2018 (A) Roll No: ______________

INTERMEDIATE PART-I (11^{th} 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) Write Closure Law and Commutative Law of Multiplication of Real Numbers.

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

(iii) Show that $z.\bar{z} = |z|^2,\ z \in c$.

(iv) Define a semi – group.

(v) Write number of elements of sets $\{a, b\}$ and $\{\{a, b\}\}$.

(vi) If $A = \{1, 2, 3, 4\}$, then write a relation in A for $\{(x, y) / x + y = 5\}$

(vii) Define Symmetric and Skew Symmetric Matrix.

(viii) If the matrix $\begin{bmatrix} 4 & \lambda & 3 \\ 7 & 3 & 6 \\ 2 & 3 & 1 \end{bmatrix}$ is symmetric, then find value of λ.

(ix) Without expansion, show that $\begin{vmatrix} \alpha & \beta+\gamma & 1 \\ \beta & \alpha+\gamma & 1 \\ \gamma & \alpha+\beta & 1 \end{vmatrix} = 0$

(x) Solve $x^{1/2} - x^{1/4} - 6 = 0$

(xi) Show that the polynomial $(x - 1)$ is a factor of polynomial $x^2 + 4x - 5$ by using factor theorem.

(xii) Discuss nature of roots of equation $x^2 + 2x + 3 = 0$.

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

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

(ii) Write the first four terms of the sequence, if $a_n = (-1)^n n^2$.

(iii) How many terms of the series $-7 + (-5) + (-3) + \text{-------}$ amount to 65?

(iv) Find the geometric mean between $-2i$ and $8i$.

(v) Find the sum of the infinite geometric series $4 + 2\sqrt{2} + 2 + \sqrt{2} + 1 + \text{-------}$

(vi) Write two important relations between arithmetic, geometric and harmonic means.

(vii) Write the following in factorial form $(n+2)(n+1)(n)$

(viii) Find the value of n, when ${}^nC_{12} = {}^nC_6$.

(ix) A die is rolled. Find the probability that top shows 3 or 4 dots.

(x) Use mathematical induction to verify for $n = 1, 2$

$$1 + \frac{1}{2} + \frac{1}{4} + \_\_\_\_\_ + \frac{1}{2^{n-1}} = 2\left[1 - \frac{1}{2^n}\right].$$

(xi) Calculate $(9.98)^4$ by means of binomial theorem.

(xii) Expand $\dfrac{\sqrt{1+2x}}{1-x}$ up to 4 – terms, taking the values of x such that the expansion in each case is valid.

P.T.O.

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

(i) Convert the angle $54^o\ 45'$ into radians.

(ii) Find r, when $\ell = 56cm \quad \theta = 45^o$ in a circle.

(iii) Prove that $\dfrac{1}{1 + Sin\theta} + \dfrac{1}{1 - Sin\theta} = 2Sec^2\theta$

(iv) If $Cos\alpha = \dfrac{3}{5}$, find the value of $Cot\alpha$, where $0 < \alpha < \dfrac{\pi}{2}$

(v) If α, β, γ are angles of a triangle ΔABC, then prove that $Sin(\alpha + \beta) = Sin\gamma$

(vi) Prove that $Sin3\alpha = 3Sin\alpha - 4\,Sin^3\alpha$

(vii) Find the period of $\tan\dfrac{x}{3}$

(viii) State the Law of Cosines.

(ix) Find the area of ΔABC with $a = 200, \quad b = 120$ included angle $\gamma = 150^o$

(x) Find R if $a = 13, \quad b = 14, \quad c = 15$ are the sides of triangle ΔABC.

(xi) Find the value of $Sin\left(Cos^{-1}\dfrac{\sqrt{3}}{2}\right)$

(xii) Solve the equation $Sin x = \dfrac{1}{2}$

(xiii) Solve $Sin x + Cos x = 0$

SECTION-II

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

5.(a) Prove that all non-singular matrices of order 2×2 over real field form a non-abelian group under multiplication. 5

(b) Find the value of λ for which the following system does not possess a unique solution. Also solve the system for the value of λ. 5

$$x_1 + 4x_2 + \lambda x_3 = 2$$
$$2x_1 + x_2 - 2x_3 = 11$$
$$3x_1 + 2x_2 - 2x_3 = 16$$

6.(a) Show that the roots of the equation $x^2 - 2\left(m + \dfrac{1}{m}\right)x + 3 = 0, \quad m \neq 0$,are real. 5

(b) Resolve $\dfrac{x^4}{1 - x^4}$ into partial fraction. 5

7.(a) Sum the series:- $\dfrac{1}{1 + \sqrt{x}} + \dfrac{1}{1 - x} + \dfrac{1}{1 - \sqrt{x}} + -----$ to n terms. 5

(b) Determine the middle terms in the expansion of $\left(\dfrac{3}{2}x - \dfrac{1}{3x}\right)^{11}$ 5

8.(a) Prove the following identity:- $\sin^6\theta - \cos^6\theta = \left(\sin^2\theta - \cos^2\theta\right)\left(1 - \sin^2\theta\cos^2\theta\right)$ 5

