Q.P. Code : **4856**

(3 Hours) [Total Marks : 80

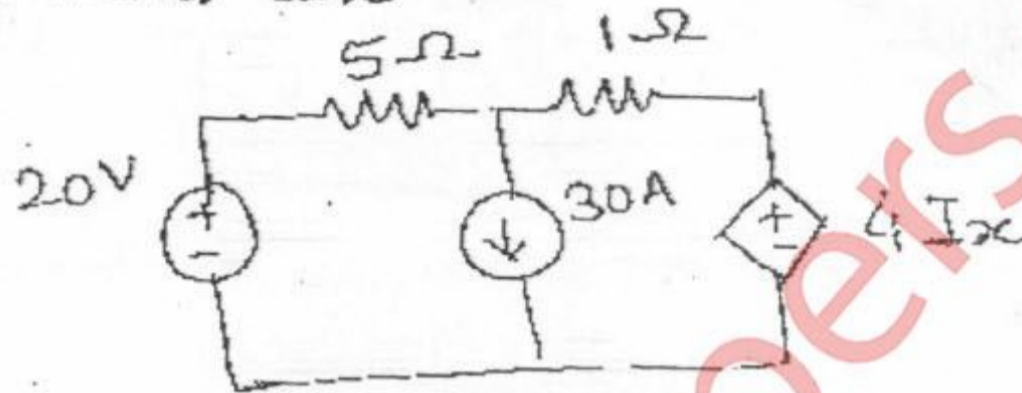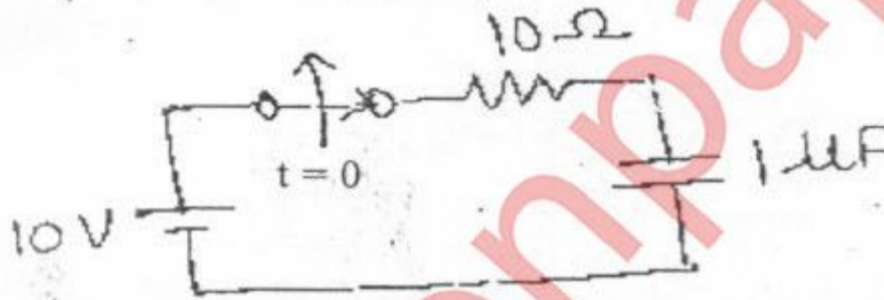**N.B:** (1) Question No. 1 is compulsory
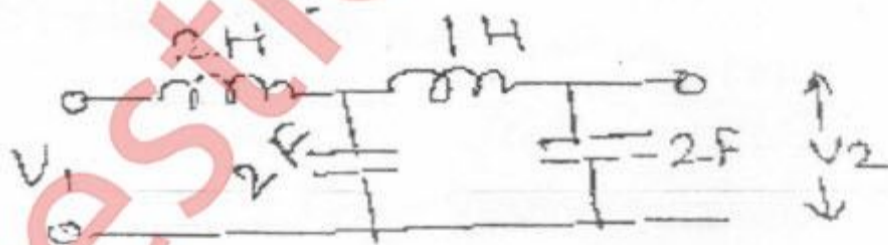(2) Attempt any three from the remaining.

1. (a) Find Ix 20



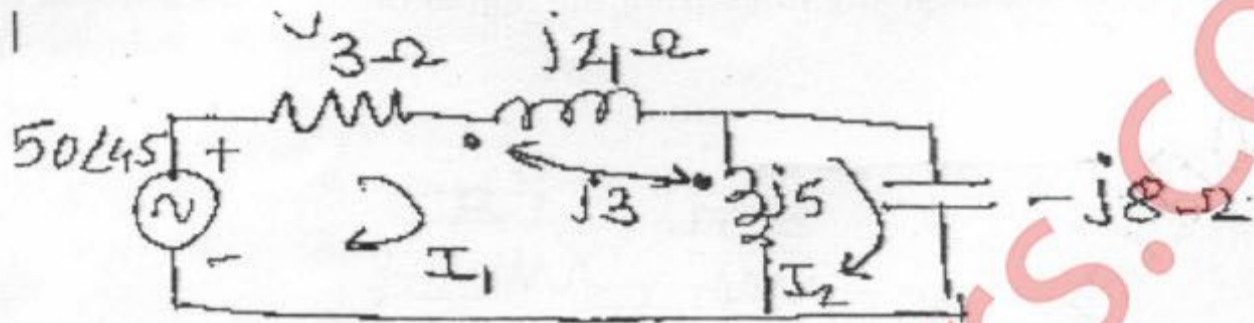(b) Find i(O⁻), i(O⁺) for the network shown below.



