Military Institute of Science & Technology

Assign. -01: Math-201 (**Vector Analysis, Laplace Transform and Coordinate Geometry**)

EWCE-9, L-2/T-1

Total Time: 30 min Date: 11.07.2024 Total Marks: 20

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1. Using the Laplace transform, find charge Q(t) in the R-C series circuit. Assuming the electromotive force $E = 10k\cos t$, resistor R =10 Ω, capacitor C= 0.1 farads, and zero initial charge on the capacitor. where k = last digit in your student number and k = 10 when last digit is equal zero in your student number... (7)

2. Compute $\mathcal{L}^{-1}\left\{\frac{1}{(s^2+1)(s^2+9)}\right\}$ by using convolution theorem. (6)

3. Find the values of the constants a, b, c so that the directional derivative of $\emptyset = axy^2 + byz + cz^2x^3$ at (1, 2, -1) has a maximum magnitude 64 in the direction parallel to *z*-axis. (7)