Q1. What is Instrumentation Amplifier (IA) and what are all the advantages?

Ans1. An instrumentation amplifier is a differential op-amp circuit providing high input impedances with ease of gain adjustment by varying a single resistor

Q2. Two Nmos Transistors are connected in series and the gates of both the transistors are connected to 5V. One end of the Transistor is connected to a 10V supply and the Vth=1V. What is the voltage at the other end?
PS:This was a quick interview question asked by a company called Alcatel, to short list one of my friend for the interview

Ans2. The output voltage is 4V.

Consider a single NMOS as a switch.
The max voltage at the other end can reach max of VG - Vt, after that NMOS will be off.
So if the voltage at one end is less than VG-Vt it passes that value to the other end, but if it is more, it reaches VG-Vt at the end and stops there bcoz after that the MOS switch will be off.

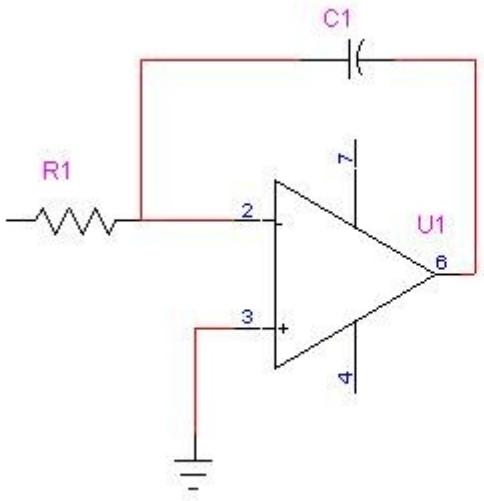
So in this case, first NMOS which has 12v, at the input, gives 4v out at its source, the other Transistor which has 4v at the input transmits samething to the other end as it is.

So final voltage is 4V.

Q3. What are the important characteristics of a Source Follower ?

Ans3. Source follower need not be for an opamp.
1.Give the input to the gate and take the output at the source of a Mosfet, we get the configuration called Source follower.The gain of such a stage is very close to 1.
2.It acts as a voltage buffer
3.Some of the drawbacks of this are non-linearity due to body effect,voltage headroom consumption due to level shift, and poor driving capability

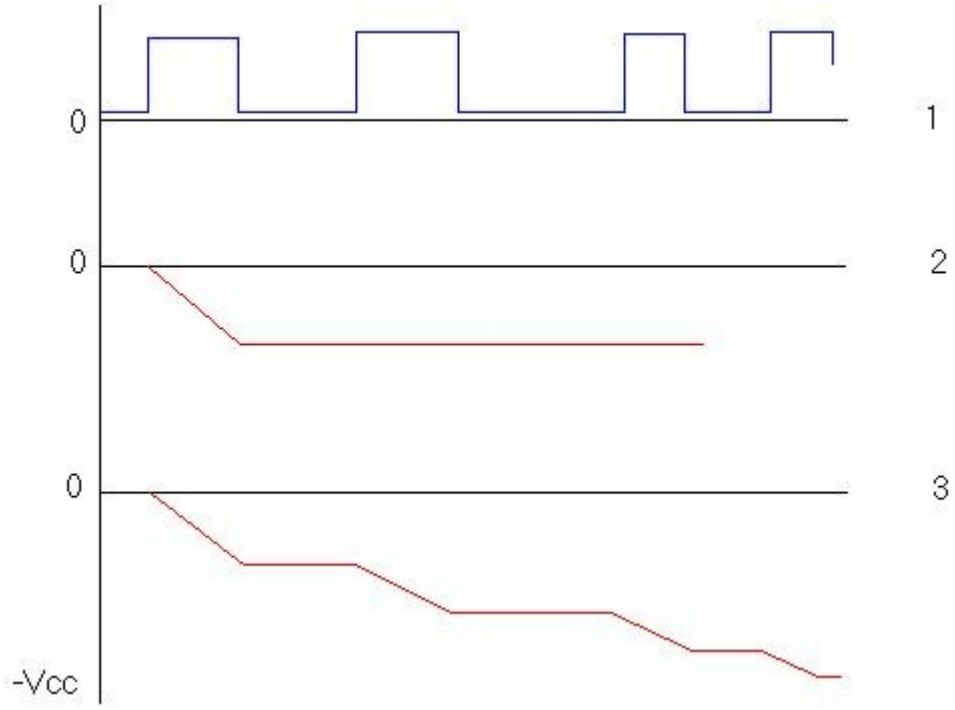
Q4:



How will the output signal of an ideal integrator look like after
- a positive pulse is applied to the input;
- a series of 10 positive pulses ?

Ans4
Among the above 3 waveforms,
1 --> Input pulses.

2 --> O/P for one pulse.
3 --> O/P for cont pulses of 1 waveform.



Q5. In the above circuit (Ref Q4), let R = 10KOhm C = 10nF. If the integrator capacitor is shunted by a 1MOhm resistor, how will be the response for an input pulse of 1-V height and 1ms width?