(b) Prove that:- $\dfrac{\sin\theta + \sin 3\theta + \sin 5\theta + \sin 7\theta}{\cos\theta + \cos 3\theta + \cos 5\theta + \cos 7\theta} = \tan 4\theta$ 5

9.(a) Prove that $(r_1 + r_2)\,Tan\dfrac{\gamma}{2} = c$ (with usual notations) 5

(b) Prove that $Cos^{-1}\dfrac{63}{65} + 2Tan^{-1}\dfrac{1}{5} = Sin^{-1}\dfrac{3}{5}$ 5

Paper Code Number: 2191

2018 (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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) If n is prime then $\sqrt{n}$ is:-
(A) Rational number (B) Whole number (C) Natural number (D) Irrational number

(2) If $a, b \in G$, where G is a group then $(ab)^{-1} =$ _____
(A) $a^{-1}b^{-1}$ (B) $b^{-1}a^{-1}$ (C) $\frac{1}{ab}$ (D) $\frac{-1}{ab}$

(3) If $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$ then co-factor of "4" is:- (A) + 1 (B) – 1 (C) – 4 (D) 3

(4) If $A = \left[a_{ij}\right]_{3\times 3}$, then $|KA| =$ _______
(A) $|A|$ (B) $K|A|$ (C) $K^2|A|$ (D) $K^3|A|$

(5) If $x^3 + 4x^2 - 2x + 5$ is divided by $x - 1$ then the remainder is:- (A) 10 (B) – 10 (C) 8 (D) – 8

(6) Nature of the roots of the equation $2x^2 + 5x - 1 = 0$:-
(A) Irrational and unequal (B) Rational and equal (C) Imaginary (D) Rational and unequal

(7) The type of rational fraction $\frac{3x^2 - 1}{x - 2}$ is:- (A) Proper (B) Improper (C) Polynomial (D) Identity

(8) In geometric sequence *nth* term is:-
(A) $a_1 + (n-1)d$ (B) $\frac{n}{2}[2a_1 + (n-1)d]$ (C) $\frac{a_1}{1-r}$ (D) $a_1 r^{n-1}$

(9) For any series $\sum_{k=1}^{n} K =$ _____
(A) $\frac{n(n+1)(2n+1)}{6}$ (B) $\frac{n(n-1)}{2}$ (C) $\frac{n(n+1)}{2}$ (D) $\frac{n^2(n+1)^2}{4}$

(10) For two events A and B if $P(A) = P(B) = \frac{1}{3}$ then probability $P(A \cap B) =$ ______
(A) $\frac{1}{9}$ (B) $\frac{1}{3}$ (C) $\frac{1}{6}$ (D) 1

(11) If ${}^nC_8 = {}^nC_{12}$, where C stands for combination then value of n is equals to:-
(A) 4 (B) 20 (C) 8 (D) 12

(12) The inequality $n^2 > n + 3$ is true for:- (A) $n \ge 2$ (B) $n \ge 3$ (C) $n \ge 0$ (D) $n \ge 1$

(13) The coefficient of the last term in the expansion of $(x - y)^5$ is:- (A) – 1 (B) 1 (C) 5 (D) – 5

(14) $Sin^2(5\theta) + Cos^2(5\theta) =$ _______ (A) 5 (B) 2 (C) 1 (D) 10

(15) For double angle identities $Sin 2\alpha =$ ________
(A) $1 - 2Sin^2\alpha$ (B) $2\sin\alpha\, Cos\alpha$ (C) $2Cos^2\alpha - 1$ (D) $Cos^2\alpha - Sin^2\alpha$

(16) The smallest positive number p for which $f(x + p) = f(x)$ is called:-
(A) Index (B) Domain (C) Coefficients (D) Period

(17) For any triangle ΔABC, with usual notations r_2 is equals to:-
(A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

(18) If ΔABC is right angle triangle such that $m\angle\alpha = 90^o$, then with usual notations, the true statement is:-
(A) $a^2 = b^2 + c^2$ (B) $b^2 = a^2 + c^2$ (C) $c^2 = a^2 + b^2$ (D) $a^2 = b^2 = c^2$

(19) The domain of $y = Sin^{-1}x$ is:-
(A) $-1 < x < 1$ (B) $-1 \le x \le 1$ (C) $-\pi/2 \le x \le \pi/2$ (D) $-\pi/2 < x < \pi/2$

(20) If $Sin x = \frac{1}{2}$ then $x =$ ________
(A) $-\pi/6,\ 5\pi/6$ (B) $-\pi/6,\ -5\pi/6$ (C) $\pi/3,\ 2\pi/3$ (D) $\pi/6,\ 5\pi/6$

Paper Code Number: 2193

2018 (A) Roll No: ________________

INTERMEDIATE PART-I (11^{th} 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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) The smallest positive number p for which $f(x+p) = f(x)$ is called:-
(A) Index (B) Domain (C) Coefficients (D) Period

(2) For any triangle ΔABC, with usual notations r_2 is equals to:-
(A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

