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B.Tech. (Sem. - 3rd)

NETWORK ANALYSIS & SYNTHESIS

SUBJECT CODE : EE - 201

Paper ID : [A0305]

[Note : Please fill subject code and paper ID on OMR]

Time : 03 Hours **Maximum Marks : 60**

Instruction to Candidates:

1) Section - A is **Compulsory**.
2) Attempt any **Four** questions from Section - B.
3) Attempt any **Two** questions from Section - C.

Section - A

Q1) *(10 x 2 = 20)*

a) Differentiate between loop analysis and nodal analysis.

b) Define reciprocity theorem.

c) State convolution theorem.

d) List the fundamental difference between an RC and an LC impedance function.

e) What are the properties of a positive real function?

f) List four important properties of a driving point impedance function of an RC network.

g) What are the properties of a transfer function?

h) Obtain the magnitude and phase response of the function F(jw) = (jw)2.

i) Give merits of active filters over passive filters.

j) List advantages of m-derived filters.

Section - B

(4 x 5 = 20)

Q2) State and explain superposition theorem.

Q3) Describe the principle of operation of an active second order high pass filter.

Q4) Draw the pole zero diagram for the given network function and hence plot v(t)

$$V(S)=\frac{4(s+2)s}{(s+1)(s+3)}.$$

Q5) Realize the function $F(S)=\frac{(s^2+1)}{s(s^2+2)}$ in Foster form I.

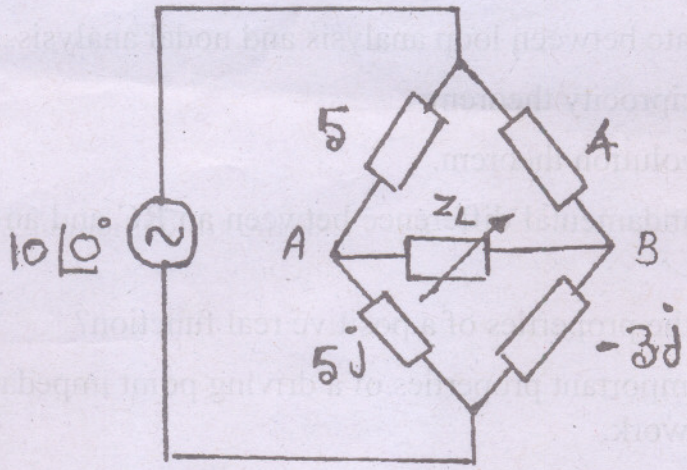
Q6) Design a composite low-pass filter with a cutoff frequency of 10 kHz for a load resistance of 500 ohm. It should have high attenuation at 10.65 kHz.

Section - C

(2 x 10 = 20)

Q7) (a) State Norton's theorem and give steps to develop Norton's equivalent circuit from Thevenin's theorem.

(b) Find the maximum power across the resistance Z_L shown in figure below. What is the corresponding value of Z_L?



Q8) Find the R-L network corresponding to the driving point impedance using Cauer form I and Cauer form II.

$$Z(S)=\frac{(s+4)(s+8)}{(s+2)(s+6)}.$$

Q9) Write short notes on the following :

(a) Time domain behavior from poles and zeros.

(b) Design of constant K filter.