

# JK LAKSHMIPAT UNIVERSITY, JAIPUR

## INSTITUTE OF ENGINEERING AND TECHNOLOGY

End Term Examination (Regular), Nov.-Dec. 2015

B. Tech in .....EE & ECE & CS..... Engineering, Semester I

Roll No.....

COURSE CODE: EE101

Time: 3 hours

Max. Marks: 100

COURSE TITLE: Electrical & Electronics

### Instructions to students:

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever required and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics/ flow chart wherever, required are an integral part of the answer.

Q.1A Objective type multiple choice questions (10 questions @ 1 mark)

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- i. A network has 12 branches and 8 independent loops. How many nodes are there in the network?  
(a) 19                      (b) 17                      (c) 5                      (d) 4
- ii. The power factor of an R-C circuit is  
(a) Often zero  
(b) Between zero and 1  
(c) Always unity  
(d) Between zero and -1
- iii. The current through a branch in a linear network is 2 A when input source voltage is 10 V. If the voltage is reduced to 1V and the polarity is reversed, the current through the branch is:  
(a) -2 A                      (b) -0.2 A                      (c) 0.2 A                      (d) 2 A
- iv. A load is connected to a network. At the terminals to which the load is connected,  $R_{th}=10\ \Omega$  and  $V_{th}=40\text{ V}$ . the maximum power supplied to the load is  
(a) 160 W                      (b) 80 W                      (c) 40 W                      (d) 1 W
- v. When the total charge in a capacitor is doubled, the energy stored:  
(a) remains same  
(b) is halved  
(c) is doubled  
(d) is quadrupled
- vi. If  $v_1 = 30\sin(\omega t + 10^\circ)\text{ V}$  and  $v_2 = 20\sin(\omega t + 50^\circ)\text{ V}$ , which of these statement is true?  
(a)  $v_1$  and  $v_2$  are in phase  
(b)  $v_1$  leads  $v_2$   
(c)  $v_2$  lags  $v_1$   
(d)  $v_2$  leads  $v_1$   
(e)
- vii. The imaginary part of impedance is called  
(a) Admittance  
(b) Susceptance

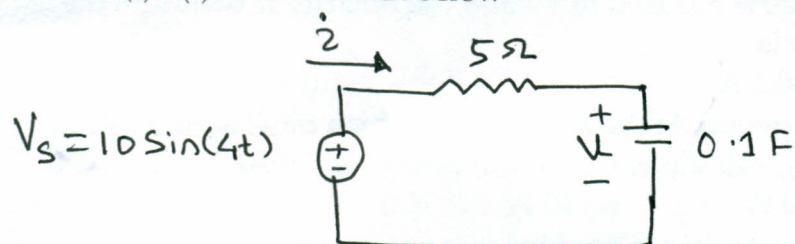
- (c) Conductance
- (d) Reactance

- viii. A quantity that contains all the power information in a given load is
- (a) apparent power
  - (b) average power
  - (c) reactive power
  - (d) complex power
- ix. Two parameters that are equal when a parallel resonant circuit is operating at its resonant frequency are:
- (a) L and C
  - (b) R and C
  - (c) R and L
  - (d)  $X_c$  and  $X_L$
- x. Reactive power is measured in
- (a) Watts
  - (b) VA
  - (c) VAR
  - (d) none of the above

Q.2 Short answer type questions (4 questions @ 2.5 marks)

10

- i. What is power factor?
- ii. Transform these sinusoids to phasors
  - (i)  $v(t) = 4\sin(30t + 20^\circ)$
  - (ii)  $i(t) = 6\cos(50t - 40^\circ)$
- iii. Find  $v(t)$ ,  $i(t)$  in the circuit below

