DVD Quiz 3

Total marks =10

Instructions

1. This is a take-home quiz, with no compulsion to join the meeting, but please ask your doubts in the meeting itself.

*2. The quiz duration is **25 mins and 10 mins** extra given to upload your scanned PDFs (high quality) on the google classroom. Upload answer PDF on classroom*

*3. The quiz starts at **8:00 PM** sharp and ends at 8:25 PM. 10 minutes are reserved for scanning and uploading the quiz to Google Classroom, any submission after **8:35 PM** will attract a penalty*

4. Meeting link for doubts: https://meet.google.com/gyd-cecr-tez

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Q1. There are two wires with their dimensions shown in the Fig. 1 below. The current direction is shown by the black arrow. If the ratio of their resistances R_Wire1 : R_Wire2 = 3:2 . Find the ratio of their sheet resistances. [1 marks]

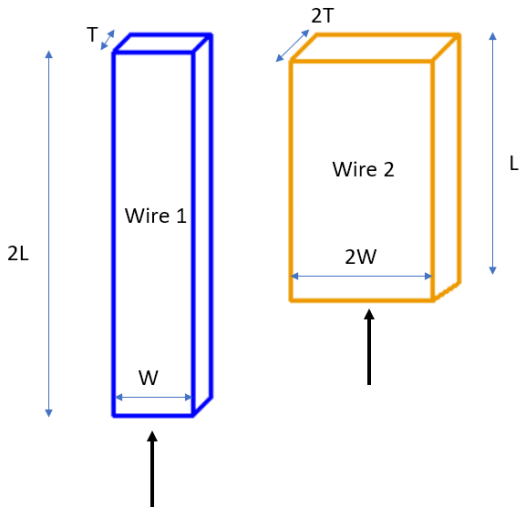

Fig. 1

Q2. What is the height of a standard cell in a 12 track library with the following specifications:

Min metal1 width = 0.09u [2 marks]

Min metal2 width =0.1u

Min spacing between two metal1 = 0.09u

Min spacing between two metal2 = 0.1u

Q3. Given below is the stick diagram (rough layout sketch) for a circuit.

Identify the circuit. How can you improve it ?(Draw the modified stick diagram). List two advantages of the modified version as compared to the given stick diagram? [1 + 1.5 +1 marks]

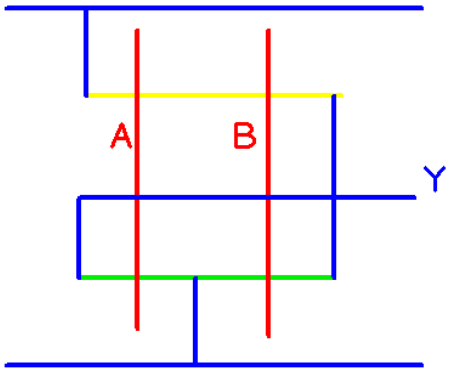

Fig. 2

Q4. Given below in Fig. 4 is an NMOS with I as input and Y as output . Fig. 5 shows an unfingered NMOS version of Fig.4 and Fig 6 shows 2-fingered version of the same NMOS.

Given,

Width of the NMOS in Fig. 5 (W) =0.5u

Lex = W/4

Wnew =W/2 (as the same transistor is broken in two fingers)

Lo= Lex * 1.25

Side wall diffusion capacitance = 0.4 fF/um

Bottom diffusion capacitance = 0.5 fF/um^2

a) Find the diffusion capacitance of region A, B , C and D [2.5 marks]
b) Where should you connect output Y in Fig 5 and in Fig 6. [1 marks]

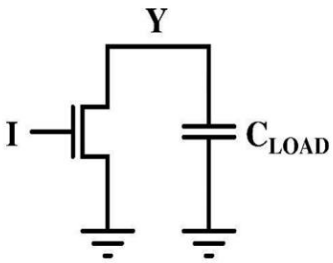

Fig. 4

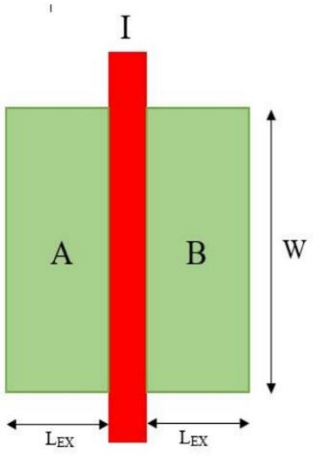

Fig. 5

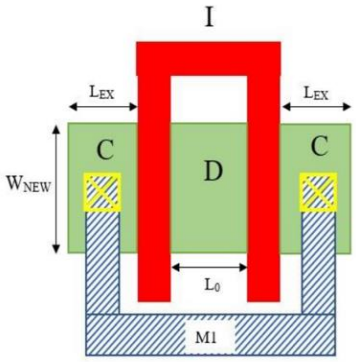

Fig. 6