Total No. of Questions—**8**] [Total No. of Printed Pages—**4+1**

| Seat No. | |
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# [4957]-1038

**S.E. (Electrical Engineering) (Second Semester)**

**EXAMINATION, 2016**

**NETWORK ANALYSIS**

**(2012 PATTERN)**

**Time : Two Hours** **Maximum Marks : 50**

***N.B.*** **:—** (*i*) Answer Q. No. **1** *or* Q. No. **2,** Q. No. **3** *or* Q. No. **4,** Q. No. **5** *or* Q. No. **6,** Q. No. **7** *or* Q. No. **8**.

(*ii*) Neat diagrams must be drawn wherever necessary.

(*iii*) Figures to the right indicate full marks.

(*iv*) Use of calculator is allowed.

(*v*) Assume suitable data, if necessary.

## SECTION I

**1.** (*a*) Find the current through 6 ohm resistance as shown in Fig. 1 by using nodal analysis method. [7]

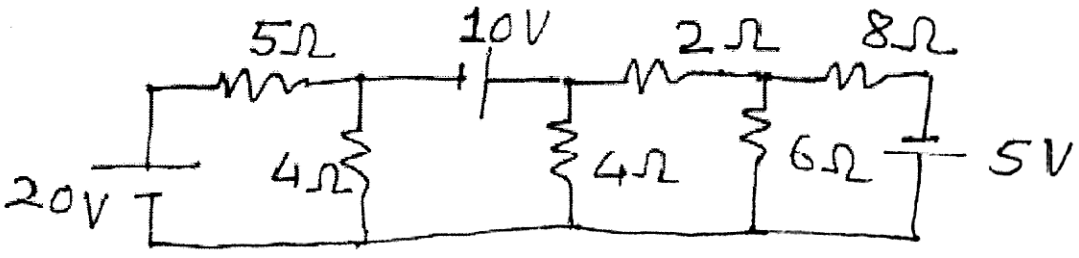


Fig. 1

P.T.O.

(*b*) Find total reactance as shown in Fig. 2. [6]

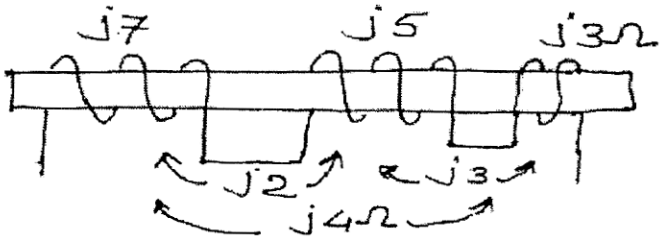


Fig. 2

*Or*

**2.** (*a*) Find current through 8 ohm resistance by using superposition theorem as shown in Fig. 3. [7]

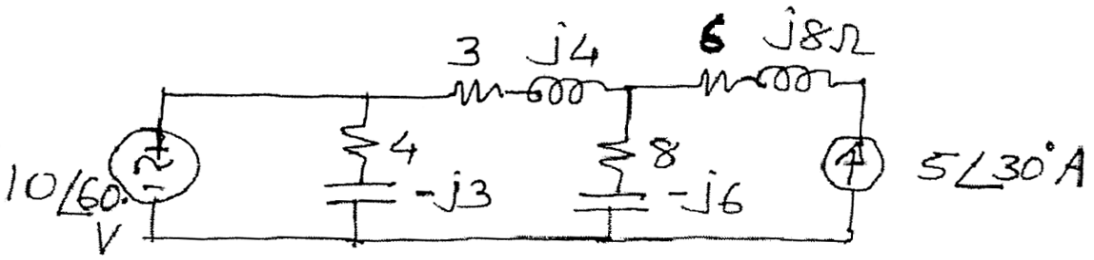


Fig. 3

(*b*) Write and explain maximum power transfer theorem. Also prove the condition of maximum power transfer for DC circuit. [6]