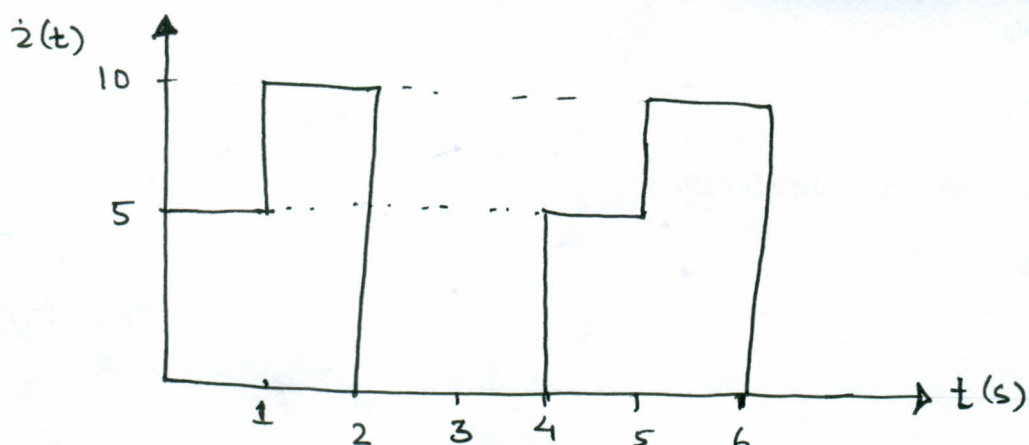


- iv. Define quality factor.

Q.3A Find

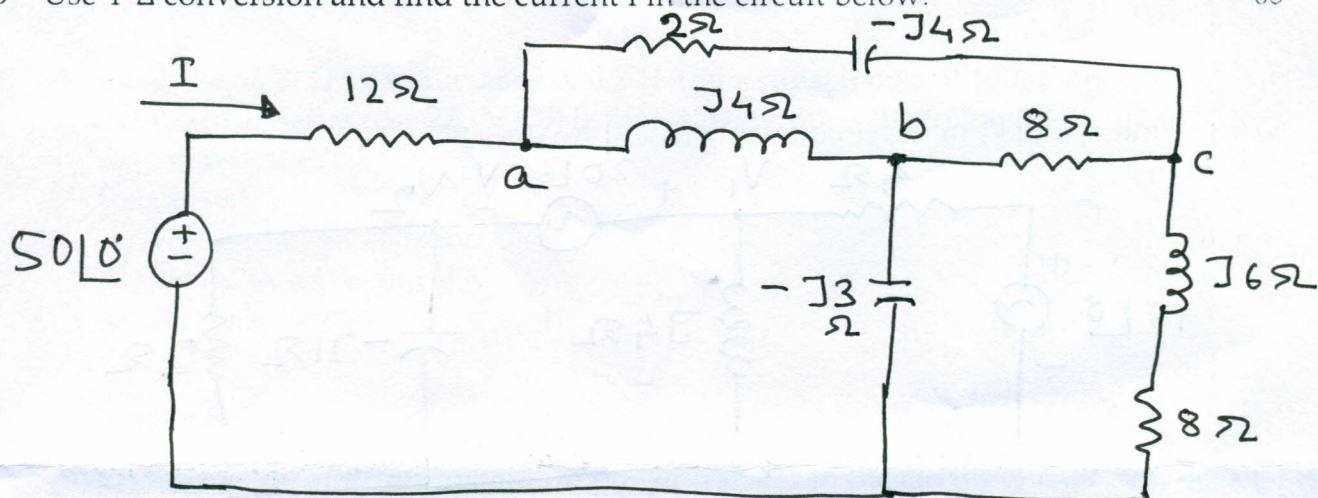
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- (i) Period of  $i(t)$
- (ii) Average value of  $i(t)$
- (iii) r.m.s value of  $i(t)$



