K22P 3332

Reg. No. : .....

Name : .....

IV Semester M.Sc. Degree (CBSS – Reg./Supple./Imp.) Examination, April 2022
(2018 Admission Onwards)
PHYSICS
PHY4E12 : Experimental Techniques

Time : 3 Hours Max. Marks : 60

SECTION – A

Answer **all** questions. **Each** question carries **12** marks (either **a** or **b**). **(2×12=24)**

1. a) Draw the block diagram of Pirani gauge and explain its working. What is a pulsed Pirani gauge ? Mention its advantages and disadvantages.

   OR

   b) Explain Pulsed Laser Deposition (PLD). What are the advantages and disadvantages of using PLD for thin film growth ?

2. a) Explain adiabatic demagnetization. Derive the theory used.

   OR

   b) Describe the construction and working of cyclotron. Calculate the frequency of deutrons accelerated in a cyclotron of magnetic field strength 1.5 Tesla. (mass of deutron = 3.3×10^{-27} kg, charge of deutron = 1.6×10^{-19} coulomb).

SECTION – B

Answer **any four** questions. **1** mark for Part **a**, **3** marks for Part **b**, **5** marks for Part **c**. **(4×9=36)**

3. a) What is a thermocouple gauge ?
   b) How does a thermocouple gauge work ?
   c) Briefly explain the working of a solenoid valve.

4. a) What is thin film interference ?
   b) Obtain the condition for constructive interference.
   c) Using an example explain phase interaction.

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5. a) Give the principle of nuclear demagnetization.
   b) Explain the principle of thermocouple thermometry.
   c) Describe the working of a low temperature resistance thermometer.

6. a) What is an ion source ?
   b) Briefly explain how ion sources are produced.
   c) Discuss any one type of an ion source.

7. a) What do you mean by reaction kinematics ?
   b) Explain the non-relativistic two body kinematics of elastic scattering.
   c) Derive an expression for the total cross section.

8. a) What is Neutron Activation Analysis (NAA) ?
   b) What are the four major neutron reactions ? Give examples.
   c) Describe an experimental arrangement to study NAA.
