^2$ (D) $a^2 + b^2 + c^2 = 0$

(18) Angle below the horizontal line is called:-
(A) Right angle (B) Oblique angle (C) Angle of Elevation (D) Angle of Depression

(19) $Cos(\tan^{-1}\sqrt{3})$ is equal to:- (A) $\dfrac{1}{2}$ (B) $-\dfrac{1}{2}$ (C) $\dfrac{\sqrt{3}}{2}$ (D) $-\dfrac{\sqrt{3}}{2}$

(20) If $Cos\, x + 1 = 0$, then:-
(A) $\{\pi/2 + 2n\pi\}$ (B) $\{\pi + 2n\pi\}$ (C) $\{\pi + n\pi\}$ (D) $\{-\pi/2 + 2n\pi\}$

2016 (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. **$8 \times 2 = 16$**

(i) Name the property used in $a(b-c) = ab - ac$

(ii) Separate $\dfrac{i}{1+i}$ into real and imaginary parts.

(iii) Simplify $\left(-\dfrac{1}{2} + \dfrac{\sqrt{3}}{2}i\right)^3$

(iv) Write $\{x \mid x \in N \wedge x \leq 10\}$ in the descriptive and tabular forms.

(v) Show that $(p \wedge q) \rightarrow p$ is a tautology.

(vi) Define a Group.

(vii) Find the value of λ if $A = \begin{bmatrix} 4 & \lambda & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{bmatrix}$ is singular.

(viii) Without expansion verify that $\begin{vmatrix} bc & ca & ab \\ \dfrac{1}{a} & \dfrac{1}{b} & \dfrac{1}{c} \\ a & b & c \end{vmatrix} = 0$

(ix) If A is symmetric, show that A^2 is symmetric.

(x) Prove that $(x^3 + y^3) = (x+y)(x+wy)(x+w^2y)$

(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 $(p+q)x^2 - px - q = 0$ are rational.

3. Attempt any eight parts. **$8 \times 2 = 16$**

(i) Resolve $\dfrac{7x+25}{(x+3)(x+4)}$ into Partial Fractions.

(ii) Find the next two terms of 7, 9, 12, 16, ------

(iii) If $\dfrac{1}{a}, \dfrac{1}{b}$ and $\dfrac{1}{c}$ are in A.P. show that $b = \dfrac{2ac}{a+c}$

(iv) Find the sum of infinite geometric series $\dfrac{1}{2} + \dfrac{1}{4} + \dfrac{1}{8} + \text{-------}$

(v) If 5 is H.M. between 2 and b, find b.

(vi) Evaluate $\dfrac{8!}{4!.\,2!}$

(vii) How many 3 – digit numbers can be formed by using each one of the digits 2, 3, 5, 7, 9 only once?

(viii) Find the value of n, when ${}^nC_5 = {}^nC_4$

(ix) A die is rolled. What is the probability that the dots on the top are greater than 4?

(x) Prove $1 + 5 + 9 + \text{------} + (4n-3) = n(2n-1)$, for $n = 1, 2$

(xi) Find the 6th term in the expansion of $\left(x^2 - \dfrac{3}{2x}\right)^{10}$

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

P.T.O.

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

(i) Verify $Cos2\theta = 1 - 2Sin^2\theta$ when $\theta = 30^\circ, 45^\circ$

(ii) Verify $\sin^2\frac{\pi}{6} + \sin^2\frac{\pi}{3} + \tan^2\frac{\pi}{4} = 2$

(iii) Prove that $\frac{2\tan\theta}{1+\tan^2\theta} = 2\sin\theta\cos\theta$

(iv) If α, β, γ are the angles of a triangle ABC, then prove that $\tan(\alpha+\beta) + \tan\gamma = 0$

(v) Prove that $Cos(\alpha + 45^\circ) = \frac{1}{\sqrt{2}}(Cos\alpha - Sin\alpha)$

(vi) Prove that $Cos2\theta = \frac{1-\tan^2\theta}{1+\tan^2\theta}$

(vii) Find the period of $Cot\,8x$

(viii) Define in-circle.

(ix) Prove that $r_1 = s\tan\frac{\alpha}{2}$

(x) Find r, if measures of the sides of triangle ABC are $a = 13,\ b = 14,\ c = 15$

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

(xii) Find the solution of $Cot\theta = \frac{1}{\sqrt{3}}$ in $[0, 2\pi]$

(xiii) Solve $\tan^2\theta = \frac{1}{3}$ in $[0, 2\pi]$

SECTION-II

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

5.(a) Show that $\begin{vmatrix} b+c & a & a^2 \\ c+a & b & b^2 \\ a+b & c & c^2 \end{vmatrix} = (a+b+c)(a-b)(b-c)(c-a)$ 5

(b) Prove that $\frac{x^2}{a^2} + \frac{(mx+c)^2}{b^2} = 1$ will have equal roots if $c^2 = a^2m^2 + b^2$, $a \neq 0,\ b \neq 0$ 5

6.(a) Resolve $\frac{1}{(x+1)^2(x^2-1)}$ into partial fractions. 5

(b) For what value of n, $\frac{a^n + b^n}{a^{n-1} + b^{n-1}}$ is the positive geometric mean between a and b ? 5

