Reg. No…… Name……

B.Sc. DEGREE END SEMESTER EXAMINATION OCTOBER/NOVEMBER 2017

SEMESTER **–1: PHYSICS (COMPLEMENTARY COURSE FOR CHEMISTRY)**

COURSE: **15U1CPPHY2: PROPERTIES OF MATTER, MECHANICS AND PARTICLE PHYSICS.**

(Common for Regular 2017 admission and Supplementary/Improvement 2016, 2015 & 2014 admission)

Time: Three Hours Max. Marks: 60

PART A

Answer **all** questions, 1 mark each (Total 8 marks)

1. Define the terms Stress and Strain. Mention their units.
2. What is meant by neutral surface of a bend beam?
3. Explain the concept of radius of gyration.
4. State the parallel axis theorem of moment of inertia.
5. State the difference between periodic and oscillatory motions.
6. What is meant by resonance? Write down the expression for resonant frequency.
7. Name the elementary particles.
8. What are the different quarks? (1 x 8 = 8)

PART B

Answer **any six** questions, 2 marks each (Total 12 marks)

9. Show that the work done in deforming a body in longitudinal strain is ½.stress.strain.
10. Distinguish between uniform and non-uniform bending.
11. Calculate the moment of inertia of a circular ring of mass M and radius R.
12. Derive an expression for the rotational kinetic energy of a rigid body.
13. What is a flywheel? Write down an expression for its moment of inertia.
14. Obtain the differential equation for a simple harmonic oscillator. Explain the terms involved.
15. Plot the variation of potential and kinetic energy with displacement of a simple harmonic oscillator.
16. Discuss the features of Baryons. (2 x 6 = 12)

PART C

Answer **any four** questions, 5 marks each (total 20 marks)

17. Calculate the depression at the free end of a cantilever of length 1.4 m loaded by 2kg at the free end. Breadth and thickness of the cantilever are 4cm and 9mm.Youngs modulus of the material is $2x10^{11}N/m^2$.
18. A wire 2m long and 10^{-3}m in radius stretches by $1.5x10^{-8}$ m under a load of 10kgWt.what is the diameter of another wire of length 3m made of the same material which stretches by $2x10^{-8}$m under a load of 20 Kg.Wt.

19. The blades of a ceiling fan starts from rest and acquires an angular velocity of π rad/sec in 4s.calculate (1)the average angular acceleration and (2)the number of revolutions made during this time.

20. A solid sphere made of steel has a diameter of 18cm. Determine its moment of inertia about a diameter. Density of the steel is $8x10^3 Kg/m^3$.
21. A body of mass 200gm is executing SHM along a straight line. At distances 10cm and 20cm from the mean position, velocities of the body are 2m/s and 1m/s respectively. Find the time period and frequency.
22. What are forced oscillations? Give the differential equation for a forced harmonic oscillator.

(5 x 4 = 20)

PART D

Answer **any two**. Ten marks each (Total 20 marks)

23. What are torsional oscillations? Obtain an expression for the time period of a torsion pendulum. How we can use this arrangement to determine the rigidity modulus of the material of a wire.
24. Define moment of inertia of a rigid body. Determine the moment of inertia of a rod about an axis perpendicular to its length and passing through (1) centre and (2) one end.
25. What are the characteristics of a SHM? Using differential equation for motion derive expressions for the velocity and acceleration.
26. What are elementary particles? Discuss in detail the elementary particle quantum number conservation laws. (10 x 2 = 20)

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