(3) If ΔABC is right angle triangle such that $m\angle\alpha = 90^o$, then with usual notations, the true statement is:-
(A) $a^2 = b^2 + c^2$ (B) $b^2 = a^2 + c^2$ (C) $c^2 = a^2 + b^2$ (D) $a^2 = b^2 = c^2$

(4) The domain of $y = Sin^{-1}x$ is:-
(A) $-1 < x < 1$ (B) $-1 \le x \le 1$ (C) $-\pi/2 \le x \le \pi/2$ (D) $-\pi/2 < x < \pi/2$

(5) If $Sin x = \frac{1}{2}$ then $x =$ ________
(A) $-\pi/6$, $5\pi/6$ (B) $-\pi/6$, $-5\pi/6$ (C) $\pi/3$, $2\pi/3$ (D) $\pi/6$, $5\pi/6$

(6) If n is prime then $\sqrt{n}$ is:-
(A) Rational number (B) Whole number (C) Natural number (D) Irrational number

(7) If $a, b \in G$, where G is a group then $(ab)^{-1} =$ _____
(A) $a^{-1}b^{-1}$ (B) $b^{-1}a^{-1}$ (C) $\frac{1}{ab}$ (D) $\frac{-1}{ab}$

(8) If $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$ then co-factor of "4" is:- (A) + 1 (B) – 1 (C) – 4 (D) 3

(9) If $A = [a_{ij}]_{3\times 3}$, then $|KA| =$ _______
(A) $|A|$ (B) $K|A|$ (C) $K^2|A|$ (D) $K^3|A|$

(10) If $x^3 + 4x^2 - 2x + 5$ is divided by $x - 1$ then the remainder is:- (A) 10 (B) – 10 (C) 8 (D) – 8

(11) Nature of the roots of the equation $2x^2 + 5x - 1 = 0$:-
(A) Irrational and unequal (B) Rational and equal (C) Imaginary (D) Rational and unequal

(12) The type of rational fraction $\frac{3x^2 - 1}{x - 2}$ is:- (A) Proper (B) Improper (C) Polynomial (D) Identity

(13) In geometric sequence nth term is:-
(A) $a_1 + (n-1)d$ (B) $\frac{n}{2}[2a_1 + (n-1)d]$ (C) $\frac{a_1}{1-r}$ (D) $a_1 r^{n-1}$

(14) For any series $\sum_{k=1}^{n} K =$ _____
(A) $\frac{n(n+1)(2n+1)}{6}$ (B) $\frac{n(n-1)}{2}$ (C) $\frac{n(n+1)}{2}$ (D) $\frac{n^2(n+1)^2}{4}$

(15) For two events A and B if $P(A) = P(B) = \frac{1}{3}$ then probability $P(A \cap B) =$ ______
(A) $\frac{1}{9}$ (B) $\frac{1}{3}$ (C) $\frac{1}{6}$ (D) 1

(16) If ${}^nC_8 = {}^nC_{12}$, where C stands for combination then value of n is equals to:-
(A) 4 (B) 20 (C) 8 (D) 12

(17) The inequality $n^2 > n + 3$ is true for:- (A) $n \ge 2$ (B) $n \ge 3$ (C) $n \ge 0$ (D) $n \ge 1$

(18) The coefficient of the last term in the expansion of $(x - y)^5$ is:- (A) – 1 (B) 1 (C) 5 (D) – 5

(19) $Sin^2(5\theta) + Cos^2(5\theta) =$ _______ (A) 5 (B) 2 (C) 1 (D) 10

(20) For double angle identities $Sin 2\alpha =$ ________
(A) $1 - 2Sin^2\alpha$ (B) $2\sin\alpha Cos\alpha$ (C) $2Cos^2\alpha - 1$ (D) $Cos^2\alpha - Sin^2\alpha$

Paper Code Number: 2195	2018 (A) Roll No: _______________
	INTERMEDIATE PART-I (11^{th} CLASS)

MATHEMATICS PAPER-I GROUP-I TIME ALLOWED: 30 Minutes

OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

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(3) The coefficient of the last term in the expansion of $(x-y)^5$ is:- (A) -1 (B) 1 (C) 5 (D) -5

(4) $Sin^2(5\theta) + Cos^2(5\theta) =$ _______ (A) 5 (B) 2 (C) 1 (D) 10

(5) For double angle identities $Sin 2\alpha =$ ________
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(A) Index (B) Domain (C) Coefficients (D) Period

(7) For any triangle ΔABC, with usual notations r_2 is equals to:-
(A) $\frac{\Delta}{s}$ (B) $\frac{\Delta}{s-a}$ (C) $\frac{\Delta}{s-b}$ (D) $\frac{\Delta}{s-c}$

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(A) $a^2 = b^2 + c^2$ (B) $b^2 = a^2 + c^2$ (C) $c^2 = a^2 + b^2$ (D) $a^2 = b^2 = c^2$

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(10) If $Sin x = \frac{1}{2}$ then $x =$ ________
(A) $-\pi/6, 5\pi/6$ (B) $-\pi/6, -5\pi/6$ (C) $\pi/3, 2\pi/3$ (D) $\pi/6, 5\pi/6$

