

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 deuterons accelerated in a cyclotron of magnetic field strength 1.5 Tesla.  
(mass of deuteron =  $3.3 \times 10^{-27}$  kg, charge of deuteron =  $1.6 \times 10^{-19}$  coulomb).

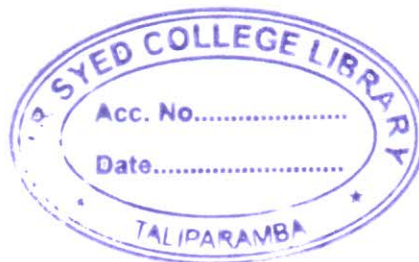
**SECTION – B**

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.
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