

## AV213: Network Analysis

Total Marks 15. Approach towards solving a problem is as important as the final answer. Each step should be shown clearly. All the best

- 1) Prove the following theorems of Laplace Transforms: (4)

$$\lim_{s \rightarrow \infty} sF(s) = \lim_{t \rightarrow 0+} f(t) \quad \text{and} \quad \lim_{s \rightarrow 0} sF(s) = \lim_{t \rightarrow \infty} f(t)$$

- 2) Find out Laplace transform of  $f(t)$ , a periodic waveform, shown in Figure 1. (5)

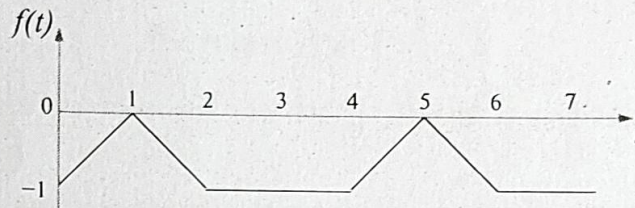


Figure 1: Part of a periodic waveform.

- 3) For the network shown in Figure 2, the  $Sw$  (after being closed for a long time) is opened at  $t = 0$ . Given :  $I_{in} = 2 \cos t$  A,  $L_1 = 1$  H,  $R_1 = 1 \Omega$ ,  $R_2 = 1 \Omega$  and  $C_1 = 0.5$  F. Find the expression of  $i_{load}(t)$  for  $t \geq 0$  and evaluate its value at  $t = \pi$  secs for the following two cases: (6)

- $Z_{load}$  being a resistance ( $R_{load}$ ) of  $1 \Omega$ .
- $Z_{load}$  being a parallel combination of resistance ( $R_{load}$ ) and inductance ( $L_{load}$ ) of  $1 \Omega$  and  $1$  H respectively.

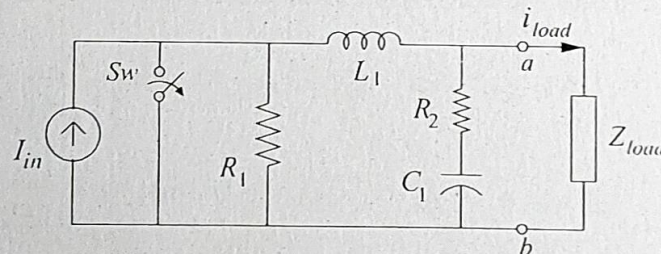


Figure 2: Switched  $RLC$  network.