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(13) If $A = \begin{bmatrix} 3 & 1 \\ 4 & 2 \end{bmatrix}$ then co-factor of "4" is:- (A) $+1$ (B) -1 (C) -4 (D) 3

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(A) Irrational and unequal (B) Rational and equal (C) Imaginary (D) Rational and unequal

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(20) For two events A and B if $P(A) = P(B) = \frac{1}{3}$ then probability $P(A \cap B) =$ ______
(A) $\frac{1}{9}$ (B) $\frac{1}{3}$ (C) $\frac{1}{6}$ (D) 1

Paper Code Number: 2197	2018 (A) INTERMEDIATE PART-I (11th CLASS)	Roll No: ____________

MATHEMATICS PAPER-I GROUP-I TIME ALLOWED: 30 Minutes

OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

(1) Nature of the roots of the equation $2x^2 + 5x - 1 = 0$:-
(A) Irrational and unequal (B) Rational and equal (C) Imaginary (D) Rational and unequal

(2) The type of rational fraction $\frac{3x^2 - 1}{x - 2}$ is:- (A) Proper (B) Improper (C) Polynomial (D) Identity

(3) In geometric sequence nth term is:-
(A) $a_1 + (n-1)d$ (B) $\frac{n}{2}[2a_1 + (n-1)d]$ (C) $\frac{a_1}{1-r}$ (D) $a_1 r^{n-1}$

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(5) For two events A and B if $P(A) = P(B) = \frac{1}{3}$ then probability $P(A \cap B) =$ _____
(A) $\frac{1}{9}$ (B) $\frac{1}{3}$ (C) $\frac{1}{6}$ (D) 1

(6) If ${}^nC_8 = {}^nC_{12}$, where C stands for combination then value of n is equals to:-
(A) 4 (B) 20 (C) 8 (D) 12

(7) The inequality $n^2 > n + 3$ is true for:- (A) $n \geq 2$ (B) $n \geq 3$ (C) $n \geq 0$ (D) $n \geq 1$

(8) The coefficient of the last term in the expansion of $(x - y)^5$ is:- (A) -1 (B) 1 (C) 5 (D) -5

(9) $Sin^2(5\theta) + Cos^2(5\theta) =$ _____ (A) 5 (B) 2 (C) 1 (D) 10

(10) For double angle identities $Sin 2\alpha =$ _____
(A) $1 - 2Sin^2\alpha$ (B) $2 \sin\alpha \, Cos\alpha$ (C) $2Cos^2\alpha - 1$ (D) $Cos^2\alpha - Sin^2\alpha$

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(A) $a^2 = b^2 + c^2$ (B) $b^2 = a^2 + c^2$ (C) $c^2 = a^2 + b^2$ (D) $a^2 = b^2 = c^2$

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(A) $-1 < x < 1$ (B) $-1 \leq x \leq 1$ (C) $-\pi/2 \leq x \leq \pi/2$ (D) $-\pi/2 < x < \pi/2$

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(16) If n is prime then $\sqrt{n}$ is:-
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(19) If $A = [a_{ij}]_{3\times 3}$, then $|KA| =$ _____
(A) $|A|$ (B) $K|A|$ (C) $K^2|A|$ (D) $K^3|A|$

(20) If $x^3 + 4x^2 - 2x + 5$ is divided by $x - 1$ then the remainder is:- (A) 10 (B) -10 (C) 8 (D) -8

2018 (A) Roll No: ________________

INTERMEDIATE PART-I (11^{th} 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) Prove that $\frac{7}{12} - \frac{5}{18} = \frac{-21-10}{36}$ by justifying each step. (writing each property)

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

(iii) Prove that $\bar{z} = z$ if and only if z is real.

(iv) Write two proper subsets of the set of real numbers R.

(v) Construct truth table for the following $(p \wedge \sim p) \rightarrow q$.

(vi) For a set $A = \{1, 2, 3, 4\}$, find the relation $R = \{(x, y) / x + y < 5\}$ in A. Also state the domain of R.

(vii) Find 'x' and 'y' if the matrices are as $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$

(viii) If $A = [a_{ij}]_{3 \times 4}$, then show that $I_3 A = A$

(ix) Without expansion show that $\begin{vmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{vmatrix} = 0$

(x) Solve the following equation by factorization $x(x+7) = (2x-1)(x+4)$

(xi) Show that $x^3 - y^3 = (x-y)(x-\omega y)(x-\omega^2 y)$, where ω is a cube root of unity.

(xii) Use remainder theorem to find the remainder, when $x^2 + 3x + 7$ is divided by $x + 1$.

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

(i) Define a Partial Fraction.

(ii) If $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}$ are in arithmetic progression, show that $b = \frac{2ac}{a+c}$

(iii) Find the arithmetic mean between $3\sqrt{5}$ and $5\sqrt{5}$.

(iv) If the series $y = \frac{x}{2} + \frac{x^2}{4} + \frac{x^3}{8} + \text{-----} \infty$ and $0 < x < 2$. Then prove that $x = \frac{2y}{1+y}$

(v) If 5 is Harmonic mean between "2" and "b". Find "b".

(vi) Prove that $\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$

(vii) How many 5 digits multiples of "5" can be formed from the digits 2, 3, 5, 7, 9 when no digit is to be repeated?

