



LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

B.Sc. DEGREE EXAMINATION – CHEMISTRY

THIRD SEMESTER – NOVEMBER 2017

16UPH3AL01 – PHYSICS FOR CHEMISTRY - I

Date: 09-11-2017

Dept. No.

Max. : 100 Marks

Time: 09:00-12:00

PART-A

Answer ALL questions

(10x2=20 marks)

1. Draw velocity versus time graph.
2. State law of conservation of momentum.
3. What is Poisson's ratio?
4. Give the unit and dimension of viscosity.
5. State Charles's law.
6. Write any two laws of gas.
7. What is Unit Cell of crystal lattice?
8. Define Miller indices.
9. Distinguish between inertial and non-inertial frame of reference.
10. Calculate the rest energy mass of an electron.

PART-B

Answer ANY FOUR questions

(4x7.5=30 marks)

11. Determine the time period of oscillation of a liquid in a U-tube.
12. Describe Quincke's method of finding surface tension of a liquid.
13. a) Derive an expression for work done by gas in expansion.
b) A gas has a volume of 0.02 m^3 at a pressure of $2 \times 10^5 \text{ Pa}$ and temperature of 27°C . It is heated at constant pressure until its volume increases to 0.03 m^3 . Calculate the external work done.
(3+4.5 marks)
14. Give a brief note on classification of crystals.
15. Derive Einstein's mass energy equation.
16. Derive the expression to determine the excess pressure in a liquid drop.

PART-C

Answer ANY FOUR questions

(4x12.5=50 marks)

17. Determine the time period of oscillation of a simple pendulum and verify time period by energy method.
(6.5+6 marks)
18. a) Derive Poiseuille's formula for the rate of flow of liquid through a capillary tube.
b) Water flows through a horizontal tube of length 0.2 m and internal radius $8.1 \times 10^{-4} \text{ m}$ under a constant head of the liquid 0.2 m high. In 12 minutes $8.64 \times 10^{-4} \text{ m}^3$ of liquid issues from the tube. Calculate the coefficient of viscosity of water. Given, the density of water is 1000 kg/m^3 and g is 9.81 m/s^2 .
(8+4.5 marks)
19. a) State Avogadro's Hypothesis and hence derive the general gas equation.
b) A cylinder containing oxygen gas has a volume of $1 \times 10^{-2} \text{ m}^3$ at 300 K and a pressure of $2.5 \times 10^5 \text{ Pa}$. After some of the oxygen is used at constant temperature, the pressure falls to $1.3 \times 10^5 \text{ Pa}$. Calculate the molar mass of oxygen.
(8+4.5 marks)
20. a) State Bragg's law.
b) Explain the rotating crystal method to determine the interplanar spacing of a crystal.
(2.5+10 marks)
21. Describe Michelson-Morley experiment and discuss its negative results.
22. Explain the different types of crystal structure in cubic system.