**3.** (*a*) Using classical theory, find voltage across inductor at time $t$ = 2 second, after switch is opened. [7]

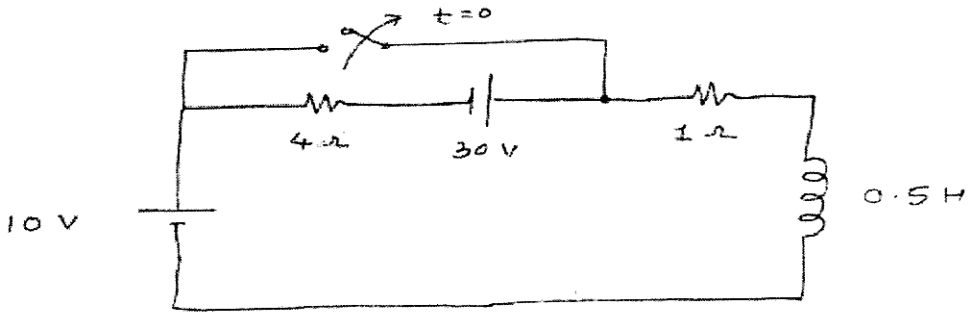


Fig. 4

(*b*) Explain what you understand by critical resistance. Derive the formula. What will be general solution if resistance of network is less than and greater than critical resistance. [6]

*Or*

**4.** (*a*) Find the Laplace transform of the wave shown in Fig. 5. [7]

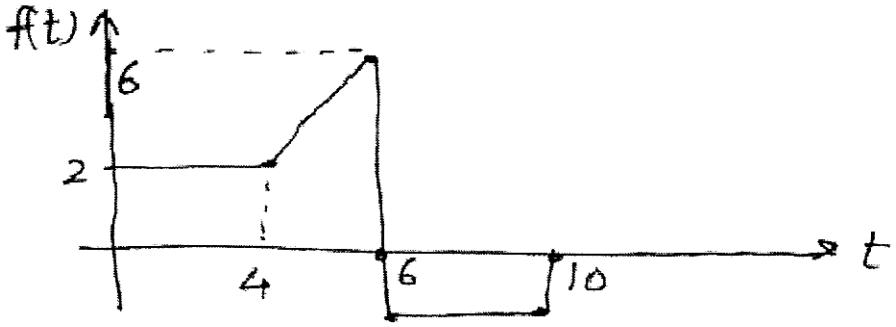


Fig. 5

(*b*) Find current by using Laplace transform technique as shown in Fig. 6. [6]

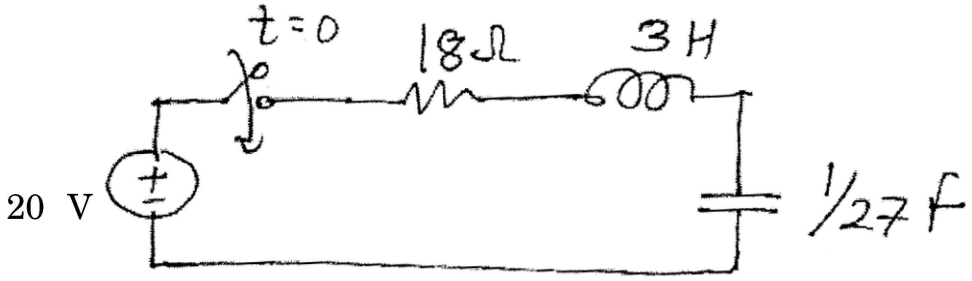


Fig. 6

**5.** (*a*) Design constant K HPF network for cut-off frequency 1 KHz, and design resistance 1000 ohm. [6]

(*b*) Obtain the ABCD parameters of the circuit shown in Fig. 7. [6]

