SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

ROLL No: | | | | | | | | | | | | | | Total number of pages:{2 }
Total number of questions:06

B.Tech. || EE || 3rd Sem

Circuit Theory

(RP)

Subject Code: BTEE-301A/301

Paper ID: M118

(2011 batch onwards)

Time allowed: 3 Hrs Max Marks: 60

Important Instructions:

- All questions are compulsory
- Assume any missing data

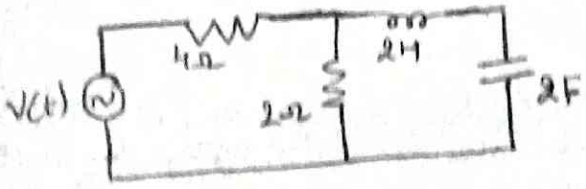
PART A (2×10)

Q. 1. Short-Answer Questions: All Cos

(a) State Norton's theorem.

(b) What is composite filter?

(c) Convert the given circuit in s domain (fig 1a)



(d) Find the poles and zeros of given transfer function. $P(s) = \frac{5(s+1)(s+2)}{s(s+3)}$

(e) Find Laplace inverse of the function $F(s) = \frac{1}{s(s+2)}$

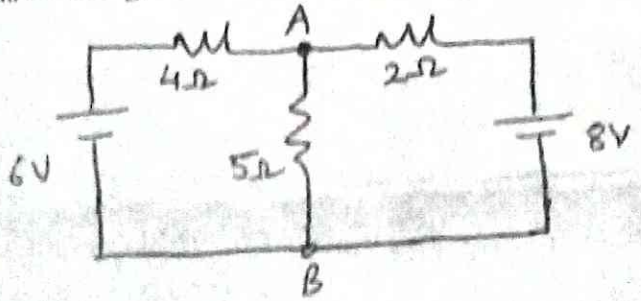
(f) What is characteristic equation?

(g) Drive the formula for critical frequency of low pass filter.

(h) What is steady state response?

(i) State Convolution theorem.

(j) Find Z_{th} of the given network across pts A and B(fig 1b)



PART B (8×5)

Q. 2. a) What is the relationship between Impulse response and Transfer function? CO1&CO2
Derive the relation.

b) State superposition theorem and find the current in each branch using the same. (fig 2)

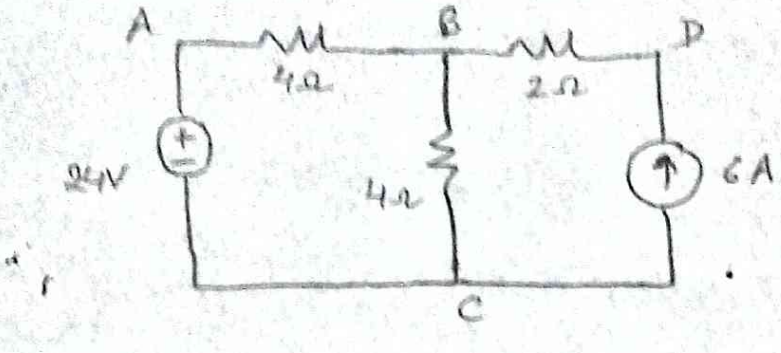


fig 2.

OR

a) State and prove Maximum power transfer theorem. CO1&CO2

b) Discuss natural response of RL series circuit.

Q. 3. a) Design a low pass T and ∏ filter with cut off frequency of 1000Hz and a purely resistive image impedance of 500 ohm. CO4

b) Obtain driving point impedance function and transfer function for the given network.(fig3)

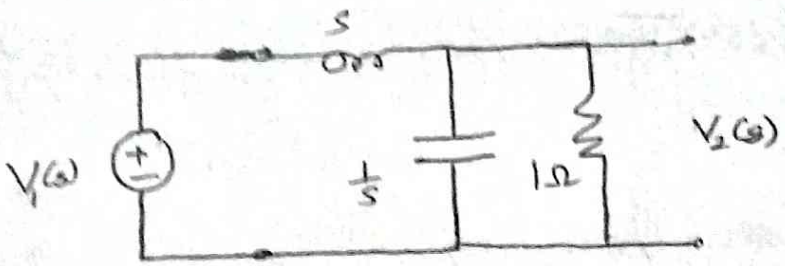


fig 3.

OR

Design a composite low pass filter (T network) to have a cut off frequency of 1000Hz and characteristic impedance of 600ohm. The frequency of infinite attenuation is 1050Hz. CO4

Q. 4. What is filter? Discuss its types in detail with diagram. CO4

OR

Derive the characteristic impedance of ∏ network and prove that CO4

$Z_\pi^2 = Z_{OC}Z_{SC}$

Q. 5. a) Discuss representation of electrical components in s domain. CO2

b) Determine the value of K for which the system is stable.

$s^4 + s^3 + ks^2 + s + 1 = 0$

OR

Draw pole zero diagram for the given function and find f(t) CO2

$$F(s) = \frac{s(s+1)}{(s+4)(s^2+4s+8)}$$

Q. 6. Synthesize the given impedance function in Foster I and II form CO3

$$Z(s) = \frac{(s+1)(s+3)}{s(s+2)}$$

OR

Synthesize the given impedance function in Cauer I and II form CO3

$$Z(s) = \frac{(s+2)(s+5)}{(s+1)(s+3)}$$