Exam No: _____

GANPAT UNIVERSITY

B. TECH SEM- III, ELECTRICAL ENGINEERING

REGULAR EXAMINATION– NOV-DEC 2015

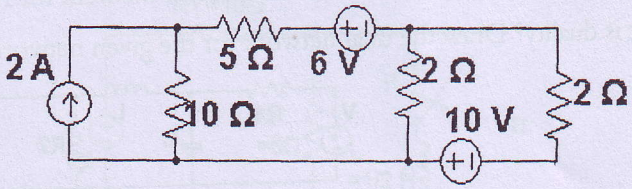
2EE301: CIRCUIT ANALYSIS

TIME: 3 HRS **TOTAL MARKS: 60**

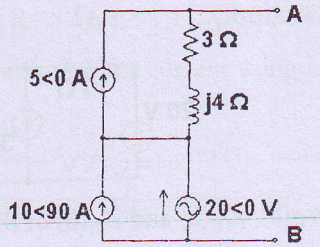
Instructions: (1) This Question paper has two sections. Attempt each section in separate answer book.
(2) Figures on right indicate marks.
(3) Be precise and to the point in answering the descriptive questions.

SECTION: I

Q.1 **(A)** Using mesh analysis, find current in all the resistors. **(5)**

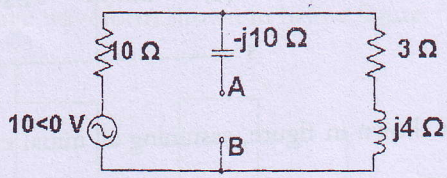


(B) Find the Norton's equivalent network across A-B in below figure. **(5)**



OR

Q. 1 **(A)** Find Thevenin's or Norton's equivalent circuit across A-B. **(5)**



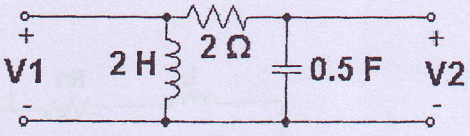
(B) Find z-parameters in terms of y-parameters. **(5)**

Q.2 **(A)** State the Tellegen's theorem. Prove it by taking any simple arbitrary circuit. **(4)**

(B) Write the defining equations of h-parameters, draw the equivalent circuit and find the conditions for reciprocity & symmetry. **(6)**

OR

Q.2 **(A)** For the 2-port network shown in figure, determine the driving point impedance $Z_{11}(S)$, transfer impedance $Z_{21}(S)$ and the voltage transfer ratio (forward voltage gain) $G_{21}(S)$. **(6)**



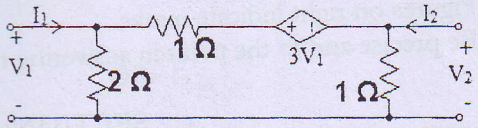
(B) What is a filter? What are the types of filter? **(4)**

Q.3 (A) A reduced incidence matrix of an oriented graph is given as: (5)

$$A=\begin{bmatrix} -1 & 1 & 0 & 0 & 0 & 0 & 0 \\ 0 & -1 & 1 & 1 & 0 & 0 & 0 \\ 0 & 0 & 0 & -1 & 1 & 0 & 0 \\ 0 & 0 & 0 & 0 & -1 & 1 & 0 \\ 0 & 0 & -1 & 0 & 0 & -1 & 1 \end{bmatrix}$$

Draw the oriented graph and calculate the possible number of trees.

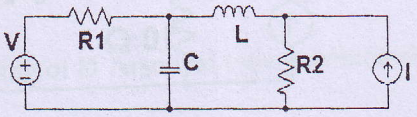
(B) Determine z-parameters for the network shown. (5)



SECTION: II

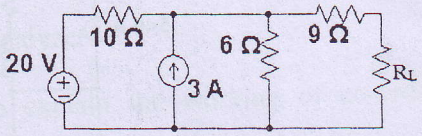
Q.4 (A) State and prove the Maximum Power Transfer theorem for AC circuits. (6)

(B) What is duality? Draw the dual network for the given network. (4)

