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S·E· ELEC NEP June 2026

SEM III

(2 Hours) Total Marks: 60

04/06/26.

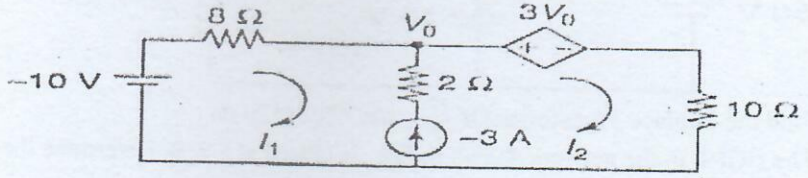
Note: 1. Question No. 1 is compulsory.
2. Answer any THREE from the remaining FIVE questions.
3. Assume suitable data if necessary and justify the same.
4. Figure to right indicates marks

Q.1 Attempt any five questions [compulsory problem]

(a) Find the Laplace Transform of $e^{2t} + 4t^3$-sin2t.cos3t 3

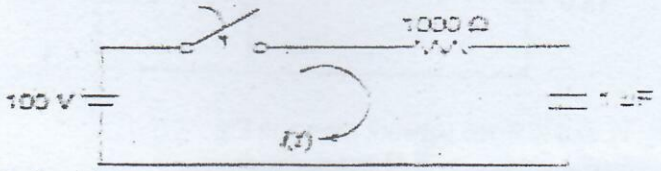
(b) Determine the constants a,b,c,d if 3
f(z) =$(x^2 + 2axy + by^2)$+i$(cx^2 + 2dxy + y^2)$is analytic.

(c) In the network of following Fig. find currents I_1 and I_2. 3



(d) Define the term "Loop" and write its properties? 3

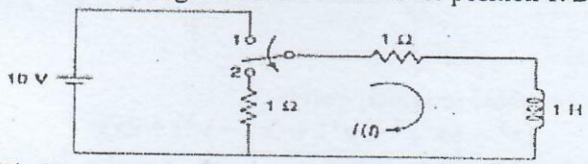
(e) In the network of Fig. the switch is closed of $t = 0$. With the capacitor uncharged, find value for i,at $t = 0^+$. 3



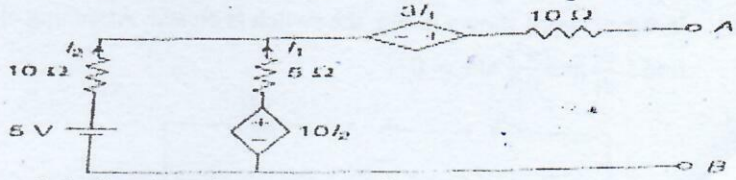
(f) Define Unit step Function and find its Laplace Transform. 3

Q.2 (a) Find L$(e^{-3t}cosh5t.sin4t)$ 4

(b) In the network of Fig, the switch is moved from the position 1 to 2 at $t = 0$, steady-state condition having been established in the position 1. Determine $i(t)$ for $t > 0$. 5



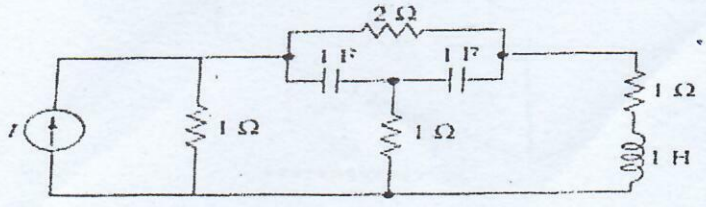
(c) Find Norton's equivalent network across terminals A and B of Fig. 6



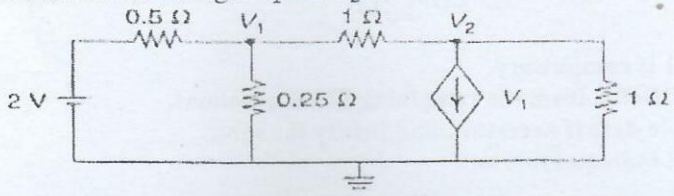
Q.3 (a) Construct an analytic function whose real part $e^x cosy$ 4