7.(a) Prove that ${}^{n-1}C_r + {}^{n-1}C_{r-1} = {}^nC_r$ 5

(b) If $2y = \frac{1}{2^2} + \frac{1.3}{2!}.\frac{1}{(2)^4} + \frac{1.3.5}{3!}.\frac{1}{2^6} + \text{------}$ then prove that $4y^2 + 4y - 1 = 0$ 5

8.(a) Prove the identity $\frac{Tan\theta + Sec\theta - 1}{Tan\theta - Sec\theta + 1} = Tan\,\theta + Sec\,\theta$ 5

(b) Prove that $Cos20^\circ\ Cos40^\circ\ Cos60^\circ\ Cos80^\circ = \frac{1}{16}$ 5

9.(a) The sides of a triangle are $x^2 + x + 1$, $2x + 1$ and $x^2 - 1$.
Prove that the greatest angle of the triangle is 120° 5

(b) Prove that $\tan^{-1}\frac{3}{4} + \tan^{-1}\frac{3}{5} - \tan^{-1}\frac{8}{19} = \frac{\pi}{4}$ 5

Paper Code Number:	6192

2016 (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) Modulus of $5-3i$ is:- (A) 4 (B) 16 (C) 34 (D) $\sqrt{34}$

(2) Drawing conclusions from premises believed to be true is called:-
(A) Induction (B) Deduction (C) Proposition (D) Contradiction

(3) M_{21} of $\begin{bmatrix} 1 & 3 \\ 2 & -3 \end{bmatrix}$ is:- (A) 1 (B) 2 (C) 3 (D) -3

(4) Every Diagonal matrix is also:-
(A) Triangular Matrix (B) Scalar Matrix (C) Rectangular Matrix (D) Symmetric Matrix

(5) $x+\frac{3}{x}=4$ is:-
(A) Reciprocal Equation (B) Transcendental Equation (C) Quadratic Equation (D) Identity

(6) If the roots of $ax^2+b=0$ are real and unequal then:-
(A) $ab>0$ (B) $ab<0$ (C) $ab=0$ (D) $ab\geq 0$

(7) Any improper rational fraction can be reduced to a mixed form by:-
(A) Addition (B) Multiplication (C) Factorization (D) Division

(8) With usual notations, the product of n Geometric Means between a and b is:-
(A) $(G)^n$ (B) nG (C) $(A)^n$ (D) $(G)^{\frac{n}{2}}$

(9) $1^2+2^2+3^2+------+n^2=$
(A) $\frac{n(n+1)}{2}$ (B) $\frac{n(n+1)(n+2)}{6}$ (C) $\frac{n(n+1)(2n+1)}{6}$ (D) $\frac{n^2(n+1)^2}{4}$

(10) If A and B are independent events then probability $P(A\cap B)=$
(A) $P(A)\cap P(B)$ (B) $P(A).P(B)$ (C) $P(A)+P(B)$ (D) $P(A)+P(B)-P(A\cap B)$

(11) $(n-1)(n-2)(n-3)------(n-r+1)=$
(A) $\frac{(n-1)!}{(n-r)!}$ (B) $\frac{n!}{(n-r)!}$ (C) $\frac{(n-1)!}{(n-r+2)!}$ (D) $\frac{n!}{(n-r+1)!}$

(12) There is no integer n for which 3^n is:- (A) Odd (B) Even (C) Prime (D) Complex

(13) Expansion of $(1-2x)^{\frac{1}{3}}$ is valid if:-
(A) $|x|<1$ (B) $|x|<\frac{1}{3}$ (C) $|x|<2$ (D) $|x|<\frac{1}{2}$

(14) An angle is said to be in standard position if its vertex is at:-
(A) (0, 0) (B) (1, 1) (C) (0, 1) (D) (1, 0)

(15) $2Cos5\theta Sin3\theta=$
(A) $Sin4\theta-Sin\theta$ (B) $Sin4\theta+Sin\theta$ (C) $Sin8\theta-Sin2\theta$ (D) $Cos8\theta+Cos2\theta$

(16) Range of $y=Cos x$ is:- (A) R (B) $-1\leq x\leq 1$ (C) $y\geq 1$ or $y\leq -1$ (D) $-1\leq y\leq 1$

(17) With usual notations area of triangle ABC is:-
(A) $\sqrt{(s-a)(s-b)(s-c)}$ (B) $\frac{b}{2Sin\beta}$ (C) $\frac{ac\,Sin\beta}{2}$ (D) $ab\,Sin\gamma$

(18) With usual notations $\sqrt{\frac{(s-c)(s-b)}{s(s-a)}}=$ (A) $Tan\frac{\alpha}{2}$ (B) $Tan\frac{\beta}{2}$ (C) $Tan\frac{\gamma}{2}$ (D) $Cot\frac{\alpha}{2}$

(19) $Sin^{-1}\left(-\frac{1}{2}\right)=$ (A) $\frac{\pi}{3}$ (B) $-\frac{\pi}{6}$ (C) $\frac{\pi}{4}$ (D) $-\frac{\pi}{3}$

(20) Solutions of the equation $1+Cos\theta=0$ are in quadrants:-
(A) I and IV (B) II and III (C) II and IV (D) None of these