(viii) Find n if ${}^nC_5 = {}^nC_4$ (C is used for combination)

(ix) What is the probability that a slip of numbers divisible by 4 is picked from slips bearing numbers 1, 2, 3, _____, 10?

(x) Use Binomial Theorem, find $(21)^5$.

(xi) Expand up to four terms $(8 - 2x)^{-1}$

(xii) If x be so small that its square and higher powers can be neglected. Then prove $\frac{\sqrt{1+2x}}{\sqrt{1-x}} \approx 1 + \frac{3x}{2}$

P.T.O.

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

(i) Find "ℓ" (arc length) when $r = 18mm$ and $\theta = 65^o\,20'$.

(ii) If $\sec\theta < 0$ and $\sin\theta < 0$, in which quadrant terminal arm of 'θ' lies.

(iii) Show that $Sin^2\,\pi/6 + Sin^2\,\pi/3 + \tan^2\,\pi/4 = 2$

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

(v) Find the value of $Sin15^o$

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

(vii) Find the period of $Cos\,x/6$

(viii) In a right ΔABC, if $b = 30.8$, $c = 37.2$ and $\gamma = 90^o$. Find α and β

(ix) Find the area of ΔABC in which $b = 21.6$, $c = 30.2$ and $\alpha = 52^o\,40'$.

(x) Define "Inscribed Circle".

(xi) Show that $Cos\left(Sin^{-1}x\right) = \sqrt{1-x^2}$

(xii) Solve the equation $Sin\,x = \dfrac{1}{2}$ where $x \in [0, 2\pi]$

(xiii) Solve the equation $4Cos^2x - 3 = 0$, where $x \in [0, 2\pi]$

SECTION-II

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

5.(a) Show that the set $\{1, \omega, \omega^2\}$, (where $\omega^3 = 1$), is an abelian group w.r.t. ordinary multiplication. 5

(b) Without expansion verify that $\begin{vmatrix} -a & 0 & c \\ 0 & a & -b \\ b & -c & 0 \end{vmatrix} = 0$ 5

6.(a) Resolve $\dfrac{x^2+1}{x^3+1}$ into Partial Fraction. 5

(b) Solve the equation $\sqrt{3x^2-7x-30} - \sqrt{2x^2-7x-5} = x-5$ 5

7.(a) Find the value of n so that $\dfrac{a^n + b^n}{a^{n-1} + b^{n-1}}$ may be the Arithmetic Mean between a and b. $1+3+1$

(b) Use mathematical induction to prove that the following formula holds for every positive integer "n"

$$\frac{1}{2\times 5} + \frac{1}{5\times 8} + \frac{1}{8\times 11} + \text{-----} + \frac{1}{(3n-1)\,(3n+2)} = \frac{n}{2(3n+2)}$$ $1+1+3$

8.(a) Prove that $\sin^6\theta + \cos^6\theta = 1 - 3\sin^2\theta\,\cos^2\theta$ 5

(b) Prove that $\sin\dfrac{\pi}{9}\sin\dfrac{2\pi}{9}\sin\dfrac{\pi}{3}\sin\dfrac{4\pi}{9} = \dfrac{3}{16}$ 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^o 5

(b) Prove that $Cos^{-1}\dfrac{63}{65} + 2\tan^{-1}\dfrac{1}{5} = Sin^{-1}\dfrac{3}{5}$ 5

Paper Code Number: 2192	2018 (A) Roll No: ______
	INTERMEDIATE PART-I (11^{th} 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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) Multiplicative inverse of complex number $\left(\sqrt{2},\ -\sqrt{5}\right)$ is:-
(A) $\left(\frac{\sqrt{2}}{\sqrt{7}}, \frac{\sqrt{5}}{\sqrt{7}}\right)$ (B) $\left(\frac{-\sqrt{2}}{\sqrt{7}}, \frac{-\sqrt{5}}{\sqrt{7}}\right)$ (C) $\left(\frac{\sqrt{2}}{7}, \frac{\sqrt{5}}{\sqrt{7}}\right)$ (D) $\left(\frac{\sqrt{2}}{7}, \frac{\sqrt{5}}{7}\right)$

(2) If A, B are two sets then $A \cap (A \cup B)$ equals:- (A) A (B) $A \cup B$ (C) B (D) ϕ

(3) A square matrix A is called skew symmetric if $A' =$ ___
(A) A (B) $\overline{A}$ (C) $-A'$ (D) $-A$

(4) If $\begin{vmatrix} 2 & \lambda \\ 3 & 7 \end{vmatrix} = 2$, then $\lambda =$ ______ (A) 1 (B) 2 (C) 3 (D) 4

(5) A reciprocal equation, remains unchanged when variable x is replaced by:-
(A) $\frac{-1}{x}$ (B) $\frac{1}{x^2}$ (C) $-x$ (D) $\frac{1}{x}$

(6) $f(x) = 3x^4 + 4x^3 + x - 5$ is divided by $x + 1$ then remainder is:- (A) -6 (B) 7 (C) 6 (D) -7

