Lithography techniques VTU CBCS Question Paper Set 2018

USN ☐☐☐☐☐☐☐☐☐☐ **10NT64**

Sixth Semester B.E. Degree Examination, June/July 2016
Lithography Techniques

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define lithography. Mention types of clean rooms. **(04 Marks)**
b. Explain working of optical lithography with neat diagram. **(10 Marks)**
c. Write a note on multistage scanners resolution. **(06 Marks)**

2 a. What is phase shift mask? Explain attenuated phase shift masks. **(08 Marks)**
b. Explain optical proximity correction. Mention its applications. **(08 Marks)**
c. Discuss the working principle of holographic lithography. **(04 Marks)**

3 a. Explain maskless optical projection lithography. Mention its advantages. **(10 Marks)**
b. Describe extreme ultraviolet lithography in detail. Mention its applications. **(10 Marks)**

4 a. Explain the following :
i) Scanning electron – beam lithography
ii) Electron beam projection lithography. **(12 Marks)**
b. Discuss projection reduction exposure. **(08 Marks)**

PART – B

5 a. Listout proximity effects. Explain proximity correction method. **(08 Marks)**
b. Discuss the effect of charging on deflection of e – Beam. **(06 Marks)**
c. Write a note on e – Beam nanolithography. **(06 Marks)**

6 a. What is Ion beam lithography? Explain. **(06 Marks)**
b. Discuss the advantages and applications of
i) Ion projection lithography and
ii) Masked Ion beam lithography **(08 Marks)**
c. Write a note on masked ion beam direct structuring. **(06 Marks)**

7 a. Discuss nonoimprint lithography. **(06 Marks)**
b. Explain replica moulding. **(06 Marks)**
c. Discuss in brief working principle of dip-pen lithography. **(08 Marks)**

8 a. Explain how Reactive Ion Etching is enhanced. **(06 Marks)**
b. Discuss wet etching of silicon. **(08 Marks)**
c. Write a note on electrochemical etching. **(06 Marks)**

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

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PART – A

1 a. What is the principle of Lithography? Explain about optical lithography with neat diagram. **(08 Marks)**
b. Explain about multistage scanner resolution with examples. **(07 Marks)**
c. Which are the factors affecting construction and maintenance of a clean room. **(05 Marks)**

2 a. Explain about phase shift mask and the principle involved in it. **(07 Marks)**
b. Describe about binary mask with diagram. **(06 Marks)**
c. Explain in detail about attenuated phase shift mask with a neat diagram. **(07 Marks)**

3 a. Explain about extreme ultraviolet lithography. **(10 Marks)**
b. Describe zone plate array lithography with diagram. State its advantages over other types of lithography. **(10 Marks)**

4 a. Explain in detail about scanning electron beam lithography. **(10 Marks)**
b. Explain about parallel direct – write e-beam systems electron beam projection lithography. **(10 Marks)**

PART – B

5 a. Discuss about electron scattering and proximity correction. **(06Marks)**
b. Explain about electron beam nano-lithography with diagram. **(10 Marks)**
c. Define and explain about shot noise and substrate charging. **(04 Marks)**

6 a. Describe about focused ion beam lithography. **(10 Marks)**
b. Explain in detail about ion beam lithography. **(07 Marks)**
c. State applications of masked ion lithography. **(03 Marks)**

7 a. What is soft lithography? Explain nano imprint lithography with various steps involved. **(08 Marks)**
b. Explain about NIL-Hot Embossing with diagram. State its advantages. **(12 Marks)**

8 a. Explain about types of etching with neat diagram. State their advantages and limitations. **(12 Marks)**
b. Explain about reactive ion etching. **(04 Marks)**
c. Discuss about wet etching of silicon. **(04 Marks)**

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