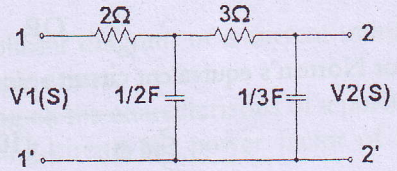


OR

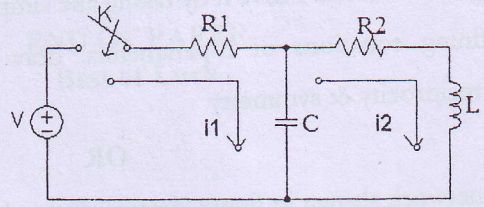
Q.4 (A) Find maximum power in R_L. (5)



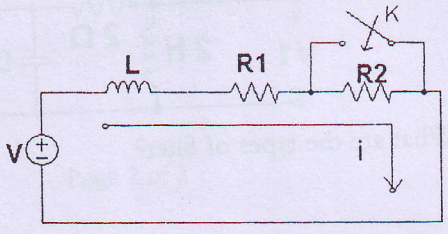
(B) Determine $G_{12}(S)$, $\alpha_{12}(S)$, $Z_{11}(S)$ and $Z_{21}(S)$ of the network shown in figure. (5)



Q.5 (A) In the network shown in figure, assuming all initial condition as zero, find i_1, i_2, $\frac{di_1}{dt}$, $\frac{di_2}{dt}$, $\frac{d^2i_1}{dt^2}$ and $\frac{d^2i_2}{dt^2}$ at $t = 0_+$ (5)

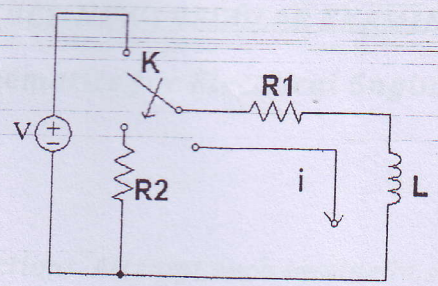


(B) In the network of figure, the switch K is closed at t=0, a steady state having previously been attained. Find the particular solution for the current. (5)

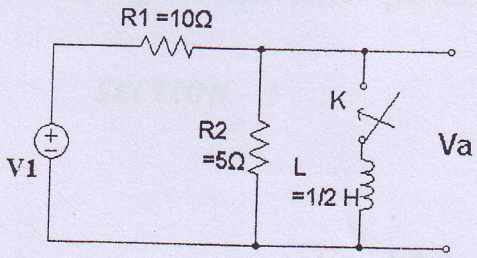


OR

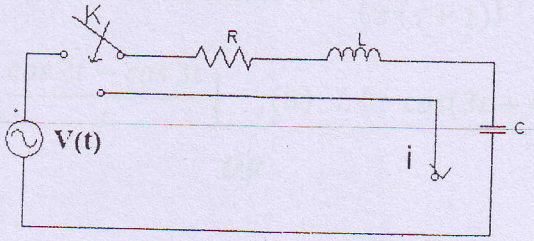
Q.5 (A) Find i, $\frac{di}{dt}$, & $\frac{d^2i}{dt^2}$, at t=0+, if V = 20V, R_1 = 10 Ω, R_2 = 20 Ω and L = 1H. (5)



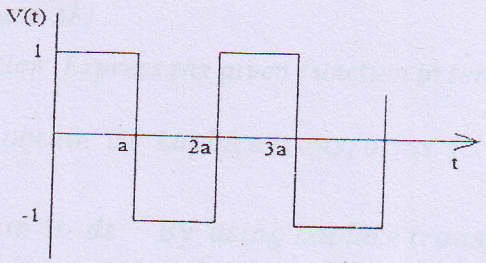
(B) In the network shown in fig., V1 = 3V, R1 =10 Ω, R2= 5 Ω, L=1/2H. The network attains a steady state at t=0. The switch is then closed. Find particular solution of Va(t). (5)



Q.6 (A) In the series R-L-C circuit of figure, R=5 Ω, L=1 H, C=0.25 F & V(t)= $6e^{-2t}$ V. Switch K is closed at time t=0. Obtain particular solution for current using Laplace transform method. (5)



(B) Find the transform of the voltage waveform shown in below figure. (5)



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