# Basic Electronics (Test – 3)

- **Instructions:** Please mention these on the first page of your answer script (your name, roll no., subject name, your signature and date); Insert page no. in every page; The final answer(s) (numerical values with unit) should be enclosed within a box ; Answer all questions; Show the necessary steps in your answers with high clarity and supported explanation; All waveform sketches / diagrams must be neatly drawn and clearly labelled; At the end of this test, you have to upload a single PDF file of your hand-written answer script (Max file size 10 MB); For any doubt, please feel free to ask the instructor.

1. Find the voltage gain (V_o/V_1) of the op-amp circuit shown in following figure. Consider that the Op-Amp is ideal. **[3]**
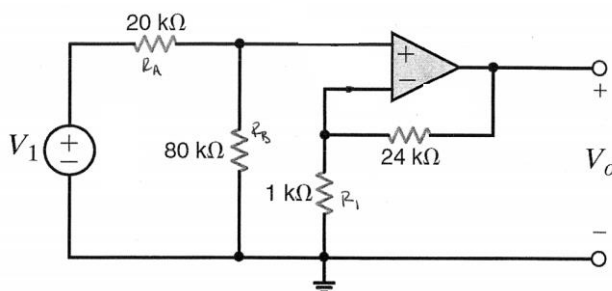

2. Estimate the output voltage (V_o) in the following Op-Amp circuit. Consider that the Op-Amp is ideal. **[3]**
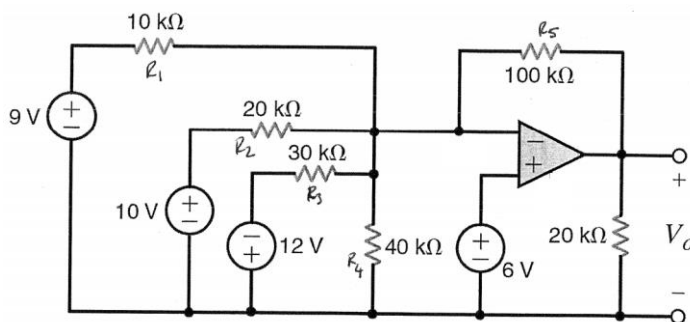

3. Neatly draw the output (X) waveform for the combination circuit shown below for the inputs at A and B. Draw the output waveform along with input waveforms to demonstrate the change in X with inputs. **[2]**
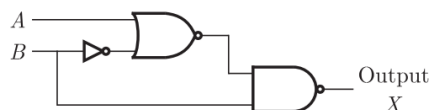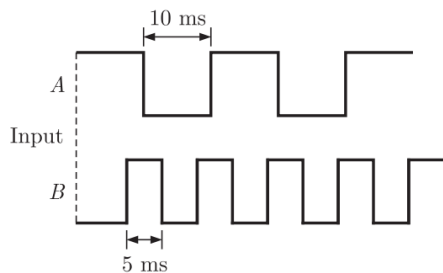
4. Estimate the output Y in the following circuit if total 20 XOR gates are connected as shown. **[2]**
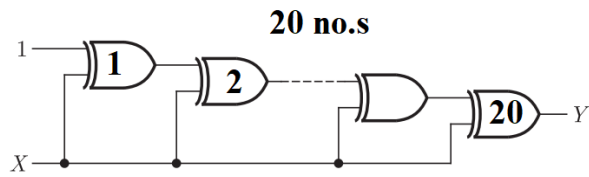
5. In the following circuit express output (f) in terms of x and y. Explain your answer. **[2]**
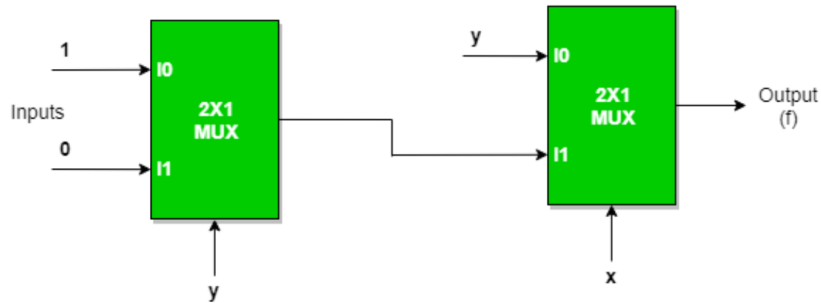
6. For a particular MOSFET operating in saturation region at a constant V_{GS}, the drain current is found to be 2 mA and 2.2 mA for V_{DS} of 4 V and 8 V respectively. Find the value of channel length modulation parameter (λ) and the output resistance (r_o). **[2+2]**