

Reg. No

Name

B. Sc DEGREE END SEMESTER EXAMINATION - OCTOBER 2019
SEMESTER 1 : FOR CHEMISTRY
COURSE : 19U1CPPHY2 : PROPERTIES OF MATTER AND THERMODYNAMICS
(For Regular - 2019 Admission)

Time : Three Hours

Max. Marks: 60

Section A**Answer any 8 (2 marks each)**

1. Write down poiseuille's equation and explain the symbols.
2. What are the factors on which the viscosity of a gas depend?
3. Why a larger rain drop falls faster than a smaller rain drop?
4. Mention three applications of stokes law.
5. What do you mean by an isothermal process? Obtain the equation.
6. Define efficiency of a heat engine and write expression for it.
7. Give a breif explanation about the different parts of a Heat Engine.
8. What is meant by elasticity?
9. Briefly explain the term "Stress"
10. What is meant by strain produced in a body?

(2 x 8 = 16)

Section B**Answer any 6 (4 marks each)**

11. In giving a patient a blood transfusion ,the bottle is setup so that the level of blood is 1.3 m above the needle which has an internal diameter of 3.6×10^{-4} m and is 0.03 m in length. If $4.5 \times 10^{-6} \text{m}^3$ of blood passes through the needle in one minute, calculate the viscosity of blood if its density is 1020kg/m^3 .
12. A liquid flows through a pipe of 10^{-3} m radius and 0.1 m length under a pressure of 10^3N/m^2 . Calculate the rate of flow and the speed of the liquid coming out of the pipe. $\eta = 1.25 \times 10^{-3}$ decapoise
13. Derive Mayer's relation using first law of thermodynamics.
14. Obtain the expression for the change in entropy during an isothermal process.
15. Calculate the increase of entropy when 1 g of water is heated from 0°C to 100°C . Given, specific heatcapacity of water = $4200 \text{Jkg}^{-1}\text{K}^{-1}$.
16. Describe an experiment to determine the Youngs modulus of the material of a rectangular scale by Cantilever method.
17. A disc 0.1 m in radius and weighing 1 kg is suspended in a horizontal plane by a vertical wire 1.5 m long attached to its centre. The diameter of the wire is 10^{-3} m and the period of torsional oscillations of the disc is 5 sec. Find the rigidity modulus of the material of the wire.
18. Briefly explain the dynamical method for determining the rigidity modulus of a rod.

(4 x 6 = 24)

Section C
Answer any 2 (10 marks each)

19. State and prove Bernoulli's theorem
20. (i) Describe adiabatic process and derive the expression for work done.
(ii) Explain about the thermodynamic parameter which remains constant during an adiabatic process.
21. Obtain an expression for the depression at the midpoint of a beam loaded at the centre. Hence arrive at the expression for Y of a bar of rectangular cross section.
22. Derive expressions connecting the three elastic moduli and Poisson's ratio.

(10 x 2 = 20)