PRE BOARD EXAMINATION 2019

XI $\sum$ ATHEMATICS

FROM THE DESK OF: FAIZAN AHMED

PAPER C

Max. Marks: 20 **Time: 20 minutes**

Section A" (Multiple Choice Questions)

1. If $z = x - iy$ then $|z|$ is

   * $x^2 + y^2$ * $\sqrt{x^2 + y^2}$ * $x^2 - y^2$ * $\sqrt{x^2 - y^2}$

2. If Z=3 +6i then 6 is:

   * Real part * Imaginary part * Complex number * conjugate

3. If b^2-4ac is a perfect square then roots of equation are:

   * Real * Irrational *rational * Complex

4. If 4^{x+1}=64, then the value of x is:

   * 2 * 3 *4 *-4

5. The value of $(1-\omega-\omega^2)^2$ is:

   * 2 * 4 * 9 *1

6. If the roots of an equation are 1 and 2, then the equation is:

   * x^2+3x+2=0 * x^2-3x-2=0 * x^2-2x+3=0 * x^2-3x+2=0

7. For what value of K will (x-1) is a factor of p(x)=$2x^3$-kx^2+4x-3

   * 1 * 3 * -1 *-3

8. If α, β are the roots of equation x2+4x+5 =0,then $\alpha + \beta$ is:

   * -4 * -5 * 4 * 5

9. An isosceles triangle has:

   * Two equal sides * Three equal sides * Two equal angle * Two equal sides and equal angles

10. The (x,y) is called :

    * solution set * ordered pair * trivial solution * non-trivial solution

11. The matrix $\begin{bmatrix} 4 & 0 & 0 \\ 0 & 4 & 0 \\ 0 & 0 & -4 \end{bmatrix}$ is a

    * diagonal matrix * scalar matrix * unit matrix * null matrix

12. If A=$\begin{bmatrix} 1 \\ 2 \\ -1 \end{bmatrix}$ and B=$\begin{bmatrix} 3 & 2 & 1 \end{bmatrix}$,then order of matrix A×B is :

* 1×1 * 3×3 * 3×1 * multiplication is not possible

13. If any two rows of a determinant are same, then the value of determinant is:

* 1 * 0 * -1 * 2

14. If A is a singular matrix then the value of $|A|^3$ is:

* 1 * 0 * 3 * -3

15. Write the second term of the sequence whose nth term is $\frac{n^2-4}{2}$

* -1 * 0 * 1 * 3

16. The arithmetic mean between $\sqrt{2}\ and\ 3\sqrt{2}$ is?

* $\frac{3}{\sqrt{2}}$ * $\frac{\sqrt{3}}{2}$ * $2\sqrt{2}$ *$2\sqrt{3}$

17. The value of $\sin\left(\frac{\pi}{2}-\theta\right)$ is :

* $\sin\theta$ * $\cos\theta$ * $\tan\theta$ * $\cot\theta$

18. $\tan\theta$ is the periodic function of:

* 2π * 3π * 4π * π

19. The range of $\cos\theta$ is:

* [-1 1] * [0 1] * [-1 1] * [0 2π]

20. If the angle of triangle are in the ratio 1:1:2, then the largest angle is:

* 180° * 45° * 90° * 60°

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SECTION 'B'

(SHORT –ANSWER QUESTIONS) (50 marks)

Max. Marks: 80 **Time: 2 hours 40 minutes**

NOTE: Attempt any TEN part questions from this Section "B", selecting at least THREE part questions from each question. You may choose the tenth part question from any one sub-section. All questions carry equal marks.

COMPLEX NUMBER, ALGEBRA &MATRICES

Q-2

(i) Find the condition that one root of $px^2+qx+r=0$ may be double of the other.

(ii) Find the value of k by synthetic division method so that (x+5) is a factor of $2x^3+kx^2-2x+15$.

(iii) Solve the following equation for x, $2^x+2^{6-x}-20=0$

(iv) If $z_1=1+i$ and $z_1=3-2i$, find the value of $|5z_1-4z_2|$ and $\frac{z_1}{z_2}$

(v) Evaluate by using the properties of determinant

$$\begin{vmatrix} x & y & z \\ z & x & y \\ y & z & x \end{vmatrix}$$

GROUPS, SEQUENCES & SERIES, COUNTING PROBLEMS

Q-3

(i) Show that $(Z,*)$ is a group.

(ii) Find the sum of all numbers between 1 and 250, which are exactly divisible by 7.

(iii) If the p^{th} term of an H.P is q and the q^{th} term is p; find the $(pq)^{th}$ term

(iv) Write the 5^{th} term of a sequence whose nth term is $\frac{n-1}{2n-3}$.

(v) In how many distinct ways can the letters of the word LAPTOP be arranged?

TRIGONOMETRY

Q-4

(i) If a point on the rim of a 21cm, diameter fly wheel travels 5040 meters in a minute, through how many radians does the wheel turn in a second?

(ii) Express all trigonometric functions in term of $\sin\theta$.

(iii) Draw the graph of tanx from $-90 \le x \le 90^0$

(iv) Find the remaining trigonometric functions if $\tan\theta = -\frac{1}{2}$ and $\rho(\theta)$ is not in 2nd quadrant.

(v) Prove that $tan57^0 = \frac{\sqrt{3}\,cos3^0 - \sin 3^0}{\cos 3^0 + \sqrt{3}\,sin3^0}$.

SECTION 'C' (DETAILED-ANSWER QUESTIONS) (30 Marks)

Attempt any TWO questions.

Q-5

(a) The sum of four terms in an A. P is 4. The sum of the products of the first and last terms and of two middle terms is -38. Find the numbers. 8

(b) If α and β are the roots of given $px^2+qx+r=0$, form an equation whose roots are $\frac{\alpha}{\beta}$ and $\frac{\beta}{\alpha}$. 8

Q-6

(a) If $sin\alpha = \frac{\sqrt{3}}{2}$ and $cos\beta = \frac{1}{\sqrt{2}}$ and both $p(\alpha) and\ p(\beta)$ are in the first quadrant, find the value of

(i) $\sin(\alpha - \beta)$ (ii) $\tan(\alpha - \beta)$ 7

(b) Solve the following system of equations. 7

$2x^2 + xy + y^2 = 8$

$6xy + 2y^2 = 20$

Q-7

(a) Find the inverse of A by adjoint method

$$A=\begin{bmatrix} 2 & 0 & 3 \\ 1 & -1 & 0 \\ -1 & 0 & 1 \end{bmatrix}$$ 7

(b) Find the values of x y and z by Cramer's rule 7

$9x + 7y + 3t = 6$

$5x - y + 4t = 1$

$6x + 8y + 2t = 4$

(c) Prove that. (any TWO)

(a) $\frac{\cos\theta}{1-\sin\theta} = \frac{1+\sin\theta}{\cos\theta}$ (b) $\sin(\theta+\phi)\sin(\theta-\phi) = \sin^2\theta - \sin^2\phi$

(c) $\frac{\sin 3\theta}{\sin\theta} - \frac{\cos 3\theta}{\cos\theta} = 2$