Roll No. | | | | | | | | | | | |

Total No. of Pages : 03

Total No. of Questions : 18

B.Tech. (EE) (2018 Batch) (Sem.–3)

# ELECTRICAL CIRCUIT ANALYSIS

Subject Code : BTEE-301-18

M.Code : 76381

Time : 3 Hrs. Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.**
3. **SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.**

## SECTION-A

**Answer briefly :**

Q1 What are duality Networks?

Q2 Express Z-parameters in terms of Y-parameters.

Q3 State and derive maximum power transfer theorem.

Q4 Two parallel branches $Z_1$ and $Z_2$ take the current $I_1$ and $I_2$ as follows :

$I_1=3.15\angle 68°A$; $I_2=12\angle -45°A$, find the complex power drawn from 17V supply.

Q5 Explain the importance of pole and zeroes in a transfer function.

Q6 Define : series and parallel resonances.

Q7 Find total inductance of three inductances in additive series combination with L1=2H, L2=3H and L3=5H, the mutual inductances are M12=1H, M13=2H and M23=0.5H.

Q8 A series circuit has 4Ω, 5Ω, 9Ω and 10Ω resistors. Which resistor has the most voltage across it? Justify your answer.

Q9 Give the propagation constant of a symmetrical T-section and π-section.

Q10 Define transfer and driving point impedance of a 2-port network.

## SECTION-B

Q11 Determine frequency response in terms of resonant peak magnitude and corresponding frequency of a system having following closed loop transfer function : $C(s) = \frac{1}{s^2 + s + 1}$.

Q12 Find the frequency at which a prototype T-section low-pass filter having cut-off frequency $f_c$ have an attenuation of 15dB.

Q13 Determine the current in the 5Ω resistor for the circuit shown using mesh analysis of Fig. 1.

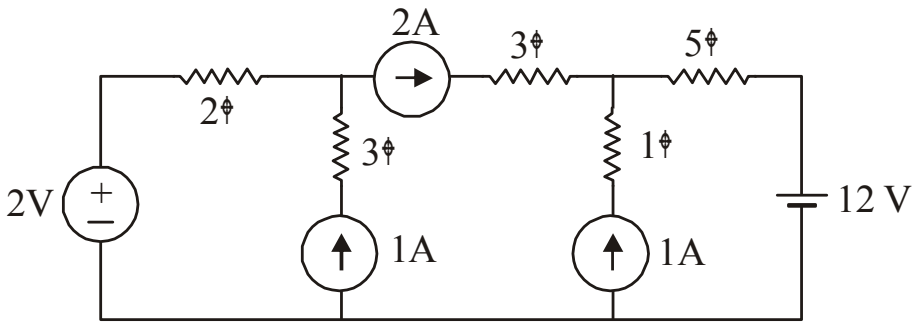


**FIG.1**

Q14 In the circuit shown, S is moved from 1 to 2 at t = 0. Determine i(t) and v(t) for t > 0 through resistor if i(0) = 2A of Fig. 2.

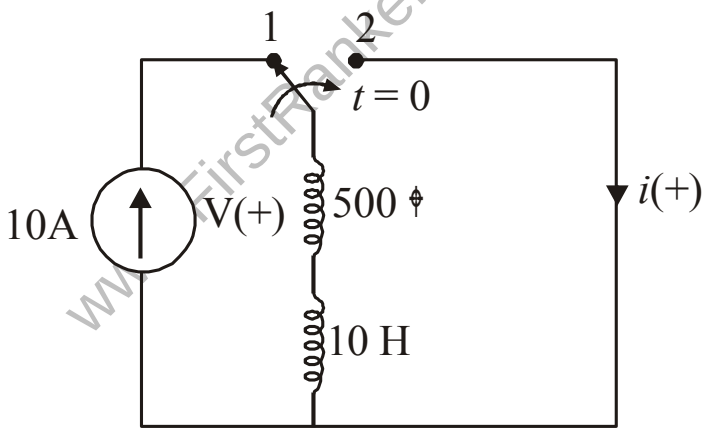


**FIG.2**

Q15 State the necessary and sufficient conditions for a polynomial to be Hurwitz and Check whether $P(s) = s^4 + s^3 + 2s^2 + 4s + 1$ is Hurwitz or not.

## SECTION-C

Q16 The driving point impedance is given by :

$$z(s)=\frac{(s+1)(s+4)}{(s)(s+2)(s+5)}$$

Obtain the Foster-I and Cauer-II forms.

Q17 Define all types of filters and draw their characteristics and block diagrams.

Q18 Find current $I_L$ in the 5Ω resistor using Thevenin theorem and verify the result using Norton theorem of Fig. 3.

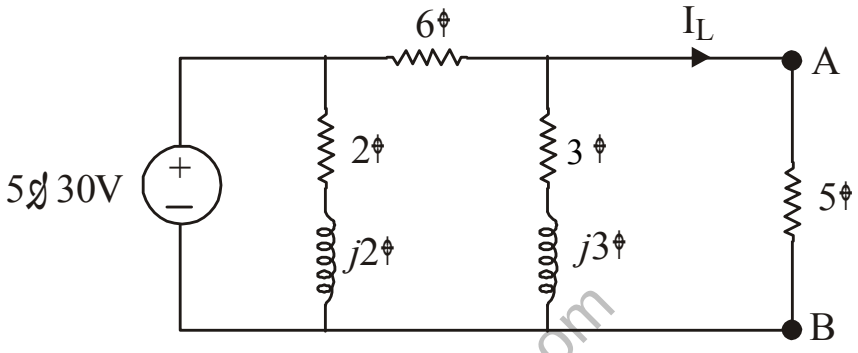


**FIG.3**



**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**