(7) Types of rational fractions are:- (A) Two (B) Three (C) Four (D) Infinite

(8) Harmonic Mean between a and b is:- (A) $\frac{ab}{a+b}$ (B) $\frac{a+b}{ab}$ (C) $\frac{2ab}{a+b}$ (D) $\frac{a-b}{ab}$

(9) If $a = -1$ and $b = 5$ then $A \times H$ is equal to:- (where A = A.M and H = H.M)
(A) -5 (B) $\frac{-5}{2}$ (C) 5 (D) $\frac{2}{5}$

(10) ${}^nC_{r-1} + {}^nC_{r-2}$ is equal to:- (where C is combination)
(A) ${}^nC_{r-1}$ (B) ${}^{n+1}C_{r-1}$ (C) ${}^{n+1}C_{r-2}$ (D) ${}^nC_{r-2}$

(11) The value of n when ${}^{11}P_n = 11 \times 10 \times 9$ is:- (where P is permutation)
(A) 0 (B) 1 (C) 2 (D) 3

(12) In the expansion of $(3 + x)^4$ middle term will be:- (A) 81 (B) $54x^2$ (C) $26x^2$ (D) x^4

(13) The inequality $4^n > 3^n + 4$ is valid if n is:-
(A) $n = 2$ (B) $n = 1$ (C) $n = -1$ (D) $n = -2$

(14) The angle $\frac{\pi}{12}$ in degree measure is:- (A) 30^o (B) 20^o (C) 45^o (D) 15^o

(15) $\tan(\pi - \alpha)$ equals:-
(A) $\tan\alpha$ (B) $-\tan\alpha$ (C) $\cot\alpha$ (D) $-\cot\alpha$

(16) Period of $\cot 8x$ is:-
(A) $\frac{\pi}{8}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{2}$ (D) π

(17) In any triangle ΔABC, with usual notation, $\sqrt{\frac{s(s-c)}{ab}}$ is equal to:-
(A) $\sin\frac{\gamma}{2}$ (B) $\cos\frac{\gamma}{2}$ (C) $\sin\frac{\alpha}{2}$ (D) $\cos\frac{\alpha}{2}$

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

(19) The value of $\sin^{-1}\left(\cos\frac{\pi}{6}\right)$ is equal to:-
(A) $\frac{\pi}{2}$ (B) $\frac{3\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{3}$

(20) If $\sin x = \frac{1}{2}$ then x is equal to:-
(A) $\frac{\pi}{6}, \frac{5\pi}{6}$ (B) $\frac{-\pi}{6}, \frac{-5\pi}{6}$ (C) $\frac{-\pi}{6}$ (D) $\frac{-5\pi}{6}$

Paper Code Number: 2194	2018 (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 bubble in front of that question number. Use marker or pen to fill the bubbles. Cutting or filling two or more bubbles 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 questions on this sheet of OBJECTIVE PAPER.

Q.No.1

(1) In any triangle ΔABC, with usual notation, $\sqrt{\frac{s(s-c)}{ab}}$ is equal to:-

(A) $\sin\frac{\gamma}{2}$ (B) $\cos\frac{\gamma}{2}$ (C) $\sin\frac{\alpha}{2}$ (D) $\cos\frac{\alpha}{2}$

(2) In a right angle triangle no angle is greater than:-

(A) 90^{o} (B) 30^{o} (C) 45^{o} (D) 60^{o}

(3) The value of $\sin^{-1}\left(\cos\frac{\pi}{6}\right)$ is equal to:-

(A) $\frac{\pi}{2}$ (B) $\frac{3\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{3}$

(4) If $\sin x = \frac{1}{2}$ then x is equal to:-

(A) $\frac{\pi}{6}, \frac{5\pi}{6}$ (B) $\frac{-\pi}{6}, \frac{-5\pi}{6}$ (C) $\frac{-\pi}{6}$ (D) $\frac{-5\pi}{6}$

(5) Multiplicative inverse of complex number $(\sqrt{2}, -\sqrt{5})$ is:-

(A) $\left(\frac{\sqrt{2}}{\sqrt{7}}, \frac{\sqrt{5}}{\sqrt{7}}\right)$ (B) $\left(\frac{-\sqrt{2}}{\sqrt{7}}, \frac{-\sqrt{5}}{\sqrt{7}}\right)$ (C) $\left(\frac{\sqrt{2}}{7}, \frac{\sqrt{5}}{\sqrt{7}}\right)$ (D) $\left(\frac{\sqrt{2}}{7}, \frac{\sqrt{5}}{7}\right)$

(6) If A, B are two sets then $A\cap(A\cup B)$ equals:- (A) A (B) $A\cup B$ (C) B (D) ϕ

(7) A square matrix A is called skew symmetric if $A' =$ ____

(A) A (B) $\overline{A}$ (C) $-A'$ (D) $-A$

(8) If $\begin{vmatrix} 2 & \lambda \\ 3 & 7 \end{vmatrix} = 2$, then $\lambda =$ ______ (A) 1 (B) 2 (C) 3 (D) 4

