|                      |   | Reg. No. |      |      |       |     |        |       |      |  |
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| SpIRED BY LIT        | <b>III SEMESTER B.S. DE</b>               | GREE EX  | AMIN | ATIO | N – I | NOV | . / DI | EC. 2 | 2017 |  |

## SUBJECT: SPECIAL NETWORK APPLICATIONS (ELE 233)

(BRANCH: E & E, E & C)

Saturday, 4 November 2017

**Time: 3 Hours** 

Max. Marks: 100

- ✓ Answer ANY FIVE full Questions.
- ✓ Missing data, if any, may be suitably assumed
- **1A.** Find the current through the 6  $\Omega$  resistor on Fig 1A using mesh analysis.





(10)

**1B.** Find the network functions  $\frac{V_1}{I_1}$ ,  $\frac{V_2}{V_1}$  for the network in Fig 1B.





**2B.** In the coupled circuit shown in Fig 2B find  $V_2$  for which  $I_1=0$ , what voltage appears at the  $8\Omega$  inductive reactance under this condition?





- **3A** Two coils with  $L_1=6.8$  mH and  $L_2=4.5$  mH are connected in series cumulative mode and differential mode. The equivalent inductance in cumulative mode is 19.6 mH and in differential mode is 3 mH. Find the value of mutual inductance and coefficient of coupling. **(06)**
- **3B.** Find the Norton's equivalent network at terminals A-B of Fig 3B.





**4A** Currents  $I_1 \& I_2$  entering port1 & port 2 respectively are given by  $I_1=0.5 V_1 - 0.2 V_2$ 

 $I_2 = -0.2 V_1 + V_2$ 

Find Y, Z and ABCD parameters.

**4B** Two identical sections of the network shown in Fig 4B are connected in cascade. Obtain the transmission parameters of the overall connection.



**5A.** Three impedances  $10 \angle 0^{\circ}$ ,  $10 \angle -30^{\circ} \& 10 \angle 30^{\circ}$  are connected in  $\triangle$  to a 400 V three phase supply. Find the line currents and prove that the power loss in the resistors is indicated by the two wattmeters. (10)

(15)

(10)

(10)

(14)

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**5B.** Find the Y parameters of the network shown in Fig 5B.





**6A.** Determine the equivalent inductance of the network shown in Fig 6A.





- **6B.** A voltage V(t)= 10 sin  $\omega t$  is applied to a series RLC circuit. At resonant frequency the voltage across capacitor is 500 V. The bandwidth of the circuit is 400 rads/sec. At resonance impedance of the circuit is 100  $\Omega$ . Determine inductance, capacitance, resonant frequency, lower and upper cutoff frequencies. **(08)**
- **7A.** Find the value of C in the circuit for resonance (Fig 7A).



(06)

(12)

(10)

**7B.** Find the Thevenin equivalent circuit at terminals AB of the coupled circuit shown in Fig 7B.



- **8A.** Resistors  $10 \Omega$ ,  $20 \Omega$ ,  $25 \Omega$  are connected in star and supplied from a 400 V, 3 phase supply. The load neutral is isolated. Find the line currents and the readings of the two wattmeters used to measure three phase power input. Also find the copper loss in the resistors. **(14)**
- **8B.** A coil of  $R=10 \Omega$  and L= 0.5 H is in parallel with a capacitor of 50  $\mu$ F. Find the resonant frequency, Q factor and band width. (06)

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