

Reg. No.....

Name.....

B.Sc. DEGREE END SEMESTER EXAMINATION - OCTOBER/NOVEMBER 2018**SEMESTER – 1: PHYSICS (COMPLEMENTARY COURSE FOR CHEMISTRY)****COURSE: 15U1CPPHY2: PROPERTIES OF MATTER, MECHANICS AND PARTICLE PHYSICS***(Common for Regular 2018 admission and improvement 2017/ supplementary 2017/2016/2015 admission)*

Time: Three Hours

Max. Marks: 60

PART A*Answer **all** questions, **1** mark each*

1. What is plasticity?
2. Hooke's law states that within the the stress is directly proportional to strain.
3. What is bending moment?
4. Moment of is called angular momentum.
5. Define radius of gyration.
6. Most of the mass of the flywheel is concentrated at the rim. Why?
7. A particle executing simple harmonic motion has a
8. What is Epoch?
9. Which is the weakest of all interactions in nature?
10. Mesons obey statistics. (1 x 10 = 10)

PART B*Answer **any seven** questions, **2** marks each*

11. Draw the stress- strain graph and explain its shape.
12. Explain why girders are of I shape.
13. Show how the value of σ limits between -1 and 0.5.
14. Show that stored energy density in a wire due to pulling is $\frac{1}{2}$ (stress x strain).
15. State and prove the perpendicular axes theorem.
16. Obtain an expression for the moment of inertia of a circular ring about its diameter.
17. Distinguish between periodic and oscillatory motions. Give examples.
18. What do you mean by free oscillation? What is meant by natural frequency?
19. Write a short note on quarks. (2 x 7 = 14)

PART C*Answer **any four** questions, **4** marks each*

20. Two wires made of the same material are subjected to a force in the ratio of 1:2. Their lengths are in the ratio 8:1. Find the ratio of their extension?
21. Calculate the couple required to twist one end of a wire of length 1 m and radius 1.5 mm through an angle 45° by keeping the other end fixed. Given $n = 5 \times 10^{10} \text{ N/m}^2$.

22. Obtain the expressions for the moment of inertia of annular disc about an axis passing through its centre and perpendicular to its plane.
23. Calculate the M.I. of a ring of mass 200 gm and radius 20 cm about (i) an axis passing through its centre and perpendicular to its plane (ii) about its diameter.
24. A body having a mass of 4 gm executes simple harmonic motion. The force acting on the body when displacement is 8 cm is 24 gm. wt. Find the period. If the maximum velocity is 500cm/s, find the amplitude and maximum acceleration.
25. The Quality factor of a harmonic oscillator consisting of a 50 gm mass attached to a massless spring is 200. It oscillates with an amplitude of 2cm in resonance with a periodic force of frequency 20 Hz. Determine the average energy stored in it and the rate of dissipation of energy.

(4 x 4 = 16)

PART D

Answer any two, 10 marks each.

26. Explain torsional couple. Obtain an expression for the couple per unit twist of a cylindrical rod.
27. Derive an expression for moment of inertia of solid sphere about a diameter and about a tangent.
28. Derive the differential equation for a forced harmonic oscillator. Obtain the condition for resonance.
29. Discuss the elementary particle quantum numbers and their conservation laws giving examples.

(10 x 2 = 20)