(c) Find $Z_{21}$ for the network



(d) Check the positive realness of the following functions.
(1) $F(s) = S^2 + 2s + 4$
(2) $F(s) = S^2 + 2S / (s^2 + 1)$

TURN OVER
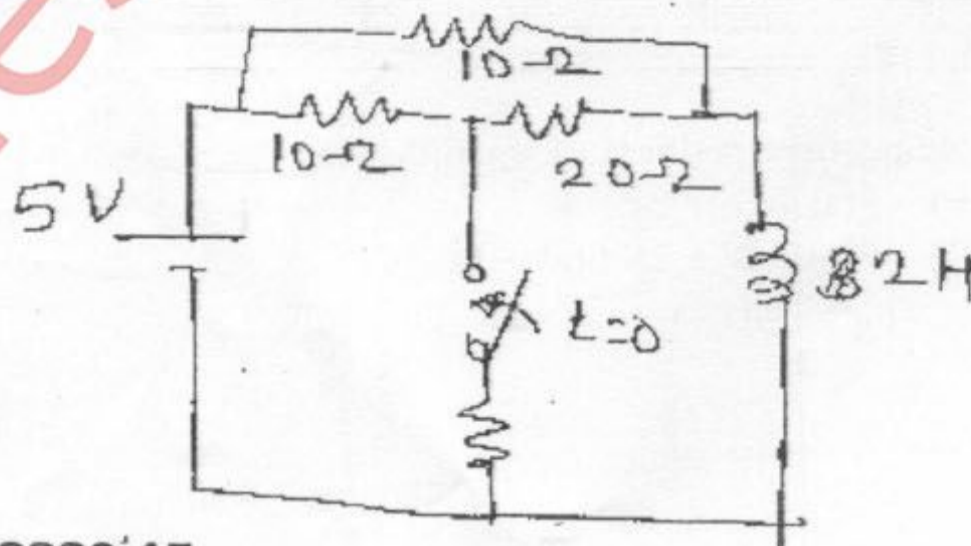
2. (a) Find current $I_2$ using mesh analysis. 10



(b) For the graph shown, write incidence matrix, tieset matrix and f-cutset 10
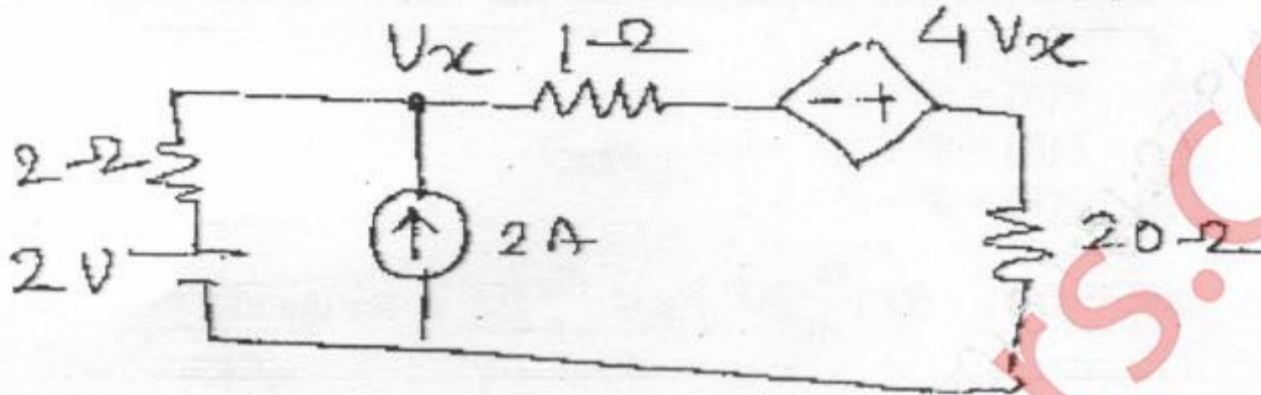matrix.



