Code No: R13212 **R13** **SET-1**

I B. Tech II Semester Supplementary Examinations, April/May - 2019
ELECTRICAL CIRCUITS ANALYSIS-I
(Electrical and Electronics Engineering)

Time: 3 hours Max. Marks: 70

Note: 1. Question Paper consists of two parts (**Part-A** and **Part-B**)
2. Answering the question in **Part-A** is Compulsory
3. Answer any **THREE** Questions from **Part-B**

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PART –A

1. a) Find the current *i (t)* in the circuit shown in figure 1(a). (4M)

Figure 1(a)

b) Define form factor. What is the value of form factor for a pure sinusoidal waveform? (3M)

c) A Series RLC Circuit has a resonant frequency of 12kHz. If R=5Ω and X_L at resonance is 300Ω, then what is the bandwidth of the Circuit. (4M)

d) What is a dot rule? How dot convention is followed in mutually coupled coils? (4M)

e) What is duality? Write equivalent dual quantities for R, L, C elements. (4M)

f) State maximum power transfer theorem. (3M)

PART –B

2. a) State and explain Kirchoff's current law and voltage law with examples. (7M)

b) Using source transformation, calculate power dissipated in 10Ω resistor in the circuit shown in figure 2(b). (9M)

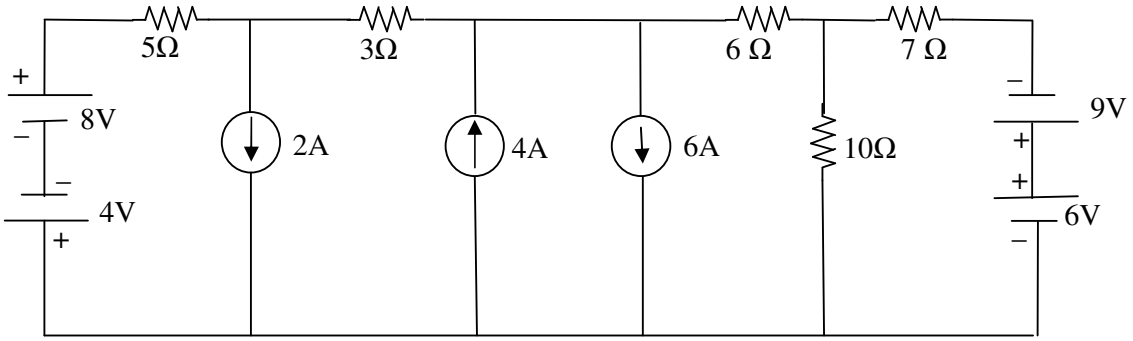

Figure 2(b)
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3. a) Calculate the form factor for the saw-tooth wave form shown in figure 3(a). (8M)

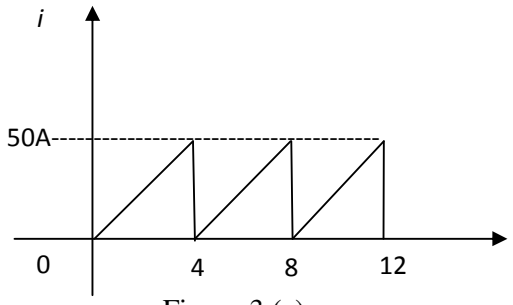

Figure 3 (a)

b) A 230V, 50Hz voltage is applied to a coil of L=5mH and R=2Ω in series with a capacitance C. What value must C have so that the p.d across the coil shall be 250V? (8M)

4. a) An impedance Z_1=10+j10Ω is connected in parallel with another impedance of resistance 8.5Ω and a variable capacitance connected in series. Find C such that the circuit is in resonance at 5Hz. (8M)

b) Derive an expression for resonant frequency for series RLC Circuit. Also derive an expression for quality factor. (8M)

5. a) State and explain Faraday's law of electromagnetic induction. Also explain statically and dynamically induced emfs. (8M)

b) The number of turns in a coil is 250. When a current of 2A flows in this coil, the flux in the coil is 0.3mWb. When this current is reduced to zero in 2 milli-seconds, the voltage in a coil lying in the vicinity of the coil is 63.75V. If the Co-efficient of coupling between the coils is 0.75, find the self inductances of two coils, mutual inductance and number of turns in the second coil. (8M)

6. a) Draw the graph of the network, find tie-set schedule and determine loop currents. (8M)

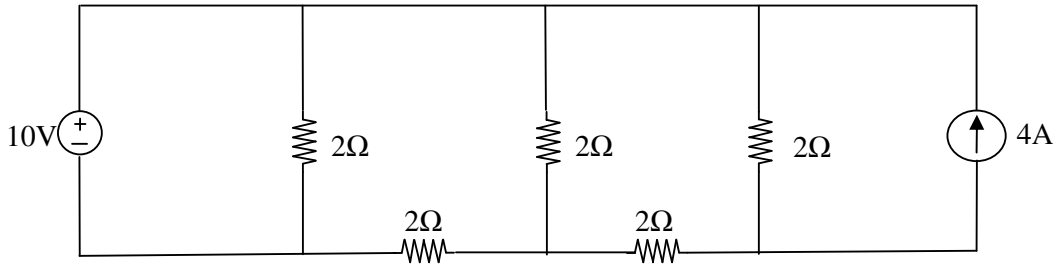

Figure 6(a)

b) Define: (i) Graph (ii) Sub-graph (iii) Connected graph (iv) Oriented graph (v) Planar graph (vi) Path (vii) Tree. (8M)

7. a) State and explain the compensation theorem. (8M)

   b) Determine the maximum power delivered to the load in the circuit shown in figure 7(b). (8M)

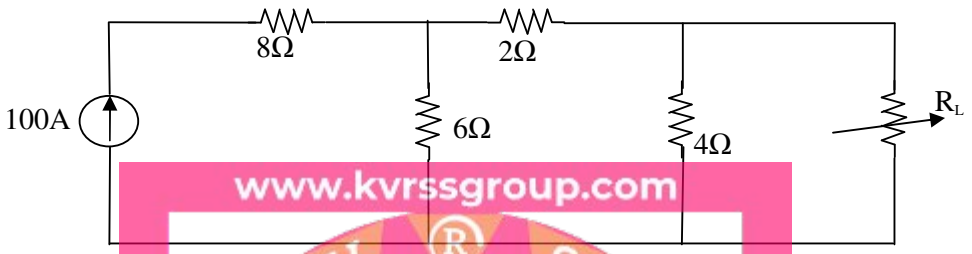

Figure 7 (b)