Started on	Saturday, 24 August 2024, 9:05 PM
State	Finished
Completed on	Saturday, 24 August 2024, 9:06 PM
Time taken	59 secs
Marks	8.00/8.00
Grade	**10.00** out of 10.00 (**100**%)

Question 1

Correct

Mark 1.00 out of 1.00

Silicon dioxide can be grown by exposing heated silicon (~ 1000C) to which of the following gases

- [ ] a. CO_2
- [x] b. NO ✓
- [x] c. N_2O ✓
- [x] d. H_2O ✓
- [x] e. O_2 ✓
- [ ] f. CO

Your answer is correct.

The correct answers are: O_2, H_2O , N_2O, NO

Question 2

Correct

Mark 1.00 out of 1.00

Which of the following wet chemicals can be used for etching silicon?

- [ ] a. pottassium hydroxide solution in water
- [x] b. hydrofluoric acid ✓
- [x] c. Mixture of ammonium fluoride and hydrogen fluoric acid ✓
- [ ] d. nitric acid
- [ ] e. sulphuric acid

Your answer is correct.

The correct answers are: hydrofluoric acid, Mixture of ammonium fluoride and hydrogen fluoric acid

Question 3

Correct

Mark 1.00 out of 1.00

Suppose you are asked to choose a process for manufacturing a 3 micro meter thick SiO_2 on a silion wafer? Which of the following can be used for this purpose?

- [x] a. Plasma enhanced CVD ✓
- [ ] b. Wet thermal oxidation of silicon
- [x] c. Thermal CVD (CVD - chemical vapour deposition) ✓
- [ ] d. Dry thermal oxidation of silicon

Your answer is correct.

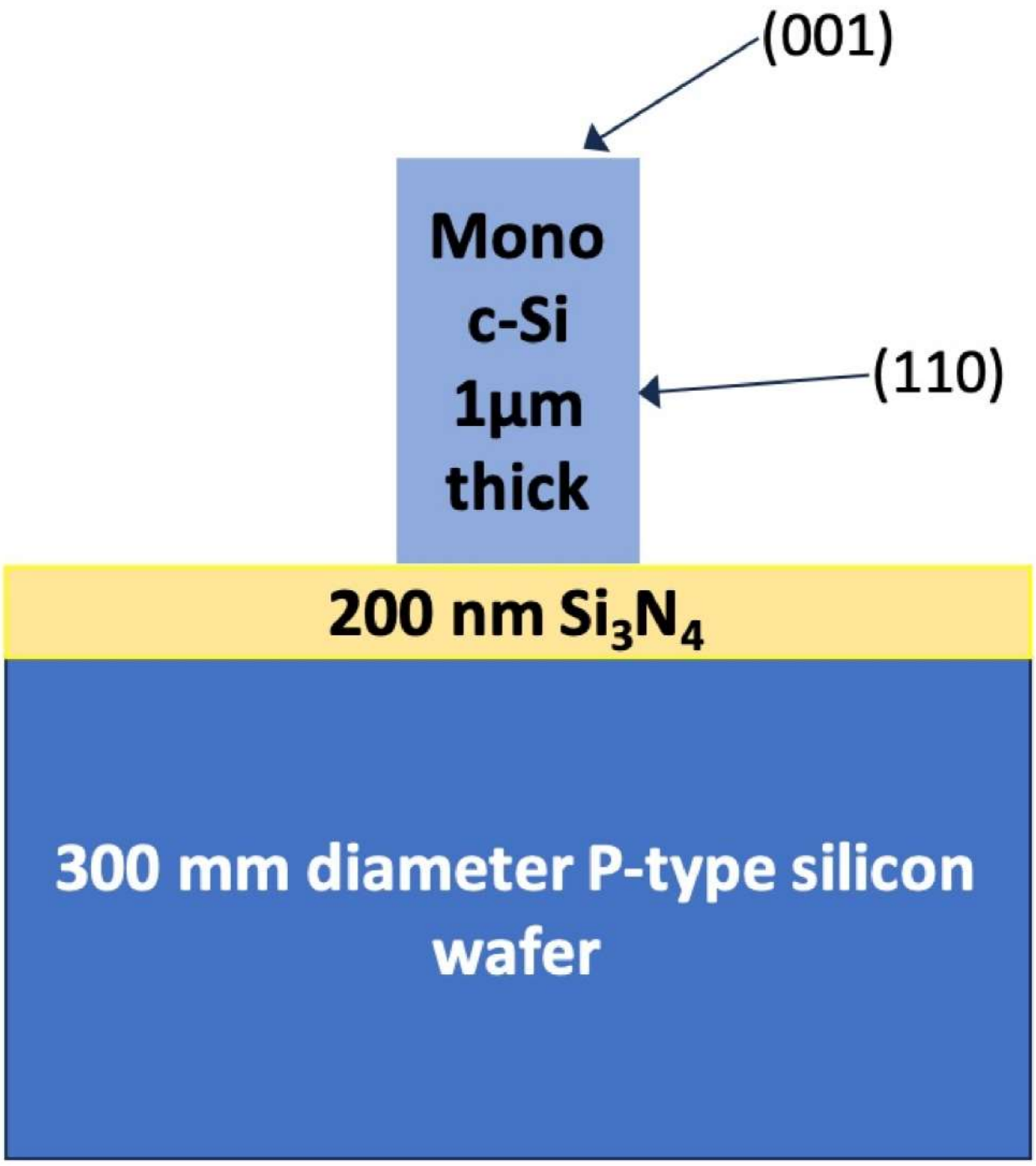
The correct answers are: Thermal CVD (CVD - chemical vapour deposition), Plasma enhanced CVD

