

SEAT No. _____

[198]

SARDAR PATEL UNIVERSITY
M.Sc. (ELECTRONICS) THIRD SEMESTER EXAMINATION
SUBJECT: THIN FILM TECHNOLOGY

No. of Printed Pages : 2

PAPER: PS03EELE21

DATE: Monday, 29th October, 2018

TIME: 02:00 P.M. to 5:00 P.M.

TOTAL MARKS: 70

Q-1 Multiple choice questions.

[08]

- 1 Metal Organic Vapor Deposition comes under the class of
 - (a) Physical
 - (b) Sputtering
 - (c) Chemical
 - (d) (a) and (b)
- 2 To improve the ionization mechanism magnets are used in
 - (a) DC sputtering method
 - (b) Magnetron sputtering method
 - (c) RF sputtering method
 - (d) (a) and (c)
- 3 In Image mode of TEM, the image of specimen is found in
 - (a) The image plane of the objective lens.
 - (b) The image plane of the projector lens.
 - (c) Back focal plane of the objective lens.
 - (d) Back focal plane of the projector lens.
- 4 Which pump usually contains material such as charcoal
 - (a) Cryo- pump with sorbents
 - (b) Turbo Molecular pump with Turbine
 - (c) Ion pump with cathodes
 - (d) Rotary pump with vanes
- 5 Rate of evaporation is
 - (a) Directly proportional to the temperature of liquid
 - (b) Inversely proportional to the temperature of liquid
 - (c) Independent of liquid
 - (d) Directly proportional to the humidity of surrounding air
- 6 Evaporation takes place at
 - (a) Freezing point
 - (b) Boiling point
 - (c) In between (a) and (b)
 - (d) at all temperatures
- 7 The technique used for epitaxial growth of the thin film is
 - (a) Direct Evaporation method.
 - (b) MBE method.
 - (c) Laser Evaporation method.
 - (d) Flash Evaporation method.
- 8 10^{-7} Torr = _____ mbar.
 - (a) 7.333
 - (b) 8.333
 - (c) 9.333
 - (d) 10.333

(P.T.O.)

1

Q-2 Short question. (Write any 7)

7x2=14

[14]

- 1 What is the difference between Thin film and Thick film technology?
- 2 Enlist the name of different types of diffusion oil in Diffusion pump.
- 3 Enlist the importance of oil in Rotary pump.
- 4 Classify the different Thin Film Deposition methods.
- 5 List appropriately different steps for thin film growth process.
- 6 Define Back streaming pressure in Diffusion pump.
- 7 Enlist CVD process steps.
- 8 Why the silicon fluid is not recommended for the use in scientific instruments where energetic particles presents?
- 9 Enlist different types of Evaporation source.

Q-3 [a] Draw the schematic diagram of Flash evaporation method and explain the deposition process takes place on substrate. Write advantages, disadvantages and its applications. [06]

Q-3 [b] Define the Sputtering Yield. Explain Magnetron sputtering method for deposition of thin films. [06]

OR

Q-3 [b] State various types of chemical vapor deposition reaction with example. [06]

Q-4 [a] Using proper schematic diagram, discuss in detail the working principle of Diffusion pump. [06]

Q-4 [b] Discuss in detail the working principle of Turbo Molecular pump. [06]

OR

Q-4 [b] Explain working principle of Cryo-pump. [06]

Q-5 [a] Describe the working principle of Transmission Electron Microscope and its applications in the Thin Film Technology. [06]

Q-5 [b] Explain the importance of X-ray Diffractions Technique and describe briefly the working of Bragg Brentano diffractometer. [06]

OR

Q-5 [b] Describe the principle and applications of Scanning Electron Microscope for the analysis of thin film. [06]

Q-6 [a] Distinguish between direct band gap and indirect band gap of semiconductor. Explain how you can measure the optical band gap of thin film semiconductor. [06]

Q-6 [b] Mention the material requirements for a thin film Resistor (TCR) [06]

OR

Q-6 [b] Describe the methods of Trimming process of the Thin Film Resistor. [06]

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