D 90031 (Pages : 3) Name.....

Reg. No.....

THIRD SEMESTER B.TECH. (ENGINEERING) DEGREE [14 SCHEME] EXAMINATION, NOVEMBER 2015

EE 14 303—ELECTRIC CIRCUIT THEORY

Time : Three Hours Maximum : 100 Marks

Part A

Answer any **eight** *questions.*

I. 1 Differentiate the following :—

(a) Active and passive elements.

(b) Dependent and independent elements.

2 Explain about series and parallel resonance circuits.

3 Explain the dot convention. Explain how the polarity of voltage is marked in dot convention.

4 With the neat diagram, explain three-phase four wire delta connected system and write down the voltage, power and current equations.

5 Explain the power measurement using two wattmeter methods.

6 Define initial value theorem and final value theorem. Write the equation. Also explain zero sequence positive and negative sequence components.

7 Explain zeros and poles and also describe the pole – zero plot with an example.

8 The *z* parameters of a two port circuit are $Z_{11} = 1\ k\Omega$ and $Z_{12} = Z_{21} = Z_{22} = 500\ \Omega$. Find the port elements I_1 and I_2 when a 12 V voltage source is connected at the input port and a 250 Ω resistor is connected at the output port.

9 The *y*-parameter of a two port circuit are $Y_{11} = 5 + j\ 20$ ms, $Y_{12} = y_{21} = -j\ 20$ ms and $Y_{22} = 0$. Find the input admittance $Y_{in} = I_1 / V_1$ when a 50 Ω resistor is connected at the output port.

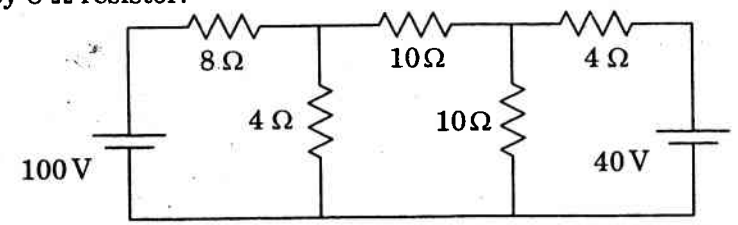
10 What is meant by a dependent source ? How many types of dependent sources are there ?

(8 × 5 = 40 marks)

Turn over

Part B

II. (a) Write the mesh equation for the network shown in figure by inspection and find the power absorbed by 8 Ω resistor.



Or

(b) A series circuit has R = 10 Ω, L = 50 mh and C = 100 μf and is supplied with 200 V, 50 Hz. Find :

(i) The impedance.

(ii) The current.

(iii) The power.

(iv) The power factor.

(v) The voltage drops across each element.

III. (a) How will you determine the polarity of induced e.m.f. in coupled circuits by dot convention and explain it ?

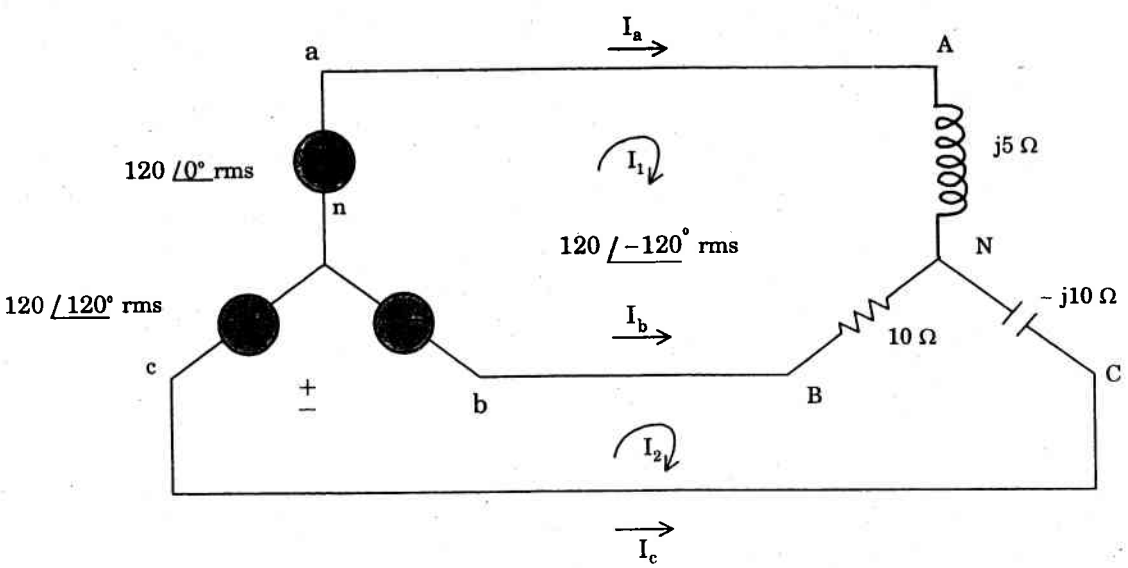
Or

(b) For the unbalanced circuit in the figure find :

(i) The line currents.

(ii) The total complex power absorbed by the load.

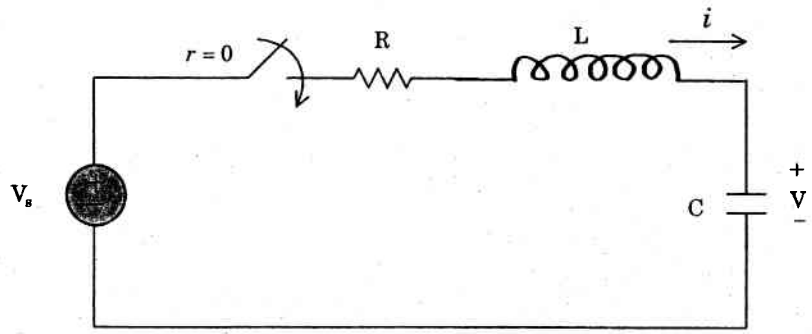
(iii) The total complex power supplied by the source.



IV. (a) For an RLC series circuit, with a step input, determine the current response $i(t)$ for over damped, critical damped and under damped cases.

Or

(b) The RLC series circuit of the figure below has R = 20Ω, L = 0.05 H and C = 20 μF with 100 V constant source. Find the transient current and assume the switch S is closed at $t = 0$.

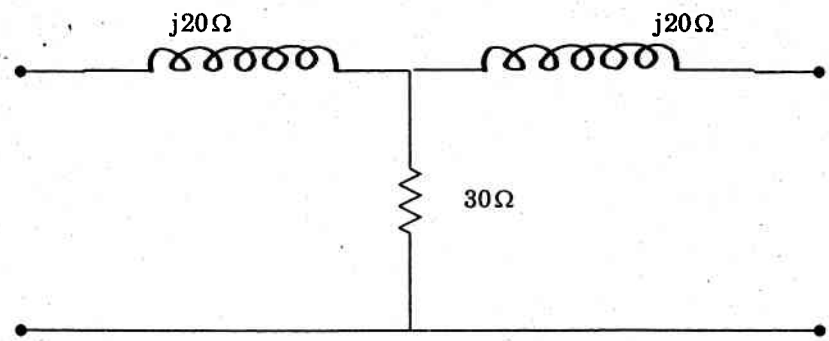


V. (a) Draw the pole-zero plots for the given network function and hence obtain $v(t)$.

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

Or

(b) For the network shown in the figure determine Z and Y parameters.



(4 × 15 = 60 marks)