Question 4

Correct

Mark 1.00 out of 1.00

Assuming that the rectangular silicon structure in the attached figure is partially oxidized by thermal oxidation, which of the following statements are correct?



- [x] a. The thickness of the oxide on the vertical side wall will be greater than the thickness of the oxide on the top of the silicon above the nitride. ✓
- [ ] b. The thickness of the oxide on the vertical side wall will be less than the thickness of the oxide on the top of the silicon above the nitride.
- [ ] c. The thickness of the oxide on the vertical side wall will be equal to the thickness of the oxide on the top of the silicon above the nitride.

Your answer is correct.

The correct answer is: The thickness of the oxide on the vertical side wall will be greater than the thickness of the oxide on the top of the silicon above the nitride.

Question 5

Correct

Mark 1.00 out of 1.00

Which of the following processes occur during thermal oxidation of silicon

- [x] a. The vacancies diffuse towards the silicon surface from the bulk of the wafer ✓
- [x] b. Vacancies are absorbed by the growing oxide. ✓
- [x] c. Silicon interstitials are injected into the silicon wafer from the surface of silicon ✓

Your answer is correct.

The correct answers are: The vacancies diffuse towards the silicon surface from the bulk of the wafer, Silicon interstitials are injected into the silicon wafer from the surface of silicon, Vacancies are absorbed by the growing oxide.

Question 6

Correct

Mark 1.00 out of 1.00

Which of the following statements are correct vis-a-vis the thermal oxidation of silicon?

- [x] a. The wafer is exposed to high temperature for shorter time during rapid thermal oxidation. ✓
- [ ] b. Rapid thermal oxidation is suitable for the growth of 100 nm oxide in an industrial process.
- [ ] c. The oxide growth rate is enhanced by rapid thermal oxidation.

Your answer is correct.

The correct answer is: The wafer is exposed to high temperature for shorter time during rapid thermal oxidation.

Question 7

Correct

Mark 1.00 out of 1.00

Which of the following statements are correct regarding the interface between silicon and silicon dioxide?

- [ ] a. Fixed oxide charges are due to silicon dangling bonds at the interface.
- [ ] b. The interface states carry fixed charges.
- [x] c. The charge in the interface states depends on the charge at the surface of the silicon. ✓

Your answer is correct.