(9) A reciprocal equation, remains unchanged when variable x is replaced by:-

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

(10) $f(x) = 3x^4 + 4x^3 + x - 5$ is divided by $x + 1$ then remainder is:- (A) -6 (B) 7 (C) 6 (D) -7

(11) Types of rational fractions are:- (A) Two (B) Three (C) Four (D) Infinite

(12) Harmonic Mean between a and b is:- (A) $\frac{ab}{a+b}$ (B) $\frac{a+b}{ab}$ (C) $\frac{2ab}{a+b}$ (D) $\frac{a-b}{ab}$

(13) If $a = -1$ and $b = 5$ then $A \times H$ is equal to:- (where A = A.M and H = H.M)

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

(14) ${}^{n}C_{r-1} + {}^{n}C_{r-2}$ is equal to:- (where C is combination)

(A) ${}^{n}C_{r-1}$ (B) ${}^{n+1}C_{r-1}$ (C) ${}^{n+1}C_{r-2}$ (D) ${}^{n}C_{r-2}$

(15) The value of n when ${}^{11}P_n = 11 \times 10 \times 9$ is:- (where P is permutation)

(A) 0 (B) 1 (C) 2 (D) 3

(16) In the expansion of $(3 + x)^4$ middle term will be:- (A) 81 (B) $54x^2$ (C) $26x^2$ (D) x^4

(17) The inequality $4^n > 3^n + 4$ is valid if n is:-

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(19) $\tan(\pi - \alpha)$ equals:-

(A) $\tan\alpha$ (B) $-\tan\alpha$ (C) $\cot\alpha$ (D) $-\cot\alpha$

(20) Period of $\cot 8x$ is:-

(A) $\frac{\pi}{8}$ (B) $\frac{\pi}{4}$ (C) $\frac{\pi}{2}$ (D) π

Paper Code Number: 2196	2018 (A) INTERMEDIATE PART-I (11th CLASS)	Roll No: ______

MATHEMATICS PAPER-I GROUP-II TIME ALLOWED: 30 Minutes

OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

(1) If $a=-1$ and $b=5$ then $A\times H$ is equal to:- (where A = A.M and H = H.M)
(A) -5 (B) $\frac{-5}{2}$ (C) 5 (D) $\frac{2}{5}$

(2) ${}^nC_{r-1}+{}^nC_{r-2}$ is equal to:- (where C is combination)
(A) ${}^nC_{r-1}$ (B) ${}^{n+1}C_{r-1}$ (C) ${}^{n+1}C_{r-2}$ (D) ${}^nC_{r-2}$

(3) The value of n when ${}^{11}P_n=11\times10\times9$ is:- (where P is permutation)
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(4) In the expansion of $(3+x)^4$ middle term will be:- (A) 81 (B) $54x^2$ (C) $26x^2$ (D) x^4

(5) The inequality $4^n>3^n+4$ is valid if n is:-
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(6) The angle $\frac{\pi}{12}$ in degree measure is:- (A) 30^o (B) 20^o (C) 45^o (D) 15^o

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(9) In any triangle ΔABC, with usual notation, $\sqrt{\frac{s(s-c)}{ab}}$ is equal to:-
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(10) In a right angle triangle no angle is greater than:-
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(11) The value of $\sin^{-1}\left(\cos\frac{\pi}{6}\right)$ is equal to:-
(A) $\frac{\pi}{2}$ (B) $\frac{3\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{3}$

(12) If $\sin x=\frac{1}{2}$ then x is equal to:-
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(14) If A, B are two sets then $A\cap(A\cup B)$ equals:- (A) A (B) $A\cup B$ (C) B (D) ϕ

(15) A square matrix A is called skew symmetric if $A^t=$ ___
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(17) A reciprocal equation, remains unchanged when variable x is replaced by:-
(A) $\frac{-1}{x}$ (B) $\frac{1}{x^2}$ (C) $-x$ (D) $\frac{1}{x}$

(18) $f(x)=3x^4+4x^3+x-5$ is divided by $x+1$ then remainder is:- (A) -6 (B) 7 (C) 6 (D) -7

(19) Types of rational fractions are:- (A) Two (B) Three (C) Four (D) Infinite

(20) Harmonic Mean between a and b is:- (A) $\frac{ab}{a+b}$ (B) $\frac{a+b}{ab}$ (C) $\frac{2ab}{a+b}$ (D) $\frac{a-b}{ab}$

Paper Code Number: 2198	2018 (A) Roll No: ______

INTERMEDIATE PART-I (11th CLASS)

MATHEMATICS PAPER-I GROUP-II TIME ALLOWED: 30 Minutes

OBJECTIVE MAXIMUM MARKS: 20

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Q.No.1

(1) A reciprocal equation, remains unchanged when variable x is replaced by:-
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(2) $f(x) = 3x^4 + 4x^3 + x - 5$ is divided by $x + 1$ then remainder is:- (A) -6 (B) 7 (C) 6 (D) -7

(3) Types of rational fractions are:- (A) Two (B) Three (C) Four (D) Infinite

(4) Harmonic Mean between a and b is:- (A) $\frac{ab}{a+b}$ (B) $\frac{a+b}{ab}$ (C) $\frac{2ab}{a+b}$ (D) $\frac{a-b}{ab}$

