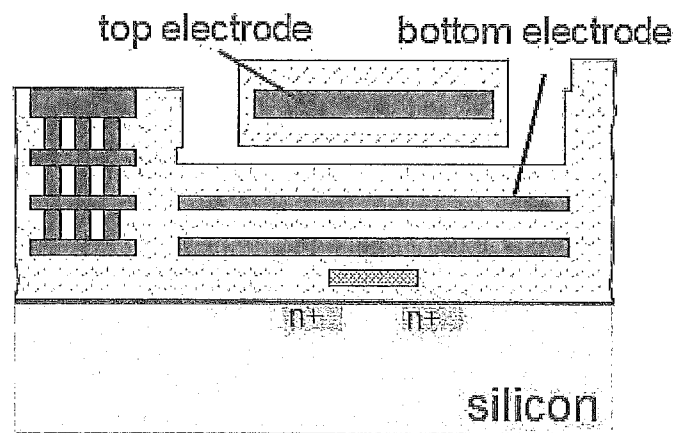
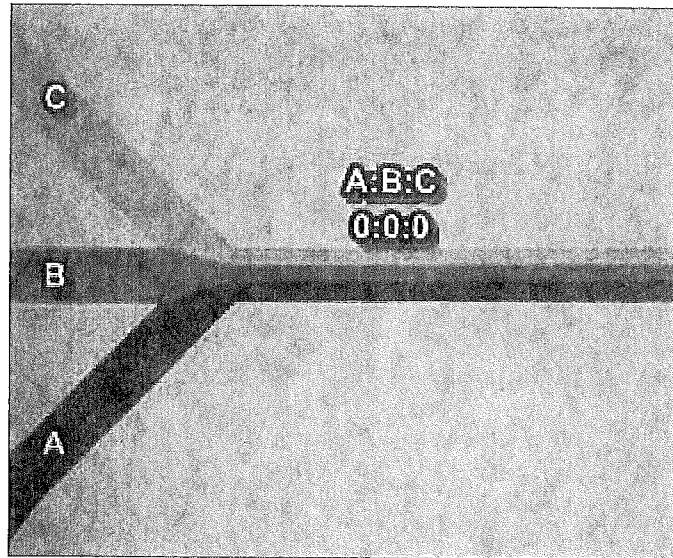


- 6) Name one advantage and one disadvantage of Si-Si fusion bonding as compared to Si-Glass anodic bonding. **(5 points)**
- 7) What is SU8 and where it is used most often? **(5 points)**
- 8) What is self-assembled monolayer (SAM) and where it is used in MEMS fabrication? **(5 points)**
- 9) Which one of the following polymers can be deposited in gas phase and exhibit conformal coverage? **(5 points)**
- PDMS
 - Parylene
 - Polyimide
 - PMMA
- 10) Is PDMS hydrophilic or hydrophobic? How can you change the surface energy of PDMS for better bonding to another PDMS or glass **(5 points)**

- A) Name two sources of stress in thin films and explain their source. Draw diagrams and explain the difference between tensile and compressive stress. Name one example of each assume the substrate is silicon. **(10 Points)**
- B) What actuation mechanism is good for situations that you need large travel range (hundreds of microns)? What about cases that the travel range is a few micron but you need very precise control over movement (nm range). Explain and justify your answers. **(10 points)**
- C) Figure below shows a capacitive tactile sensor implemented using post-CMOS process. Identify various layers and suggest a process for its implementation **(10 points)**



- D) The picture below is a microfluidic chip; explain what you see and why you see this in the context of behavior of fluids at microscale? **(10 points)**



- E) What is electric double layer? Explain your answer by drawing a figure and identify various layers. Draw a simple electric equivalent circuit for electric double layer. Name one microfluidic application/ device where electric double layer plays an important role. **(10 points)**