

# CSIR UGC NET Mathematical Sciences Question Paper 2023

## Part A Topics -

- Logical Venn Diagram
- Compound Interest
- Probability
- Ratio and Proportion
- Venn Diagram
- Number System
- Graph
- Mean
- Standard Divison
- Mensuration
- Speed and Distance

## Questions of Part B & C

1. How many real roots are there in polynomial  $x^3 - 3x + 2023 = 0$
2. Matrix  $3 \times 3$  is a real entity then which os the following is not true:
  - A. Must have real Eigenvalues
  - B. If one of the EV is 0, the determinant is 0
  - C. If elements of the matrix are negative and 3 is EV, then all EV must be positive
  - D. If all elements of the matrix are positive, and 3 is EV, then all EV must be positive
3. Linear transformation on polynomial defined as Derivative then which is true?
4. Quadratic form
  - A.  $6x^2 - 12xy + 6y^2$

- B.  $x^2 - xy - 2y^2$
- C.  $x^2 - xy + 2y^2$

5.  $|z| = 3$  +ve oriented circle

$$\int dz / z^2(e^z - e^{-z})$$

6. Let  $S$  be an infinite set

- A. Bijection  $S \times S$
- B. Bijection  $S \times S$
- C. Bijection real
- D. Bijection with power set

7. Possible Class equation for a group of order 10

- A.  $1 + 1 + 1 + \dots + 1$  (10 times)
- B.  $1 + 2 + 1 + 1 + 5$
- C. ??
- D. ??

8.  $a_n = 1/n+1 + 1/n+2 + \dots + 1/2n$  and  $b_n = 1/n$  are seq then

- A. seq  $a_n$  cgt to  $\log 2$ , and both the seq cgt with the same rate
- B. seq  $a_n$  is cgt to  $\log 4$
- C. seq  $b_n$  is not cgt
- D. seq  $a_n$  cgt  $\log 2$  but a different rate

9.  $A$  is a matrix of  $3 \times 3$  order and  $P(T)$  is ch poly of  $A$  which is divisible by  $T^2$  then

- A. All the eigen values are real
- B.  $A$  is diagonalizable
- C.  $A^3 = 0$
- D. 4?

10. Which is the following Maximal ideal of  $Z[x]$  generated by are:

- A.  $\langle 2, x^2+1 \rangle$
- B.  $\langle 3, x^2+1 \rangle$
- C.  $\langle 2, x^2+x+1 \rangle$
- D.  $\langle 3, x^2+x+1 \rangle$

11.  $uv_x + v_y = 0$

$$u(x,0) = x$$

$$u(2,3) = ?$$

12. Let  $V$  is a vector space of poly in two variable almost degree  $\ell$ , where  $\ell \geq 1$

- $\ell + 1$

- $\ell(\ell + 1)$
- $\ell(\ell + 1)/2$

