Reg. No.										

MANIPAL UNIVERSITY

THIRD SEMESTER B.S. (ENGG.) DEGREE EXAMINATION – DECEMBER 2015

SUBJECT: SPECIAL NETWORK APPLICATIONS (EE 233)
(BRANCH: E&C/E&E)

Friday, December 11, 2015

Time: 10:00 – 13:00 Hrs. Max. Marks: 100

✍ **Answer any TEN full questions.**

1. 400V, 3 phase supply feeds an unbalanced star connected with impedances of load $Z_A=100\angle 30°\Omega$ $Z_B=50\angle 45°\Omega$ $Z_C=100\angle 0\ \Omega$ Determine the line currents and the neutral current and total power consumed. Draw the phasor diagram. Assume E_{AN} as reference vector.

(10 marks)

2. Three phase three wire RYB sequence, 400V supply is connected to a star connected load with V_{YN} as reference. The neutral displacement voltage $V_{ON}=50\angle -25°$. The line currents in R and Y are $I_R=42.692\angle 87.39°$ A and $I_Y=37.356\angle -46.6345°$. Determine the load impedances in each phase.

(10 marks)

3. A 400V, 3 phase supply feeds an unbalanced three wire star connected load. The branch impedances of the load are $Z_R = (4+j8)\ \Omega$, $Z_Y = (3+j4)\ \Omega$ and $Z_B = (15+j20)\ \Omega$. Find the line currents using Mesh current analysis. Assume RYB phase sequence.

(10 marks)

4. Three impedances $Z_{AB} = 10+j10\ \Omega$, $Z_{BC} = (15+j15)\ \Omega$ and $Z_{CA} =20+J10\ \Omega$ are connected in delta across a 400V, 50 Hz, 3 phase, ABC supply. Determine the readings of the two wattmeters connected to measure the total power consumed if their current coils are in the lines A and C and pressure coil is between AB and CB lines.

(10 marks)

5. A coil of 15Ω resistance 50mH Inductance connected in parallel with a capacitor of 200μF, Find the frequency at which resonance occurs, under this condition find the value of dynamic resistance, Also find the total current and current in each branch when connected across 230V supply.

(10 marks)

6. Calculate the magnitude and the phase angle of the impedances of a series resonant circuit at 10KHz below the resonant frequency of 1.5MHz. The quality factor is 80. Capacitance is 300pF.

(10 marks)

7A. Two coupled coils with self inductances L1 and L2 and mutual inductance M have 500 and 1000 turns respectively. K between them is 0.8 .The portion of the flux that links both the coils when a current of 5A flows through coil1 is 0.9Wb. Find L1, L2 M.

7B. RLC series circuit has a resistance of 8Ω should be designed to have a bandwidth of 50Hz. Determine the values of L&C so that the system resonates at 200Hz.

(5+5 = 10 marks)

8. Derive an expression for total inductances of two series connected coupled coils when their mutual fluxes are aiding.

(10 marks)

9. Derive the expression for resonant frequency of practical parallel resonance circuit (series parallel condition).

(10 marks)

10. Find the voltage V2 such that current $i_1=0$ in the Fig Q10.

(10 marks)

11. Two two port networks are connected in cascade. Deduce the expression for the overall Y-parameter in terms of Y parameter of the individual networks.

(10 marks)

12. Find T parameter of the network shown in Fig Q12.

(10 marks)

13. For the two port network shown in the Fig Q13 find the impedance parameter Z_{11}.

(10 marks)

14. Define T parameters. Derive T Parameter in terms of h parameter.

(10 marks)

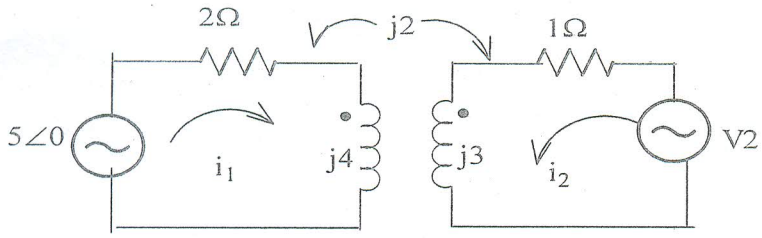

Fig Q10

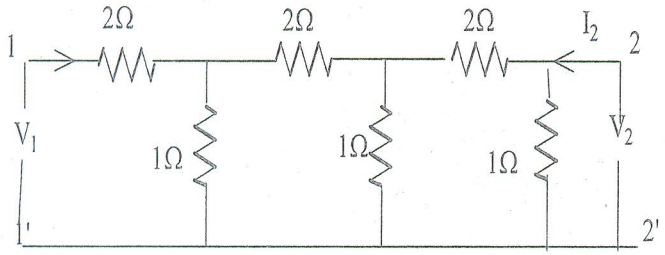

Fig Q12

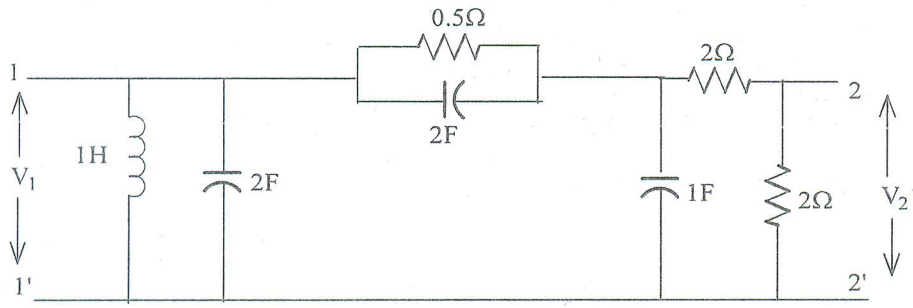

Fig Q13