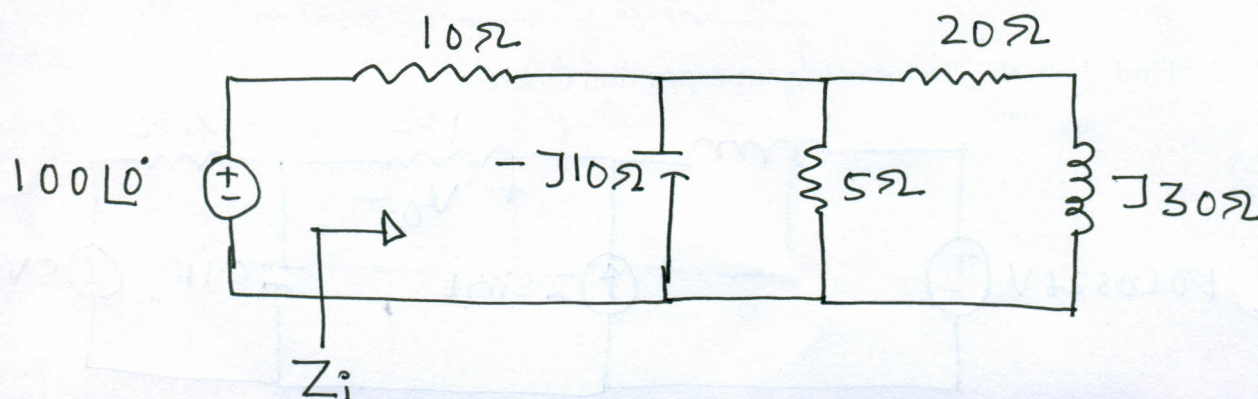
Q.3B Use Y-Δ conversion and find the current I in the circuit below.

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Q.4A Find the input Impedance  $Z_i$  and input current  $I_i$ .

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Q.4B Describe the charging and discharging process of a capacitor with detail diagram

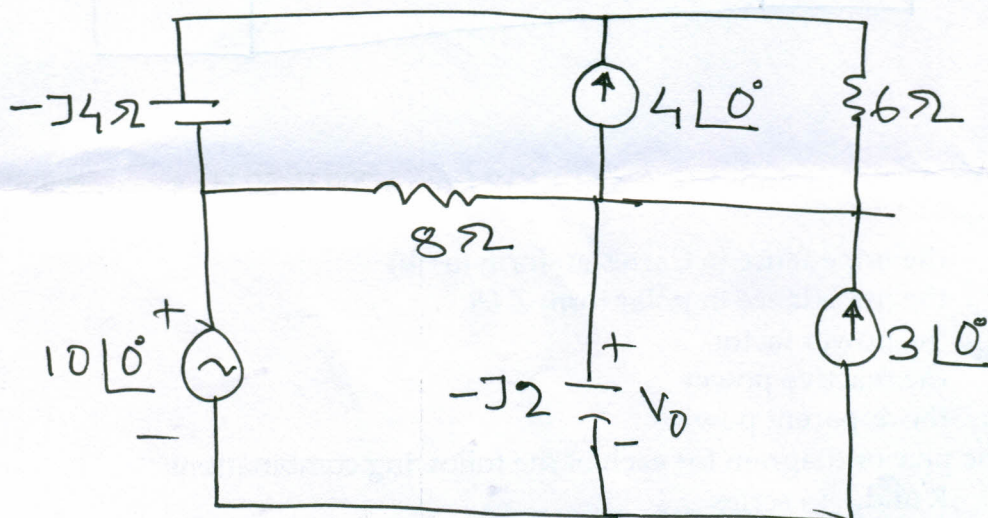
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Q.5A What is magnetic circuit and composite magnetic circuit? Give a comparison between magnetic circuit and electrical circuit.

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Q.5B Solve for  $V_o$  in the circuit using mesh analysis.

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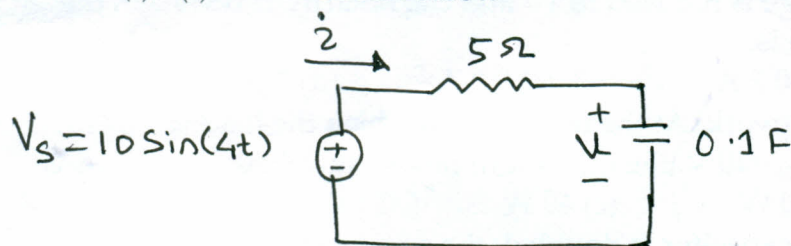
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