



K15U 0594

Reg. No. : .....

Name : .....

I Semester B.Sc. Degree (CCSS – Reg./Supple./Improv.)  
Examination, November 2015  
Complementary Course in Physics  
1C01 PHY : MECHANICS  
(2014 Admn. Onwards)

Time : 3 Hours

Max. Marks : 32

**Instruction :** Write answers **only in English.**

SECTION – A

Answer **all** questions. Very short answer type, **each** question carries **1** mark.

1. A wire is stretched to double its length. The value of strain is \_\_\_\_\_
2. If  $U$  be the potential energy of a S.H.M., the potential energy when the particle is half way to it's end point is \_\_\_\_\_
3. The one dimensional differential equation for wave motion is \_\_\_\_\_
4. The Schrodinger's time independent wave equation is \_\_\_\_\_
5. The equation for Angular momentum is \_\_\_\_\_ (5×1=5)

SECTION – B

Answer **any four**. Short answer type, **each** question carries **2** marks.

6. Iron rails used in railway tracks have cross-section in the form of I. Explain advantage of such a structure.
7. Define bending moment and write down it's expression in case of beam of rectangular cross-section.
8. Deduce the expression for periodic oscillation of a torsion pendulum.
9. Write down the expressions for energy density and intensity of a plane harmonic wave explaining the notations used.



10. Explain the significance of Davisson Germer experiment.
11. In which manner, damping force influence velocity and kinetic energy of an oscillator ? (4×2=8)

## SECTION – C

Answer **any three**. Short essay/problem type, **each** question carries **3** marks.

12. Show that angular momentum of a particle about a fixed point is equal to the product of mass and double the area described in unit time by the rotating line joining the fixed point and the particle. What is the direction of angular momentum ?
13. What do you mean by resonance and under which condition amplitude resonance take place ? Find out the frequency at the resonance.
14. Give the expression for work done in twisting a cylindrical wire. How much potential energy is stored in a cylinder of length  $L$ , area of Cross-section  $A$  and rigidity modulus  $n$  when it is twisted through  $\frac{\pi}{4}$  radian.
15. Calculate the energy difference between the ground state and the first excited. State for an electron in a one dimensional rigid box of length  $1 \text{ \AA}$  :
16. An electron initially at rest is accelerated by a potential difference of  $5000 \text{ V}$ . Find the de Broglie wave length. (3×3=9)

## SECTION – D

Answer **any two**. Long essay type, **each** question carries **5** marks.

17. Define simple harmonic motion and derive the expression for kinetic and potential energies of a harmonic oscillator. Show that total energy is conserved .
18. Explain Longitudinal waves in rods.
19. Derive the expression for depression of a cantilever loaded at the free end.
20. Describe damped harmonic oscillator. Discuss different cases of damping. (2×5=10)