Roll No. _____ GWL

Mathematics **(INTER PART-I) 319-(IV)** **GROUP: II** **PAPER: I**

Time: 30 Minutes **Code: 6198** **Marks: 20**

OBJECTIVE

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.

1- 1- $(x-1)^2 = x^2 - 2x + 1$ is called

(A) equation (B) inequality (C) identity (D) polynomial

2- If ω is complex cube root of unity then ω^{15} equals

(A) 1 (B) zero (C) ω (D) $-\omega$

3- ${}^{n-1}C_r + {}^{n-1}C_{r-1}$ equals

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

4- If $\tan\theta = \frac{1}{\sqrt{3}}$ and θ is in III quadrant then $\cot\theta$ equals

(A) $\sqrt{3}$ (B) $\frac{1}{\sqrt{3}}$ (C) $\frac{1}{2}$ (D) $-\frac{1}{2}$

5- $\sin(\cos^{-1}\frac{1}{2})$ equals

(A) $\frac{\sqrt{3}}{2}$ (B) $\frac{1}{2}$ (C) $\frac{-\sqrt{3}}{2}$ (D) $\frac{-1}{2}$

6- Additive inverse of $a \in \mathbb{R}$ is

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

7- Period of cosec $10x$ is

(A) $\frac{\pi}{10}$ (B) $\frac{2\pi}{5}$ (C) $\frac{\pi}{5}$ (D) $\frac{4\pi}{5}$

8- The middle term in expansion of $(a+x)^n$ when n is even is

(A) $\left(\frac{n}{2}+1\right)$th term (B) $\left(\frac{n}{2}-1\right)$th term (C) $\left(\frac{n}{2}\right)$th term (D) $\left(\frac{n+1}{2}\right)$th term

9- With usual notations, radius r of inscribed circle is given by

(A) $\frac{\Delta}{s}$ (B) $\frac{s}{\Delta}$ (C) $\frac{\Delta}{s-c}$ (D) $\frac{4\Delta}{abc}$

10- $\cos 315^\circ$ equals

(A) $\tan(-45^\circ)$ (B) $\tan 45^\circ$ (C) $\sin 45^\circ$ (D) $\operatorname{cosec} 45^\circ$

11- A reciprocal equation remains unchanged when variable x is replaced by

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

(Turn over)

Mathematics **(INTER PART-I) 319** **GROUP: II** **PAPER: I**
Time: 2:30 hours **SUBJECTIVE** **Marks: 80**

Note: Section I is compulsory. Attempt any three (3) questions from Section II.

SECTION I

2. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Separate into real and imaginary parts $\frac{i}{1+i}$

ii- Simplify $(i)^{101}$

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

iv- For the conditional $p \rightarrow q$. Write its inverse and converse.

v- Define disjunction of two statements p and q

vi- If a, b are elements of a group G, then show that $(ab)^{-1} = b^{-1}a^{-1}$

vii- Find x and y if $\begin{bmatrix} x+3 & 1 \\ -3 & 3y-4 \end{bmatrix} = \begin{bmatrix} 2 & 1 \\ -3 & 2 \end{bmatrix}$

viii- Find the value of λ if $A = \begin{bmatrix} 4 & \lambda \\ 7 & 3 \end{bmatrix}$ is singular.

ix- Define upper triangular matrix.

x- Reduce $x^{-2} - 10 = 3x^{-1}$ into quadratic form.

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

3. Write short answers to any EIGHT questions: **(2 x 8 = 16)**

i- Resolve $\frac{7x+25}{(x+3)(x+4)}$ into partial fractions.

ii- Define proper rational fraction.

iii- For the identity $\frac{2x-3}{x(2x+3)(x-1)} = \frac{A}{x} + \frac{B}{2x+3} + \frac{C}{x-1}$ calculate the value of A and C.

iv- Write the first four terms of the sequence $a_n = \frac{n}{2n+1}$

v- How many terms are there in A.P., in which $a_1 = 11$, $a_n = 68$, $d = 3$

vi- Sum the series $\frac{1}{1+\sqrt{x}} + \frac{1}{1-x} + \frac{1}{1-\sqrt{x}} + \ldots\ldots\ldots$ to n terms.

vii- Find the 12^{th} term of the G.P $1+i$, $2i$, $2(1-i)$, ……..

viii- Find the sum of the following infinite geometric series $4 + 2\sqrt{2} + 2 + \sqrt{2} + 1 + \ldots\ldots$

ix- How many arrangements of the letters of the word 'MATHEMATICS' , taken all together, can be made?

x- Prove the formula for $n = 1, 2$ $\quad 1 + 2 + 4 + \ldots\ldots + 2^{n-1} = 2^n - 1$

xi- Calculate $(2.02)^4$ by means of binomial theorem.

xii- Expand $(1+x)^{\frac{-1}{3}}$ upto 4-terms, taking the values of x such that the expansion is valid.

(Turn over)