

B. SC. DEGREE END SEMESTER EXAMINATION - OCT. 2020 : FEBRUARY 2021**SEMESTER 1 : COMPLEMENTARY PHYSICS FOR B SC CHEMISTRY****COURSE : 19U1CPPHY2 : PROPERTIES OF MATTER AND THERMODYNAMICS***(Common for Regular - 2020 Admission & Improvement / Supplementary 2019 Admission)*

Time : Three Hours

Max. Marks: 60

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

1. What is the effect of temperature on the viscosity of gases?
2. What is the cause of Brownian motion?
3. Explain the relation between surface tension and surface energy.
4. Why a hot liquid moves faster than a cold liquid?
5. Explain P-V diagram of an isothermal process.
6. State the first law of thermodynamics.
7. State Carnot's theorem.
8. Explain Neutral surface of a beam?
9. Give any three assumptions made in developing theory of bending.
10. What is Flexural rigidity?

(2 x 8 = 16)**PART B****Answer any 6 (4 marks each)**

11. Water flows through a horizontal pipe line of varying cross section. At a point where the pressure of water is 0.05 m of Hg, the velocity of flow is 0.25 m/s. Calculate the pressure at another point where the velocity of flow is 0.4 m/s. Density of water = 1000 kg/m³
12. Calculate the energy released when 8 droplets of water of radius 0.5mm coalesce to form a single drop. Given, surface tension of water 0.072N/m.
13. 1 Kg of air expands adiabatically so that it cools by 200K. Calculate the work done. γ (gamma)=1.4, C_p = 1000J/Kg.K
14. The temperature inside and outside a refrigerator are 273K and 303K respectively. Assuming that the refrigerator cycle is reversible, calculate the heat delivered to the surroundings for every joule of work done.
15. Derive the expression for work done in a P-V diagram.
16. A bar one metre long, 0.04 m broad and 0.005 m thick is supported on two knife edges 0.8 m apart. The depression produced by a 2 kg mass suspended from the centre of the knife edges is 0.005 m. Calculate the Young's modulus of the material of the bar.
17. A bar 1 m in length and 0.01 m square in section is clamped horizontally as a cantilever. When a load of 1 kg is applied to the free end, the depression of this end is 0.04 m. Find the Young's modulus of the material of the bar.
18. A beam of width 0.026 m and thickness 0.005 m is supported horizontally on knife edges 0.7 m apart. It is loaded with weights 0.15 kg each from its ends which project 0.10 beyond the knife edges. If the centre of the beam is thereby elevated by 0.003 m, calculate the Young's modulus of its material

(4 x 6 = 24)**PART C****Answer any 2 (10 marks each)**

19. Derive Stoke's formula for the velocity of a small sphere falling through a viscous fluid.
20. Discuss the working of a refrigerator with help of neat diagram
21. With the support of necessary theory, explain the dynamical method for the determination of Rigidity modulus of the material of the wire.
22. Obtain an expression for torsional couple. Also explain why hollow shafts are stronger than solid shafts of same mass and area of cross section.

(10 x 2 = 20)