Reg. No……..……..……… Name…………...………… **U 130**

BSc DEGREE EXAMINATION - OCTOBER 2015

SEMESTER – 1, PHYSICS (COMPLEMENTARY FOR BSc CHEMISTRY)

COURSE: U1CPPHY2: PROPERTIES OF MATTER, MECHANICS AND PARTICLE PHYSICS

(Supplementary / Improvement)

Time: Three Hours   Max. Marks: 60

Part A

Answer **all** Questions, 1Mark each.

1. Which is more elastic, steel or rubber? Why?

2. What is Poisson's ratio?

3. What is the equation of motion of a torsion pendulum?

4. Define moment of inertia.

5. Write the differential equation of a Simple Harmonic Motion.

6. What is a flywheel?

7. Distinguish between fermions and bosons.

8. What are leptons? Give one example.   (1 x 8 = 8)

Part B

Answer **any six** Questions, 2 Marks each

9. State the basic assumptions for theory of bending of beams.

10. Distinguish between uniform and non-uniform bending.

11. State and explain the principle of conservation of angular momentum.

12. Discuss the difference between periodic and oscillatory motion with examples.

13. What are the characteristic properties of a simple harmonic oscillator?

14. How do you differentiate between leptons and baryons?

15. What is meant by colour of a quark? Give the colours associated with quarks.

16. Explain the theorem of perpendicular axis.   (2 x 6 = 12)

Part C

Answer **any four** Questions, 5 Marks each

17. A steel wire of diameter 2mm can withstand a maximum strain of 10^{-3}. Find the maximum load it can hold if the young's modulus of steel is $20 \times 10^{10} \, N/m^2$.

18. A particle executing simple harmonic motion has a maximum displacement of 4cm and its

19. Acceleration at a distance of 1cm from its mean position is $3cm/s^2$. What will be the velocity of the particle when it is at a distance of 2cm from its mean position?.

20. Write down the four basic interactions in nature. Give their relative strength and name the exchange particles responsible for them.

21. If the ice on the polar caps of the earth melts, how will it affect the duration of the day? Why?

22. A thin rod of length 60cm and mass 150gm. rotates 90 times per minute about an axis through one end perpendicular to the length. Calculate the moment of inertia, angular momentum and kinetic energy of the rod.

23. Derive the expression for the period of oscillation of a torsion pendulum.

(5 x 4 = 20)

Part C

Answer **any two** Questions, 10 Marks each

23. Describe an experiment to determine the moment inertia of a flywheel. Derive the expression   for its moment of inertia.

24. Explain the terms bending moment, plane of bending and neutral axis. Derive an expression for the bending moment of a beam.

25. Define simple harmonic motion. Establish the differential equation of a simple harmonic oscillator and find the expressions for its velocity, displacement and period.

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)

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