(b) Find The Inverse Laplace Transforms Of $\frac{s+29}{(s+4)(s^2+9)}$ 5

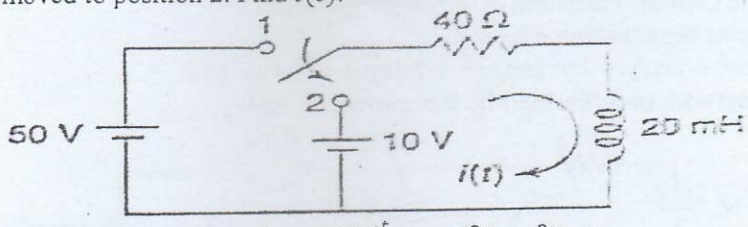
(c) For the circuit shown in Fig. (i) draw its graph, (ii) draw its tree, and (iii) write the fundamental cutset matrix. 6



Q.4 (a) Determine the voltages V_1 and V_2 in the network of Fig. 4

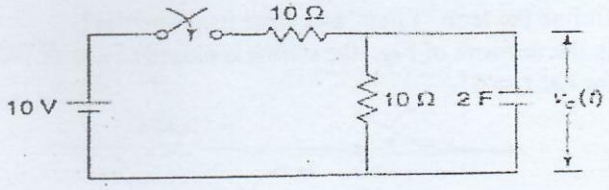


(b) The network of Fig. is under steady state with switch at the portion I. At $t = 0$, switch is moved to position 2. Find $i(t)$. 5

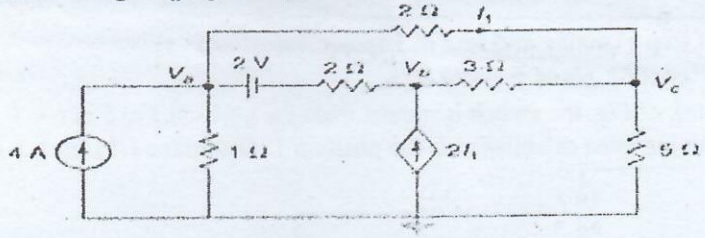


(c) Find the Laplace Transforms Of $\int_0^t ue^{-3u}cos^2 2u\ du$ 6

Q.5 (a) The switch in the network shown in Fig. is closed at $t = 0$. Determine the voltage cross the capacitor. 4



(b) Find voltages V_a, V_b and V_c in the network shown in Fig. 5

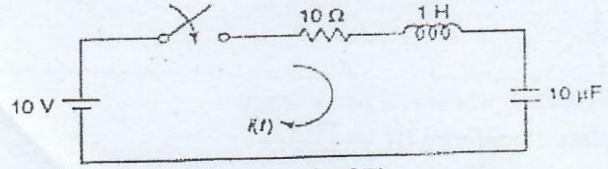


(c) Find the analytic function whose imaginary part is 6

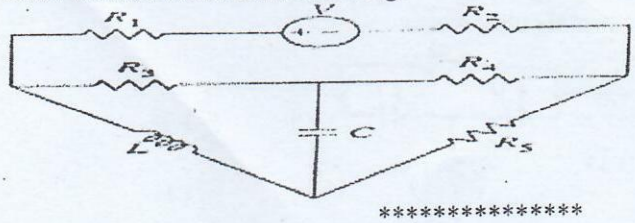
$$(x^4 - 6x^2y^2 + y^4) + (x^2 - y^2) + 2xy$$

Q.6 (a) Find k such that $\frac{1}{2}\log(x^2 + y^2) + i\frac{kx}{y}$ is analytic. 4

(b) In the network shown in Fig. the switch is closed. Assuming all initial conditions as zero, find $i, \frac{di}{dt}$ and $\frac{d^2i}{dt^2}$ at $t = 0^+$. 5



(c) Draw the dual of the network of Fig. 6



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