

**B. SC. DEGREE EXAMINATION - NOVEMBER 2014****FIRST SEMESTER - PHYSICS (COMPLEMENTARY FOR BSc CHEMISTRY)****COURSE: U1CPPHY2: PROPERTIES OF MATTER, MECHANICS AND PARTICLE PHYSICS**

Time: Three Hours

Max. Marks: 60

**Part A**(Answer **all** questions )

1. Define bending moment of a beam.
2. What is a cantilever?
3. A torsion pendulum of length 25cm has a period of 10s. When length increased to 50 cm, the period is ---?
4. What is the physical significance of moment of inertia?
5. Define angular momentum.
6. Give the quark model of a proton.
7. What is the period of oscillation of a damped harmonic oscillator?
8. Distinguish between baryons and mesons. (1 x 8 = 8)

**Part B**(Answer **any six** questions)

9. Obtain an expression for the work done in twisting a wire.
10. Explain Poisson's ratio and discuss its limiting values.
11. If a body can rotate about a number of parallel axis, about which axis the moment of inertia be minimum? Why?
12. Draw the velocity-displacement graph of a body executing simple harmonic motion.
13. What are the conditions for a periodic motion to become a simple harmonic?
14. Protons and neutrons are made up of quarks. Explain it.
15. Write a note on the quantum numbers of elementary particles.
16. What are leptons? Give one example. (2 x 6 = 12)

**Part C**(Answer **any four** questions )

17. Obtain an expression for the moment of inertia of a ring about a tangent in its own plane.
18. State the moment of inertia of a solid sphere about a diameter. Hence obtain its moment of inertia about a tangent.
19. A metallic disc of mass 1kg and radius 12 cm is suspended in a horizontal plane by a wire attached to its centre. The radius of the wire is 0.6mm and its length is 2m. The period of oscillation is 5 seconds. Find the rigidity modulus of the wire.
20. Derive the expression for bending moment.
21. Explain free vibrations, forced vibrations and resonance. Illustrate with suitable examples.
22. Discuss any five salient features of elementary particles. (5 x 4 = 20)

### **Part D**

(Answer **any two** questions )

23. Describe, with necessary theory, how the rigidity modulus of the material of a rod is determined by the static torsion method.
24. State and prove the theorems of parallel axis and perpendicular axis in moment of inertia.
25. Explain simple harmonic motion and discuss its characteristic properties. Derive expressions for velocity and energy of a particle executing simple harmonic motion.
26. Derive the expression for the moment of inertia of a circular disc about an axis through the centre perpendicular its plane. Also find the moment of inertia of it about a diameter.

(10 x 2 = 20)