3. (a) In the n/w shown, stady-state is reached with s/w open. At $t = 0$, the s/w is 10
closed. For the element values given, det the vaoues of.

$V_a(O^-)$, $V_b(O^-)$ &
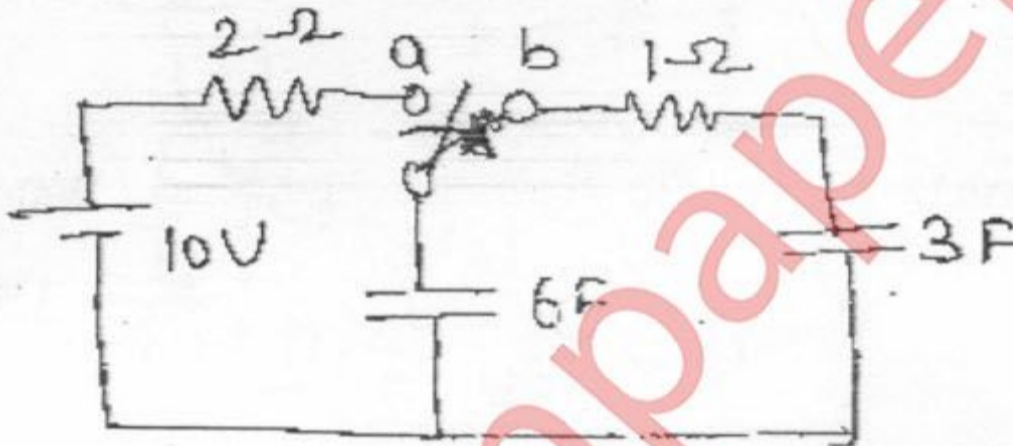$V_a(O^+)$, $V_b(O^+)$



