

SURENDRANATH COLLEGE

INTERNAL ASSESSMENT

SEMESTER-1, 2018-19

SUBJECT- MTMA

CC- 2

Time-

Full Marks-

CU Reg. No.-	SECTION-	ROLL NO.-
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MARKS OBTAINED	Signature of Examiner- With date
MARKS CONVERTED TO 10	Approved by HOD- With date

Question Booklet

<i>Q No.</i>	<i>Question</i>	<i>Marks</i>
1.	Let $S = \{1, 2, 3, \dots, n\}$ and $T = \{a \in S : \gcd(a, n) > 1\}$. Then the value of $\sum_{m \in T} m$ Is : i) $n/2$ ii) $\phi(n)/2$ iii) $n(n+1)/2 - n\phi(n)/2$ iv) $\phi(n) n/2$	
2.	The argument of $1 + i \cot \theta$, $0 < \theta < \pi$ is : i) $\pi - \theta$ ii) $\pi/2 + \theta$ iii) $\pi/2 - \theta$ iv) $\theta - \pi/2$	
3.	Three complex numbers z_1, z_2 , and z_3 are the vertices of an equilateral triangle in the complex plane is then the value of $\frac{z_1 - z_3}{z_1 - z_2} + \frac{z_1 - z_3}{z_2 - z_3}$ is : i) 0 ii) 1 iii) -1 iv) 2	
4.	If a, b, c be positive integers such that $a + b + c = 1$, then the least	

5. value of $\frac{1}{1-a} + \frac{1}{1-b} + \frac{1}{1-c}$ is :
- i) $3/2$ ii) 3 iii) $9/2$ iv) 1

Solutions of the equation $x^3 - 27x - 54 = 0$ are:

- i) $3, -3, 6$ ii) $-3, -3, 6$ iii) $-3, -3, -6$ iv) $-3, 6, 6$
6. $x^5 - 2x^4 + 3x^3 - 4x^2 + 5x - 1 = 0$ has :

- i) No real negative root ii) All the roots are real positive. iii) Only one positive real root iv) Only one negative real root.

Let ρ be a relation on \mathbb{Z} (the set of all integers) defined as follows:

“(a, b) $\in \rho$ if and only if $a \cdot b \geq 0$ ”. Which of the following is true?

- 7.
- i) ρ is an equivalence relation.
- ii) ρ is reflexive, transitive but not symmetric
- iii) ρ is reflexive, symmetric but not transitive
- iv) ρ is symmetric, transitive but not reflexive.
8. Let $f: S \rightarrow \mathbb{R}$ defined by: $f \left(\begin{pmatrix} a & b \\ c & d \end{pmatrix} \right) \rightarrow \begin{vmatrix} a & b \\ c & d \end{vmatrix}$, where $S = \left\{ \begin{pmatrix} a & b \\ c & d \end{pmatrix} : a, b, c, d \in \mathbb{R} \right\}$. Which of the following is true?
- i) f is bijective
- ii) f is injective but not surjective
- iii) f is surjective but not injective

9.

iv) f is neither injective nor surjective

The following product of 2x2 elementary matrices $E_{21}(3)E_{12}(-1)E_2(-2)$ is the matrix

i) $\begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$

ii) $\begin{pmatrix} 1 & 3 \\ 2 & 4 \end{pmatrix}$

iii) $\begin{pmatrix} 1 & 3 \\ 4 & 2 \end{pmatrix}$

iv) $\begin{pmatrix} 1 & 4 \\ 3 & 2 \end{pmatrix}$

10.

The value of λ for which the system of equations

$$x + 2y + 3z = \lambda x$$

$$3x + y + 2z = \lambda y$$

$$2x + 3y + z = \lambda z$$

has a non-trivial solution is

i) 4

ii) 6

iii) 2

iv) Non of these

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