Q. P. Code : 50072

(2½ Hours) (Total Marks : 60)

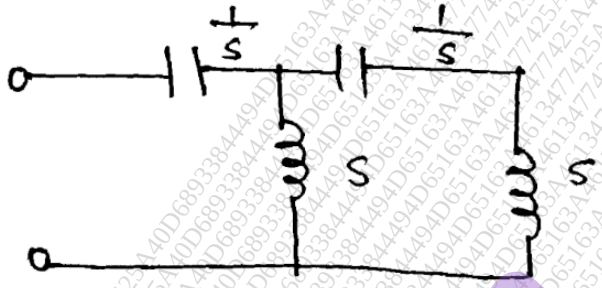
Please check whether you have the right question paper.

N.B.: 1) **Questions No.1** is **compulsory**.
2) Solve **any three** questions out of remaining **five** questions.
3) **Figures** to the **right** indicate **full marks**.

1. a) State and explain properties of positive real function. **(05)**

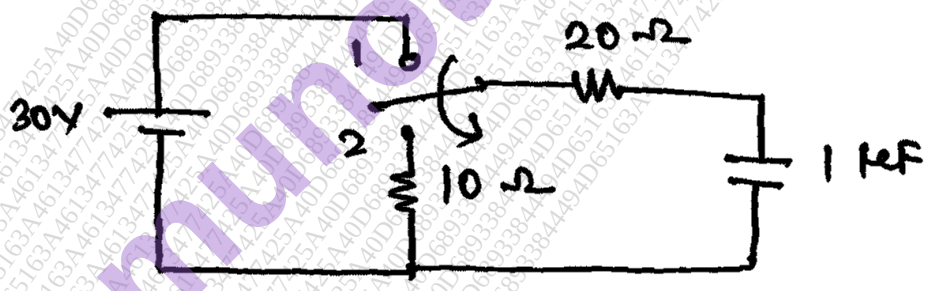
b) Compare series and parallel resonance circuit. **(05)**

c) Determine the driving point impedance of the network shown. **(05)**



d) Determine whether $p(s) = s^4 + s^3 + 2s^2 + 3s + 2$ is Hurwitz. **(05)**

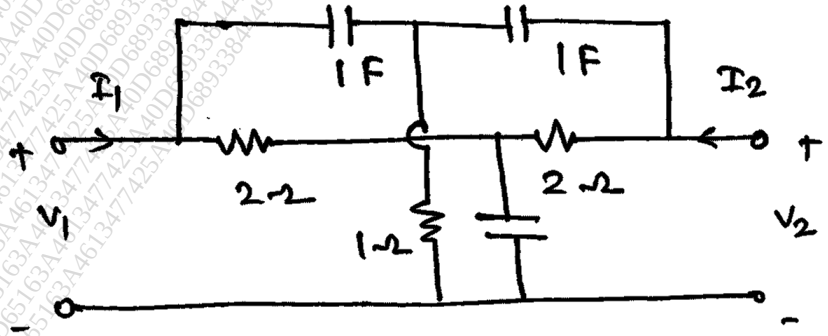
2. a) In the network shown the switch is changed from position 1 to 2 at $t = 0$. Find the values of i, $\frac{di}{dE}$ and i, $\frac{d^2i}{dt^2}$ at $t = 0^+$. **(10)**



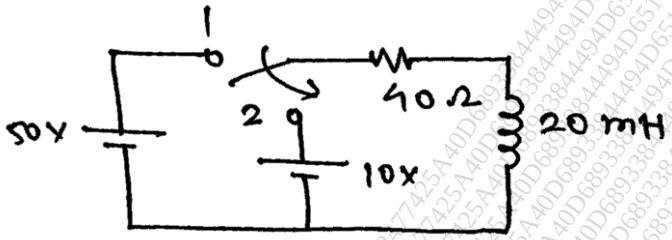
b) Find the Foster forms of the following impedance function : **(10)**

$$z(s) = \frac{(s+1)(s+4)}{(s+5)(s+3)}.$$

3. a) Find Y parameters for the network shown : **(10)**



b) The network given below is under steady state with switch at position 1. At $t = 0$ the switch is moved to positions 2. Find $i(t)$. **(10)**



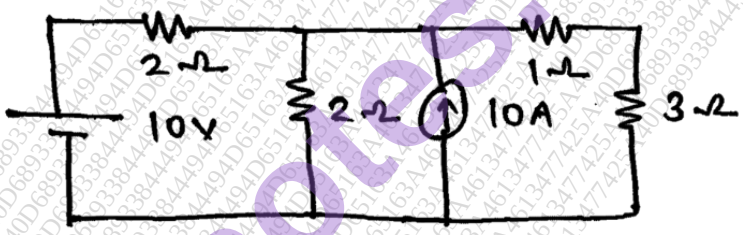
4. a) Test whether the following function is positive real : **(05)**

$$f(s) = \frac{s^2 + 6s + 5}{s^2 + 9s + 14}.$$

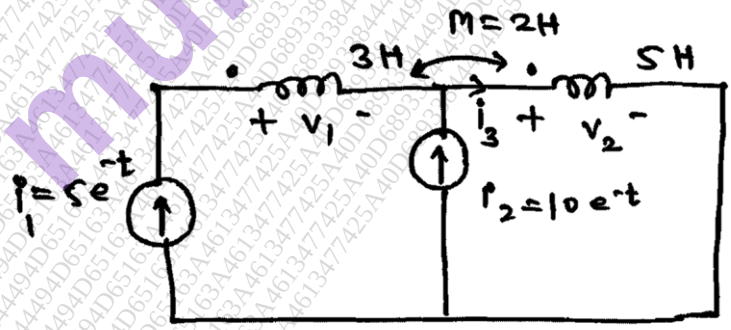
b) Derive the condition for reciprocity and symmetry for the network in terms of z parameters. **(10)**

c) Derive the relation for characteristic impedance of a transmission line. **(05)**

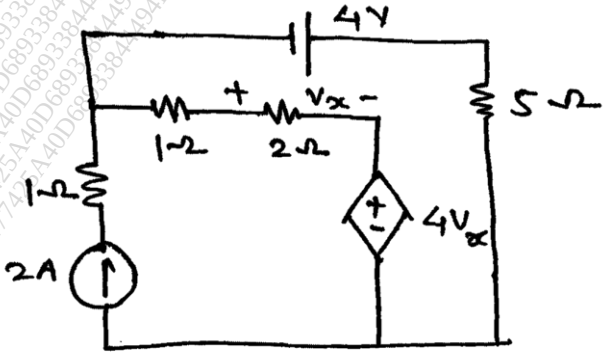
5. a) Find the current through 3 Ω resistor using Theremins theorem : **(05)**



b) In the network shown find the voltages v_1 & v_2 : **(05)**



c) Find the current through 5Ω resistor for the network given below : **(10)**



6. a) The characteristic impedance of a high frequency line is 100 Ω. It is terminated in an impedance of $100 + j100\Omega$. Using a smith chart find the impedance at $\frac{1}{8}^{th}$ wavelength away from the load end.

b) In the network shown the switch is closed at $t = 0$ connecting a source e^{-t} to the network at $t = 0$. $V_c(0) = 0.5$ V. Determine $V(t)$.