Q.7 a) Find $f(0)$ and $f(\infty)$ using initial and final value theorem for the function given below:

$$F(s) = \frac{s^2 + 7s^3 + 5}{s(s^3 + 3s^3 + 4s^2 + 2)}$$

(8)

(b) Find the response of the system whose system function

$$H(s) = \frac{Y(s)}{X(s)} = \frac{1}{s+1}$$

(i) $X(t) = d(t)$ (i.e. Impulse Function)

(ii) $X(t) = e^{-2t}$

(b) Find $I_1$, $I_2$ and $V$ in the circuit shown in figure:-

(12)
Q.3 (a) At what value of $V_A$, Power delivered from Source to Load is max.  

\[
\text{Diagram:}
\]

(b) State Millman’s Theorem. Find the Current $I$ using Millman’s Theorem.  

\[
\text{Diagram:}
\]

Q.4 (a) Define TREE of a connected graph. State its properties. State at least 4 different trees of the following graph. (8)

\[
\text{Diagram:}
\]

(b) Define the following:-  

i) Node  
ii) Link,  
iii) Twig,  
iv) Co-Tree,  
v) Cutset,  
vi) Loop 

SECTION - B

Q.5 (a) In the network shown, $K$ is changed from position $a$ to $b$ at $t=0$. Solve for $I$, $\frac{di}{dt}$, $\frac{d^2i}{dt^2}$ at $t=0+$, if $R= 1000\Omega$, $L= 1H$, $C= 0.1\mu F$ and $V=100$ V. Assume that the Capacitor is initially uncharged  

\[
\text{Diagram:}
\]

(b) In the circuit given below, at time $t_0$ after the switch was closed, it was found that $v_2=+5v$. We are required to determine the values of $i_2(t_0)$ and $\frac{di_2}{dt}$  

\[
\text{Diagram:}
\]

Q.6 (a) Obtain the $y$-parameter of the circuit shown in the fig. below. Also draw its equivalent circuit using $y$-parameter and comment on reciprocity and symmetry of the circuit. (10)

\[
\text{Diagram:}
\]

(b) Obtain the $z$ and $y$ parameters of the network shown below:-  

\[
\text{Diagram:}
\]