**JP-Con. 12220-15.**

(b) Find current in 20Ω branch using thevenin's theorem.    10



4. (a)    10
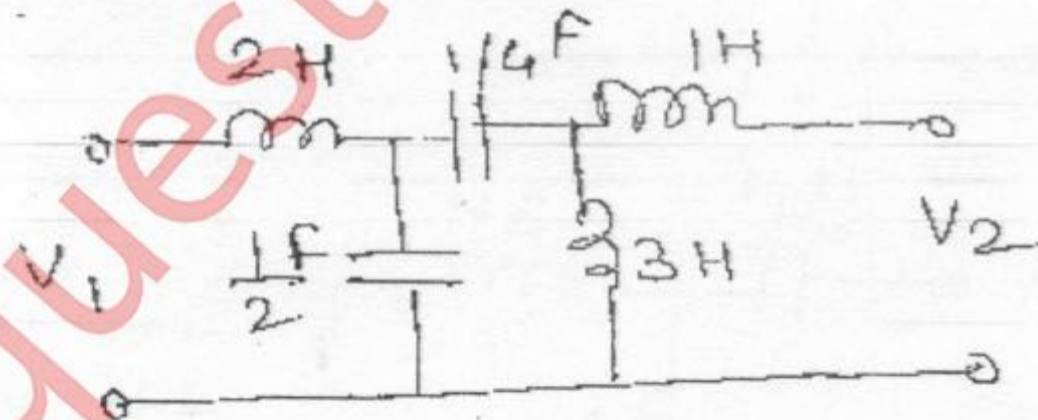


For the shown ckt; s/w is moved from a to b det.
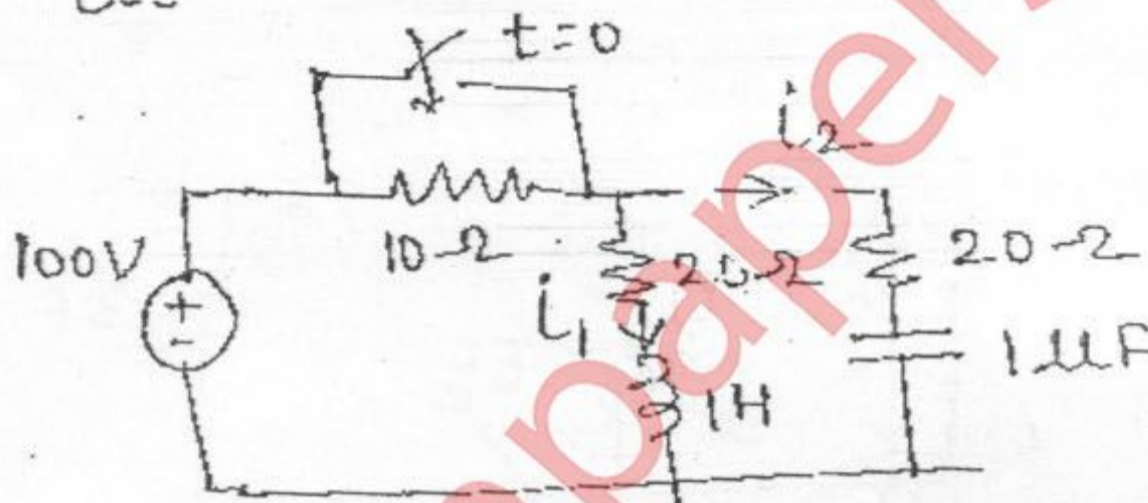i(t) and Vc(t)

(b) Obtain z parameters for the network shown.    10

5. (a) State and explain properties of Hurwitz polynomial. 5

(b) State whether the polynomials are Hurwitz. 5

    (i)    $P(S) = S^3 + 2S^2 + 4S + 2$

    (ii)   $P(S) = S^4 + 3S^3 + 4S^2 + 2S + 3$

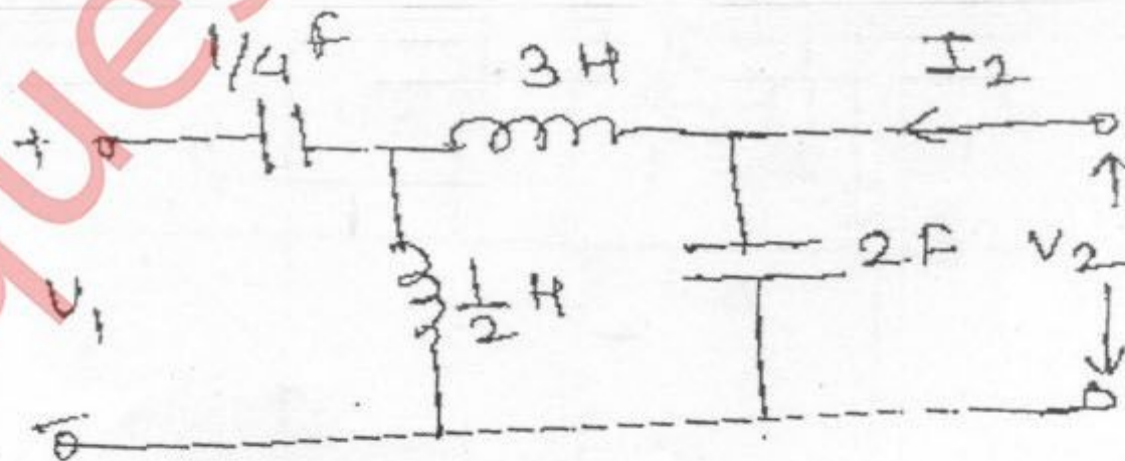    (iii)  $P(S) = S^5 + 2S^3 + 3$

(c) Det. $Vc(O^+)$, $i_1(O^+) \dfrac{di_1}{dt}(O^+)$ and $\dfrac{di_2}{dt}(O^+)$ for the ckt. 10



6. (a) Synthesize the following function in Foster I and Foster II. 10

$$z(s) = \frac{6S^4 + 42S^2 + 48}{S^5 + 18S^3 + 48S}$$

(b) Cal for the $\dfrac{V_2}{V_1} \cdot \dfrac{I_2}{i_1}, \dfrac{V_1}{I_1}, \dfrac{V_2}{I_1}$ for the 10

**Course:** S.E. (SEM. III) (CBSGS) (INSTRUMENTATION ENGG.)(prog- 740 TO 754)

**Q.P Code**: 4856

**Correction**:

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**In Q.1 (a)** find Ix : Ix is current through 5 ohms resistance flowing towards the node

**In Q. 3 (a)** resistance value is 10 ohms and Inductor value is 2 H ; point a and point b are on two sides of 20 ohms branch ( point a above the switch and point b above the inductor )

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**Query Update time: 0**5/06/2015 04:27 PM