Mathematics | **(INTER PART-I) 318 (III)** | **PAPER: I**
Time: 30 Minutes | **Code: 6195** | **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 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- If $a = 1$ then sum of even coefficients in expression of $(a + x)^n$ is equal to

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

2- The arithmetic mean (A.M) between $\frac{1}{a}$ and $\frac{1}{b}$ is equal to

(A) $\frac{a+b}{2}$ (B) $\frac{a+b}{2ab}$ (C) $\frac{1}{a+b}$ (D) $\frac{2ab}{a+b}$

3- Solution of equation $\cos x + 1 = 0$ is

(A) $\{\pi + n\pi\}$ (B) $\{\pi + 2n\pi\}$ (C) $\{\pi\}$ (D) $\left\{\frac{\pi}{2} + n\pi\right\}$

4- The radius of inscribed circle $r =$

(A) $\frac{\Delta}{s-a}$ (B) $\frac{\Delta}{s-b}$ (C) $\frac{\Delta}{s}$ (D) $\frac{\Delta}{s-c}$

5- The range of $\sin x =$

(A) $[-1, 1]$ (B) $[0, 1]$ (C) $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$ (D) $[-1, 0]$

6- The angle formed by a line above horizontal line is called

(A) right angle (B) oblique angle (C) angle of depression (D) angle of elevation

7- If A is non-singular matrix then $A^{-1} =$

(A) $\frac{Adj(A)}{|A|}$ (B) $|A|\,Adj(A)$ (C) A^t (D) $\frac{|A|}{Adj(A)}$

8- The number $\sqrt{-1}$ is called

(A) real number (B) natural number (C) complex number (D) rational number

9- The fraction $\frac{x+1}{x^2+2}$ is

(A) proper fraction (B) improper fraction (C) identity (D) mixed

10- Show that $n! > n^2$ is true for integral values of

(A) $n = 3$ (B) $n < 4$ (C) $n \geq 4$ (D) $n \leq 4$

11- The value of $2\,Sin^2\,\theta/2 =$

(A) $1 + \cos\theta$ (B) $1 - \cos\theta$ (C) $1 + \sin\theta$ (D) $1 - \sin\theta$

12- The roots of equation $ax^2 + bx + c = 0$ are rational if $b^2 - 4ac$ is

(A) positive (B) perfect square (C) negative (D) 0

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(Turn over)

13- The converse of $P \rightarrow q$ is

(A) $\sim q \rightarrow p$ (B) $q \rightarrow p$ (C) $p \rightarrow \sim q$ (D) $\sim p \rightarrow \sim q$

14- The value of $\sin(\tan^{-1}(0)) =$

(A) 0 (B) 1 (C) –1 (D) ∞

15- In a triangle with usual notation $\cos\frac{\beta}{2} =$

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

16- If α, β are roots of equation $x^2 - x + 1 = 0$ then $\alpha + \beta =$

(A) –1 (B) 0 (C) 1 (D) 2

17- For two +ve real numbers, with usual notation

(A) $A > G$ (B) $A = G$ (C) $A \geq G$ (D) $A < G$

18- A die is rolled, the probability that dots on tops are greater than 4 is

(A) $\frac{1}{2}$ (B) $\frac{1}{3}$ (C) $\frac{1}{4}$ (D) $\frac{1}{6}$

19- The value of permutation ${}^{20}P_3$ is

(A) 4050 (B) 5040 (C) 6840 (D) 4068

20- The matrix $\begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$ is called

(A) identity (B) null (C) scalar (D) diagonal

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Mathematics **(INTER PART-I) 318** **PAPER: I**

Time: 2:30 hours **SUBJECTIVE** **Marks: 80**

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

SECTION I

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

i- Find out real and imaginary parts for $(\sqrt{3}+i)^3$

ii- Simplify by justifying each step by using properties of real numbers $\dfrac{\frac{1}{4}+\frac{1}{5}}{\frac{1}{4}-\frac{1}{5}}$.

iii- Show that $(z-\bar{z})^2$ is a real number for all $z \in c$

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

v- Write the converse and inverse of $\sim p \rightarrow \sim q$.

vi- Prepare a table of addition of the elements of the set of residue classes modulo 4.

vii- If $A = \begin{bmatrix} 1 & -1 \\ a & b \end{bmatrix}$ and $A^2 = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$, find the values of "a" and "b".

viii- If $A = [a_{ij}]_{3\times4}$ then show that $AI_4 = A$

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

x- Solve the equation $x^{-2} - 10 = 3x^{-1}$

xi- Evaluate $(1 + \omega - \omega^2)^8$; ω is a complex cube root of unity.

xii- Whether factor theorem holds? When $x^3 + x^2 - 7x + 1$ is divided by $(x - 2)$

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

i- Resolve $\dfrac{3x-11}{(x^2+1)(x+3)}$ into partial fraction.

ii- Determine whether -19 is the term of A.P 17, 13, 9, ... or not.

iii- Find the 5th term of the G.P 3, 6, 12, ...

iv- Find the sum of the infinite G.P 2, $\sqrt{2}$, 1, ...

v- Show that $G^2 = A.H$ if $a = -2$, $b = -6$. (using usual notation)

vi- If $\frac{1}{a}, \frac{1}{b}$ and $\frac{1}{c}$ are in G.P, show that common ratio is $\pm\sqrt{\frac{a}{c}}$

vii- Find the value of n, when permutation ${}^{11}P_n = 11.10.9$

viii- How many arrangements of letters of word "PAKISTAN" can be made?

ix- Pakistan and India play a cricket match. Find the probability that Pakistan wins.

x- State Binomial theorem.

xi- Show that $\dfrac{n^3+2n}{3}$ is integer for $n = 1, 2, 3$.

xii- If x is so small that its square and higher powers can be neglected, then show that

$$\frac{\sqrt{1+2x}}{\sqrt{1-x}} = 1+\frac{3}{2}x$$

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