WALCHAND COLLEGE OF ENGINEERING, SANGLI.

(An Autonomous Institute)

First Year B.Tech. (All Branches)

MID SEMESTER EXAMINATION SEMESTER- I OCTOBER-2019

ENGINEERING MATHEMATICS I (4MA101)

MSE

Exam Seat Number: _____

Day, Date and Time: Wednesday, 23/10/2019 , 03.30pm to 05.00pm

Max Marks: **30**

IMP: Verify that you have received question paper with correct course, code, branch etc.

Instructions: i) All questions are compulsory. Writing question number is compulsory. The answers may not be assessed if question number is not written. Assume suitable data wherever necessary.

ii) Figures to the right of question text indicate full marks.

iii) **Mobile phones and programmable calculators are strictly prohibited.**

iv) **Except Exam Seat Number writing anything on question paper is not allowed.**

Exchange/Sharing of stationery, calculator etc. not allowed.

Text on the right of marks indicates course outcomes (only for faculty use).

		Marks	
Q1 A)	Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 1 & 2 & -2 \\ -1 & 3 & 0 \\ 0 & -2 & 1 \end{bmatrix}$ and hence find A^{-1}	6	CO1
Q1 B)	Evaluate $\lim_{x \to 0} \left(\frac{a^x + b^x + c^x}{3} \right)^{1/x}$	4	CO1
Q2 A)	Test for consistency and if possible solve by matrix method $x + y - 2z + w + 3t - 1 = 0$, $2x - y + 2z + 2w + 6t = 2$, $3x + 2y - 4z - 3w - 9t = 3$	4	CO2
Q2 B)	Verify Taylors theorem for $f(x) = x^3 - 3x^2 + 2x$ in $\left[0, \frac{1}{2}\right]$ with Lagranges remainder upto 2 terms.	4	CO1
Q2 C)	Find the eigenvalues of A^4 where $A = \begin{bmatrix} 8 & -4 \\ 2 & 2 \end{bmatrix}$	2	CO2
Q3 A)	A circular hole 4 inches in diameter and 1 foot deep in a metal block is drilled out to increase the diameter to 4.12 inches. Estimate the amount of metal removed using LMVT.	4	CO2
Q3 B)	Find the continued product of all values of $(i)^{2/3}$	4	CO2
Q3 C)	Simplify $\left(\frac{\cos\theta + i\sin\theta}{\sin\theta + i\cos\theta} \right)^4$	2	CO1