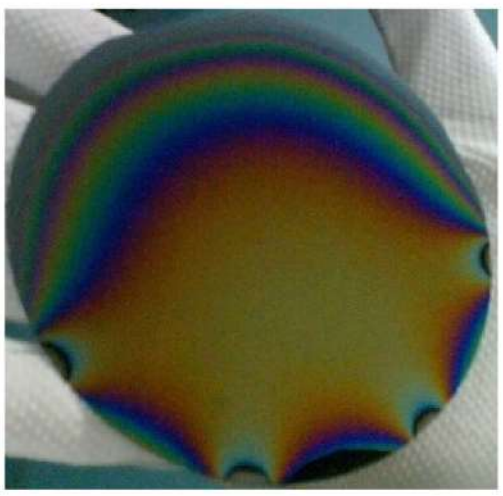
Started on	Thursday, 12 September 2024, 8:49 AM
State	Finished
Completed on	Thursday, 12 September 2024, 8:49 AM
Time taken	48 secs
Marks	6.00/6.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1

Correct

Mark 1.00 out of 1.00

When dielectrics are deposited on silicon wafers, the color of the surface changes due to the interference between light reflected from the air - dielectric interface and the dielectric - semiconductor interface. The photograph of a silicon wafer with Si_3N_4 on top is shown below. The pattern seen is called a bull's eye pattern. Such variations in the color can be attributed to which of the following reason(s)?



- [ ] a. Can be due to the variations in the thickness of the wafer itself.
- [x] b. Can be due to variations in thickness of the dielectric over the wafer. ✓
- [x] c. Can be due to variations in the refractive index of the dielectric over the wafer. ✓

Your answer is correct.

The correct answers are: Can be due to variations in thickness of the dielectric over the wafer. , Can be due to variations in the refractive index of the dielectric over the wafer.

Question 2

Correct

Mark 2.00 out of 2.00

The following figure represents the starting substrate for a silicon deposition experiment. Match the process description and the likely outcome.

Epitaxial growth of silicon	crystalline silicon will grow on silicon and poly-Si will grow on the oxide. ✓
Selective epitaxial growth of silicon	crystalline silicon will grow on silicon, and no film will grow on the oxide. ✓

Your answer is correct.

The correct answer is: Epitaxial growth of silicon → crystalline silicon will grow on silicon and poly-Si will grow on the oxide., Selective epitaxial growth of silicon → crystalline silicon will grow on silicon, and no film will grow on the oxide.

Question 3

Correct

Mark 1.00 out of 1.00

A thin film of silicon nitride was deposited on a silicon wafer using a CVD process. The process temperature was 600C, and the precursors were SiH_4 and N_2. Which of the following best describes the process?

- [ ] a. This is an epitaxial process.
- [ ] b. This is a thermal CVD process.
- [x] c. This is a PECVD process. ✓

Your answer is correct.

The correct answer is: This is a PECVD process.

Question 4

Correct

Mark 2.00 out of 2.00

In each case below, match the description of film to the CVD process likely used for the deposition of the film.

a-Si:H (hydrogenated amorphous silicon) for solar cell applications	plasma enhanced CVD ✓
Silicon oxide for trench fill applications	high density plasma enhanced CVD ✓
hydrogen-free silicon nitride film	thermal CVD ✓

Your answer is correct.

The correct answer is: a-Si:H (hydrogenated amorphous silicon) for solar cell applications → plasma enhanced CVD, Silicon oxide for trench fill applications → high density plasma enhanced CVD, hydrogen-free silicon nitride film → thermal CVD

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