MTN-11-G1-18

Paper Code Number:	2195

2018 (A)

Roll No: ______________

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

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

(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 $Sin 2\alpha =$ ______
(A) $1-2Sin^2\alpha$ (B) $2\sin\alpha Cos\alpha$ (C) $2Cos^2\alpha - 1$ (D) $Cos^2\alpha - Sin^2\alpha$

(6) The smallest positive number p for which $f(x+p) = f(x)$ is called:-
(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) $\frac{\Delta}{s-c}$

(8) If ΔABC is right angle triangle such that $m\angle\alpha = 90^\circ$, 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) $a^2 = b^2 = c^2$

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

(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) $\pi/6, 5\pi/6$

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

(12) 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) $\frac{-1}{ab}$

(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

(14) If $A = [a_{ij}]_{3\times3}$, then $|KA| =$ ______
(A) $|A|$ (B) $K|A|$ (C) $K^2|A|$ (D) $K^3|A|$

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

(16) 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

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

(18) 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) $a_1 r^{n-1}$

(19) 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) $\frac{n^2(n+1)^2}{4}$

(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

MTN-11-G1-18

2018 (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) 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.

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

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

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

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

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

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

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

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

(viii) State the Law of Cosines.

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

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

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

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

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

SECTION-II

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

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 $x^2 - 2\left(m + \frac{1}{m}\right)x + 3 = 0$, $m \neq 0$,are real. 5

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

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

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

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

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

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

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