



11. Show that the energy and wave function of a particle in a finite square well of depth  $V_0$  reduces to the energy and wave function of an infinite square well in the limit of  $V_0 \rightarrow \infty$ .
12. Explain the phenomenon of tunneling. How can the half life of an  $\alpha$  emitter be obtained from the analysis of tunnelling. (9×2 = 18)

## PART – D

Answer **any one** question. **Each** question carries **4** weightage.

1. What is Compton effect ? Derive an expression for the frequency shift of protons as a function of the angle of scattering for Compton effect using energy momentum conservation.
2. Derive the Schrodinger's equation for a linear harmonic oscillator and solve it to obtain the eigen values and eigen functions. (1×4 = 4)



Reg. No. : .....

Name : .....



VI Semester B.Sc. Degree (CCSS – Reg./Supple./Improv.)  
Examination, May 2016  
Core Course in Physics  
6B13 PHY : QUANTUM MECHANICS  
(2012 Adm. Onwards)

Time : 3 Hours

Max. Weightage : 30

## PART – A

1. Answer **all** questions. **Each** bunch carries **1** weightage.
- I) When the intensity of light incident on a metal surface is increased, the photoelectric current
- |                     |                 |
|---------------------|-----------------|
| a) Decreases        | b) Increases    |
| c) Remains the same | d) Becomes zero |
- II) In Compton scattering the incident photon loses maximum energy to the electron when the photon is scattered at
- |               |                |
|---------------|----------------|
| a) 0 degree   | b) 180 degrees |
| c) 90 degrees | d) 45 degrees  |
- III) Matter waves are
- |  |
|--|
| a) Electromagnetic transverse waves          |
| b) Longitudinal waves                        |
| c) Waves produce in a medium                 |
| d) Neither longitudinal nor transverse waves |
- IV. Which of the following statement is most correct ?
- |   |
|---|
| a) Each eigen function belongs to only one eigen value                |
| b) One or more eigen functions may belong to one eigen value          |
| c) Eigen functions belonging to different eigen values are orthogonal |
| d) All these  |

