Homework 3

Due: Sun Aug 29, 2021 23:59

kabhijit@iitdh.ac.in

General Instructions:

1. Submit your solutions as a *single PDF file* file through Moodle. Submission via other means will not be accepted. Moodle has file size limits as well as bandwidth limits so please do not leave the task of scanning and uploading to the last minute.

2. You may create the PDF either through LaTeX, Word etc. or scan a clearly / legibly written sheet of paper. Answers that are not legible / readable will marked zero. Please view/check the scanned PDF before you submit it.

3. Please attempt and submit the homework by yourself except where instructions specify group work. If you have questions, comments, doubts about any of the questions please reach out to the TAs or instructor. Do not discuss it with other students until the submission deadline. This will help regulate the pace and content of the course.
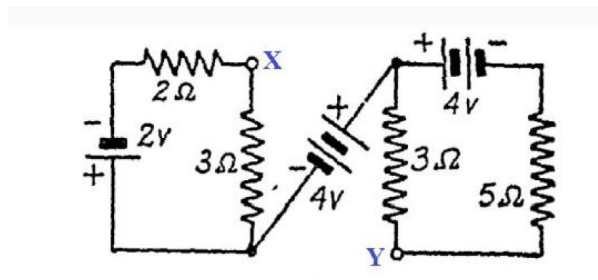
Problem 1 [5]

Figure 1: Problem 1

1. Find the value of v_{XY} i.e. voltage at node X with respect to node Y in the circuit as shown. [2]

2. If a very large resistance (R tending to infinity) is connected between X and Y, what is the current that would flow through it? Explain / justify your answer. [3]

Problem 2 [5]

1. The terminal characteristics of a two terminal device are found to be as shown in fig. 2. Based on this information, create a circuit model for the device that employs at least one ideal current source and one or more other ideal components (V, I, R). [3]

2. Is the given VI curve complete? Why/Why not? if not draw the complete VI curve for the device.[2]

Problem 3 [10]

1. A part of a circuit is shown in fig. 3, with some currents marked. Write the expression for $i_L(t)$ as a function of time, assuming that $i_L(-0.5) = 1A$
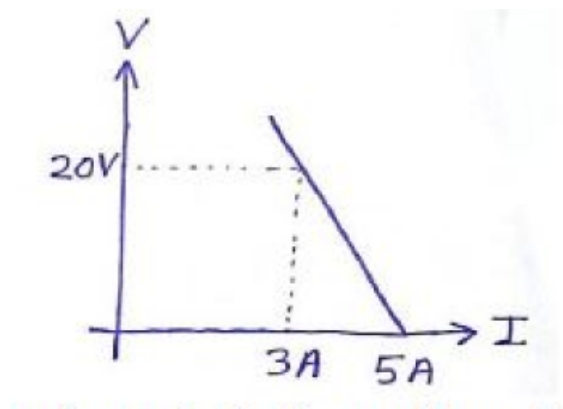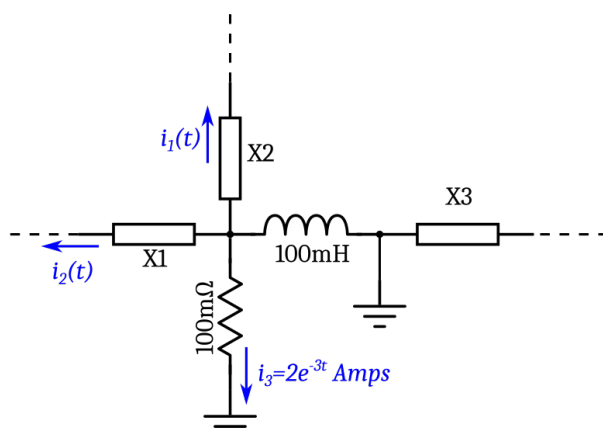
Figure 2: Problem 2

Figure 3: Problem 3