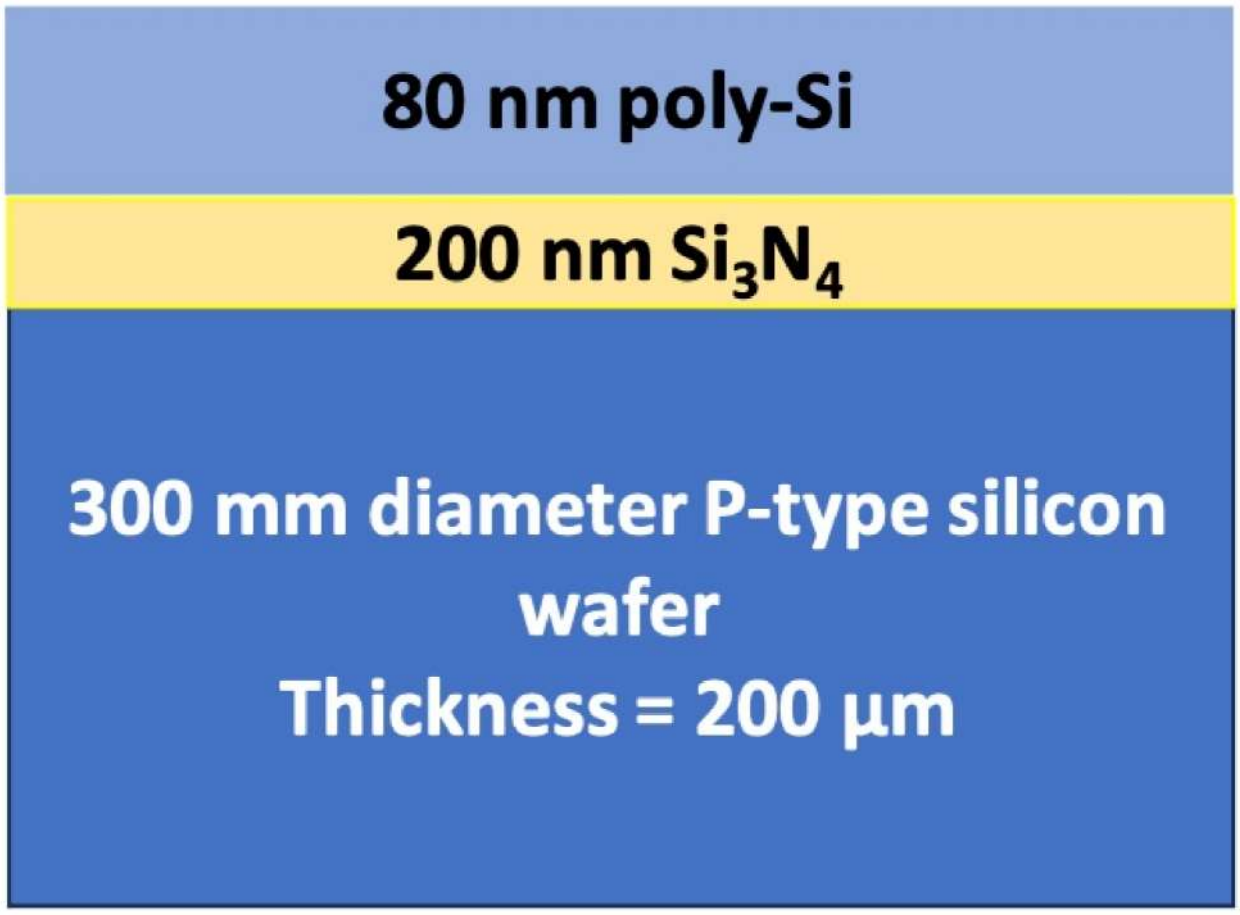
The correct answer is: The charge in the interface states depends on the charge at the surface of the silicon.

Question 8

Correct

Mark 1.00 out of 1.00

Consider the following figure. The poly-Si is completely oxidized using thermal oxidation process. What is the thickness of the resulting oxide in nano meters?



Answer: 176 ✓

The correct answer is: 176

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