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

(6) ${}^nC_{r-1} + {}^nC_{r-2}$ is equal to:- (where C is combination)
(A) ${}^nC_{r-1}$ (B) ${}^{n+1}C_{r-1}$ (C) ${}^{n+1}C_{r-2}$ (D) ${}^nC_{r-2}$

(7) The value of n when ${}^{11}P_n = 11 \times 10 \times 9$ is:- (where P is permutation)
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(8) In the expansion of $(3 + x)^4$ middle term will be:- (A) 81 (B) $54x^2$ (C) $26x^2$ (D) x^4

(9) The inequality $4^n > 3^n + 4$ is valid if n is:-
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(10) The angle $\frac{\pi}{12}$ in degree measure is:- (A) 30^o (B) 20^o (C) 45^o (D) 15^o

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(A) $\sin\frac{\gamma}{2}$ (B) $\cos\frac{\gamma}{2}$ (C) $\sin\frac{\alpha}{2}$ (D) $\cos\frac{\alpha}{2}$

(14) In a right angle triangle no angle is greater than:-
(A) 90^o (B) 30^o (C) 45^o (D) 60^o

(15) The value of $\sin^{-1}\left(\cos\frac{\pi}{6}\right)$ is equal to:-
(A) $\frac{\pi}{2}$ (B) $\frac{3\pi}{2}$ (C) $\frac{\pi}{6}$ (D) $\frac{\pi}{3}$

(16) If $\sin x = \frac{1}{2}$ then x is equal to:-
(A) $\frac{\pi}{6}, \frac{5\pi}{6}$ (B) $\frac{-\pi}{6}, \frac{-5\pi}{6}$ (C) $\frac{-\pi}{6}$ (D) $\frac{-5\pi}{6}$

(17) Multiplicative inverse of complex number $(\sqrt{2}, -\sqrt{5})$ is:-
(A) $\left(\frac{\sqrt{2}}{\sqrt{7}}, \frac{\sqrt{5}}{\sqrt{7}}\right)$ (B) $\left(\frac{-\sqrt{2}}{\sqrt{7}}, \frac{-\sqrt{5}}{\sqrt{7}}\right)$ (C) $\left(\frac{\sqrt{2}}{7}, \frac{\sqrt{5}}{\sqrt{7}}\right)$ (D) $\left(\frac{\sqrt{2}}{7}, \frac{\sqrt{5}}{7}\right)$

(18) If A, B are two sets then $A \cap (A \cup B)$ equals:- (A) A (B) $A \cup B$ (C) B (D) ϕ

(19) A square matrix A is called skew symmetric if $A' =$ ____
(A) A (B) $\overline{A}$ (C) $-A'$ (D) $-A$

(20) If $\begin{vmatrix} 2 & \lambda \\ 3 & 7 \end{vmatrix} = 2$, then $\lambda =$ ______ (A) 1 (B) 2 (C) 3 (D) 4

BOARD OF INTERMEDIATE AND SECONDARY EDUCATION,MULTAN
OBJECTIVE KEY FOR INTERMEDIATE ANNUAL/SUPPLY EXAMINATION,2018

Name of Subject: Mathematics Session: 2017 – 19

Group: 1st Group: 2nd

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

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

سرٹیفکیٹ بابت صحیح سوالیہ پرچہ/مارکنگ Key

ہم نے مضمون ریاضی پرچہ فرسٹ گروپ فرسٹ+سیکنڈ سکیم انٹر سالانہ/ضمنی امتحان 2018 کا سوالیہ پرچہ انشائیہ ومعروضی(Subjective & Objective) کو بنظر عمیق چیک کرلیا ہے یہ پرچہ Syllabus کے عین مطابق Set کیا گیا ہے۔ اس سوالیہ پرچہ میں کسی قسم کی کوئی غلطی نہ ہے۔ ہم نے سوالیہ پرچہ کا اردو اور انگریزی Version بھی چیک کرلیا ہے۔ یہ Version آپس میں مطابقت رکھتے ہیں۔ نیز اس پرچہ کی معروضی (MCQs) Key کی بابت تصدیق کی جاتی ہے کہ اس میں بھی کسی قسم کی کوئی غلطی نہ ہے۔ مزید یہ کہ ہم نے Key بنانے سے متعلق دفتر کی جانب سے تیار کردہ ہدایات وصول کرکے ان کا بغور مطالعہ کرلیا ہے اور ان کی روشنی میں Key بنائی ہے۔ نیز سب ایگزامینرز کیلئے تفصیلی مارکنگ ہدایات/ مارکنگ سکیم/Rubrics بھی تیار کر دی گئی ہیں۔

Prepared & Checked By: Dated: 02-06-2018

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Re-Checked By ہم نے درج بالا سوالیہ پرچہ(انشائیہ+معروضی)بمعہ معروضی "Key" اور ہدایات کے حوالہ سے مکمل طور پر تسلی کرلی ہے۔ کسی قسم کی کوئی غلطی نہ ہے۔

1	Muhammad Iqbal	Asso Prof	Govt College of SC Multan	0301-7353646	
2					

تاریخ ________