



Avinashilingam Institute for Home Science and Higher Education for Women

(Deemed to be University under Category 'A' by MHRD, Estd. u/s 3 of UGC Act 1956)

Re-accredited with 'A+' Grade by NAAC. Recognised by UGC Under Section 12B

Coimbatore - 641 043, Tamil Nadu, India

Bachelor's Degree Examination – March 2021 I Semester

Class : I UG
Major : Physics

Time : 3 Hours
Max. Marks: 100

18BPHC01 Properties of Matter

Part A Choose the Correct Answer

10 x 1 = 10

- Dimensions of strain are
a. [L] b. $[M][L]^{-1}[T]^{-2}$ c. $[L]^{-1}$ d. It's a dimensionless quantity
- When an elastic material with young's Modulus is subjected to stretching stress S, elastic energy stored per unit volume of given material is (Here S-Stress, Y-Young's Modulus)
a. $YS/2$ b. $S^2(Y/2)$ c. $S^2 / 2Y$ d. $S/2Y$
- The Pascal second is
a. Nm^{-2} b. Nsm^{-2} c. Nsm^{-1} d. N/sm^{-2}
- The instrument used to compare the viscosities of two liquids is
a. Poiseuille's Apparatus b. Searl's apparatus
c. Ostwald's viscometer d. Rankine's apparatus
- A soap bubble has radius r and volume V. If the excess pressure inside the bubble is P. Then PV is proportional to
a. r b. r^2 c. r^3 d. r^4
- The rain drops are spherical in shape due to
a. residual pressure b. viscous force
c. surface tension d. viscosity
- Gravitational force is responsible for
a. Keeping planets on their axes
b. Keeping planets in their radii
c. For the motion of planets around the Sun
d. Mass ratio of the planets
- What is the relation between the escape velocity (V_e) and orbital velocity (V_o) of a satellite. If the satellite is close to the earth's surface?
a. $V_e = (2 V_o)^{1/2}$ b. $V_e = (2)^{1/2} V_o$ c. $V_o = (2 V_e)^{1/2}$ d. $V_o = V_e$
- At constant pressure, the osmotic pressure of dilute solution is directly proportional to the
a. Concentration of the solution b. Viscosity of the solution
c. Surface tension of the solution d. Mass of the solution
- Berkeley and Hartley apparatus is used for to determine the _____ of the solution.
a. Viscosity b. Concentration
c. Osmotic pressure d. Osmotic volume

Part B

5 x 6 = 30

Answer ALL questions

Each answer should not exceed 400 words or two pages

- 11.a. What are the different moduli of Elasticity? Define them.
(or)
- 11.b. A steel wire of diameter 3.6×10^{-4} m and length 4m extends by 1.8×10^{-3} m under a load of 1kg and twist by 1.2 radians when subjected to a total torsional torque of 4×10^{-5} Nm at one end. Find the values of E,G and U for steel.
- 12.a. Differentiate stream line and turbulent flow with definitions.
(or)
- 12.b. State and explain Bernoulli's theorem.
- 13.a. What is surface energy? How is it related to surface tension?
(or)
- 13.b. Reason out the following
- In case of mercury, there is capillary rise, why?
 - If two bubbles of different size are blown at opposite ends of a pipe , what will happen?
- 14.a. Deduce the Newton's law of Gravitation from Kepler's law.
(or)
- 14.b. What is the principle of Rocket? Explain.
- 15.a. Discuss the Graham's and Fick's laws of diffusion.
(or)
- 15.b. Demonstrate the Osmosis by a simple experiment.

Part C

5 x 12 = 60

Answer ALL questions

Each answer should not exceed 800 words or four pages

- 16.a. Deduce the expression for the bending moment and extend it to determine the depression of the loaded end of the cantilever.
(or)
- 16.b. Describe the method of determination of Young's modulus of a material through Koenig's method and deduce the formula used.
- 17.a. Derive the Poiseuille's formula for the flow of a liquid through a capillary tube and discuss about the corrections to be applied.
(or)
- 17.b. Describe the experimental setup and method of determination of viscosity of a liquid by Searle's viscometer.
- 18.a. Prove the excess of pressure on one side of a soap film of surface tension σ over that on the other side is given by $p = 2\sigma[1/R_1 + 1/R_2]$.
(or)
- 18.b. Explain the drop weight method experiment to determine the surface tension of a liquid.
- 19.a. Explain how g varies with altitude, latitude and depth. Obtain a general relation for the variation of g in each case.
(or)
- 19.b. Describe a method of determination of g with compound pendulum.
- 20.a. Give the theory of Osmosis and Vapour pressure of a solution.
(or)
- 20.b. How will you determine the molecular weight of a substance from elevation of boiling point of a solution and lowering freezing point of a solution? Explain.