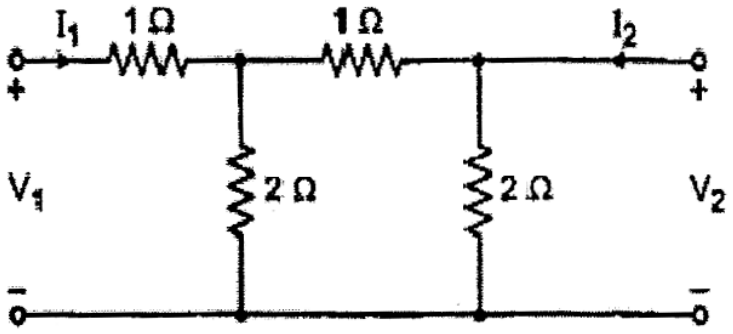


Fig. 7

*Or*

**6.** (*a*) In the circuit shown in Fig. 8, find Impedance parameters. [6]

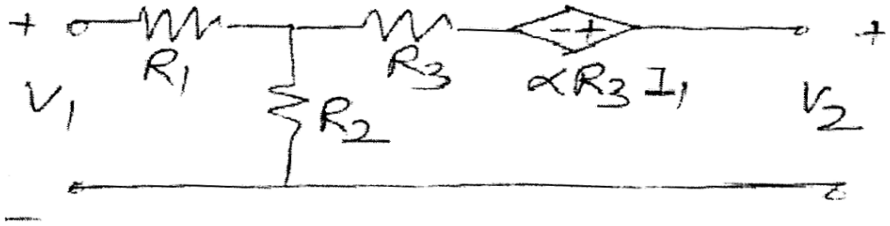


Fig. 8

(*b*) Develop the relationship between Y-parameter and Hybrid parameters. [6]

**7.** (*a*) For the network shown in Fig. 9, find driving point impedance at port 1. [6]

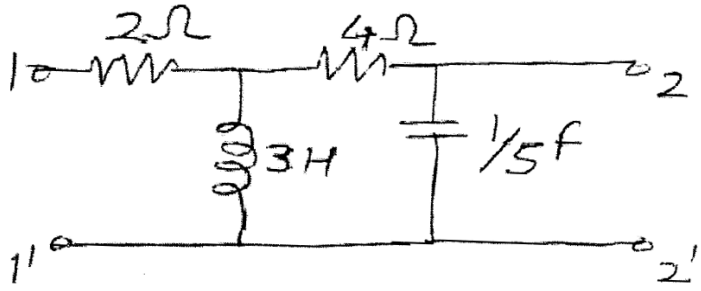


Fig. 9

(*b*) A parallel resonance circuit has a coil of 150 micro henery, Quality factor = 600, resonance frequency = 1 MHz. Find :

(*i*) Value of capacitance

(*ii*) Internal resistance of inductor

(*iii*) Impedance offered by circuit at resonance. [6]

*Or*

**8.** (*a*) Derive the impedance offered during parallel resonance condition. [6]

(*b*) For the network of Fig. 10, find transfer admittance $Y21(s) = I_2(s)/V_1(s)$. [6]

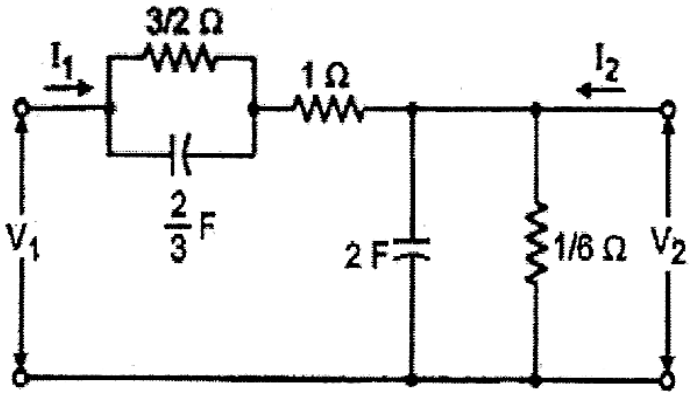


Fig. 10.