

**B.SC DEGREE END SEMESTER EXAMINATION OCTOBER 2016**  
**SEMESTER – 1: PHYSICS COMPLEMENTARY COURSE FOR B.SC CHEMISTRY**

**COURSE: 15U1CPPH Y2 – : PROPERTIES OF MATTER, MECHANICS AND PARTICLE PHYSICS**

Common for Regular (2016 Admission) & Supplementary / Improvement (2015 Admission)

Time: Three Hours

Max. Marks: 60

**SECTION – A**

Answer **all** Questions. 1 mark each (Total 8 marks)

1. What is elastic limit
2. What do you mean by bending moment of a beam?
3. Mention the uses of flywheel.
4. Why do helicopters need a tail rotar?
5. Define simple harmonic motion. Give two examples.
6. What is restoring force?
7. What are the different Leptons?
8. What do you understand by grand unified theory? (1 x 8 = 8)

**SECTION – B**

Answer **any six** Questions. 2 marks each (Total 12 marks)

9. Explain why hollow shafts are preferred to solid ones of the same mass and area of cross section.
10. Distinguish between linear velocity and angular velocity in a uniform circular motion.
11. Why does the motorcyclist tend to rotate the front wheel upward while accelerating?
12. Explain the law of conservation of angular momentum.
13. Define period and frequency of a simple harmonic motion, Obtain expression for them.
14. What is an isospin? In which fundamental interaction is the isospin not conserved.
15. Describe the features of gauge particles.
16. What is meant by a damped harmonic oscillator? Write down the differential equation for a damped harmonic oscillator. (2 x 6 = 12)

**SECTION – C**

Answer **any four** Questions. 5 marks each (Total 20 marks)

17. You are sitting on a rotating frictionless stool with your arms stretched out. When a friend gives you a twist, you start to rotate around a vertical axis. Assuming that there is no net external torque present once the rotation begins. What happens to the:-
  - a. Angular momentum as you in your arms
  - b. Angular velocity as you in your arms and
  - c. Kinetic energy as you pull in your arms.
18. Calculate the Young's modulus of the material of the wire, whose length is 10m and diameter mm and stretches by 0.2 mm when a load of 0.55 kg is hung on it.

19. A particle is oscillating simple harmonically along a straight line. When the distance are at 0.1m and 0.2 m mean position, its velocity is  $0.3 \text{ ms}^{-1}$  and  $0.2 \text{ ms}^{-1}$  . Calculate the period and amplitude of S.H.M.
20. A travelling wave on a string is given by  $y= 7.5 \sin(0.005 x + 12t + \pi/4)$  cm, what is the displacement and velocity of oscillation of a point at  $x=1$  cm and  $t=1\text{sec}$ ?
21. State and prove the parallel axis theorem.
22. List the elementary particles and discuss about their spins. (5 x 4 = 20)

#### SECTION –D

Answer **any two** Questions. 10 marks each (Total 20 marks)

23. Define Young's modulus  $Y$ , Bulk modulus  $K$  and rigidity modulus  $\eta$  . Prove the relation

$$Y = \frac{9 \eta K}{3 K + \eta}$$

24. Derive an expression for the moment of inertia of a flywheel. Also discuss the experimental set up to determine M.I. of it in your laboratory.
25. Discuss the theory of forced oscillator and hence obtain the amplitude of oscillation at resonance.
26. Describe the quark model with the features of different quarks. Discuss the quark composition of any one baryon and one meson.

(10 x 2 = 20)

\*\*\*\*\*