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**UNIVERSITY**

(Karunya Institute of Technology & Sciences)

(Declared as Deemed-to-be University under Sec.3 of the UGC Act, 1956)

Reg.No. \_\_\_\_\_\_\_\_\_\_\_\_\_

**End Semester Examination – Nov/Dec - 2016**

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|  |  | **Semester :** | **2016-17 ODD** |
| **Code :** | **12PH209** | **Duration :** | **3 hrs** |
| **Sub. Name :** | **Thin Film Technology for Engineers** | **Max. marks :** | **100** |

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| **Q. No.** | **Questions** | | **Marks** |
| **PART-A(10X1=10 MARKS)** | | | |
| 1. | ------------ pumps use no oil and operates like jet engines. | | (1) |
| 2. | Which pump is based on the principle of displacement of gap? | | (1) |
| 3. | Insulators cannot be deposited by -------------- sputtering. | | (1) |
| 4. | Evaporation boat is made up of ------------------- materials. | | (1) |
| 5. | What type of stress is applied to the film due to differential thermal expansion of the substrate? | | (1) |
| 6. | In epitaxial growth --------------- is a measure of structural compatibility between different materials. | | (1) |
| 7. | A material in which the crystallites are nearly aligned in all 3 dimensions is called a ------------ | | (1) |
| 8. | Debye Scherrer formula for particle size determination is given by D = --------------- | | (1) |
| 9. | \_\_\_\_\_\_\_ coatings are used to avoid the incoming sunlight from being reflected back off the solar cell. | | (1) |
| 10. | NEMS is the acronym for -----------------------. | | (1) |
| **PART B(5 X 3= 15 MARKS)** | | | |
| 11. | Explain the importance of vacuum coating in thin film technology. | | (3) |
| 12. | Mention the different steps involved in sol-gel process. | | (3) |
| 13. | Define Hall effect, with a suitable sketch. | | (3) |
| 14. | Define laser ablation and mention its benefits. | | (3) |
| 15. | Explain the functioning of a gas sensor. | | (3) |
| **PART C(5 X 15= 75 MARKS)** | | | |
| 16. | Explain with suitable diagram the instrumentation, working principle, advantages and drawbacks of diffusion pump. | | (15) |
| (OR) | | | |
| 17. | Explain with suitable diagram the working principle and instrumentation of cold cathode gauge. | | (15) |
| 18. | With suitable diagram explain the principle, construction and working of RF sputtering. Mention its advantages over DC sputtering. | | (15) |
| (OR) | | | |
| 19. | With a neat sketch, explain the principle, kinetics and working concept of CVD. | | (15) |
| 20. | Explain in detail the various stages in thin film growth. | | (15) |
| (OR) | | | |
| 21. | With appropriate figures, explain in detail, the different types of lattice mismatch. | | (15) |
| 22. | Define Bragg’s law. Describe how the structure of a material and the particle size are determined by X- ray diffraction studies. | | (15) |
| (OR) | | | |
| 23. | Describe in detail the basic parts and working of UV-Visible spectrophotometer. Explain how to determine the transmittance and absorbance of thin films with suitable equations. | | (15) |
| 24. | a. | Discuss in detail the different structures of thin film transistor and the various steps involved in fabrication of thin film transistors. | (10) |
| b. | Briefly discuss the steps in fabrication of a thin film solar cell. | (5) |
| (OR) | | | |
| 25. | a. | What is a gas sensor? Write short notes on different types of gas sensors. | (10) |
| b. | Explain the basic steps in fabrication of MEMS device. | (5) |

ALL THE BEST