QUESTION BANK(2013-2014) (First sem)

SUBJECT: BASIC SCIENCE (PHYSICS)(17102)

Q.1 Questions for 2 Marks.

1. Define Deforming Force & Restoring force.
2. Define Elasticity and give example.
3. State Hooke's Law of Elasticity.
4. Explain the concept of Poission's ratio.
5. Define Velocity Gradient and state its Unit.
6. Define Viscosity and give SI unit of coefficient of viscosity.
7. State Archimede's Principle.
8. State Pascal's Law of pressure on liquid with example.
9. Calculate the pressure at a depth 5m inside the water.
10. Calculate strain produced in a wire under tension when its stress is 24 X 10^5 kg/m^2, Y for the material is 4 X 10^6kg/m^2.
11. Explain the effect of temperature and adulteration on viscosity of liquid.
12. Define Adhesive force and Cohesive force.
13. Define Surface Tension & give its Unit.

Q.2 Questions for 3 Marks

1. Explain Molecular theory of Elasticity.
2. Explain Newton's Law of Viscocity.
3. Explain Reynold's number and Give its significance.
4. Define Young's Modulus, Bulk modulus & Modulus of rigidity.
5. Define Strain And explain its types.
6. Derive an expression for pressure-depth relation.
7. A liquid flows through a pipe of radius4cm with a speed of 12m/s. The density of liquid is 0.85X 10^3 kg/m^3 and coefficient of viscocity is 0.6Ns/m^2.Determine reynold's no. & type of flow of liquid.
8. A metal cube is subjected to stress of 4 X 10^{10} N/m^2,each cube is shortened by 2%. Find volume strain and Bulk modulus of metal.

Q.3 Questions for 4 Marks.

1. Explain Behaviour of a wire under continuously increasing load.
2. Derive an equation for coefficient of viscocity by Stoke's Method.
3. Distinguish between Streamline flow and Turbulent flow.
4. A wire of length 1.5m extends by 1.5mm when a force is applied to it. Calculate the Stress produced in it. GivenY= 2 X 10^{11} N/m^2.
5. Define Breaking Stress, Ultimate Stress, Working stress and Factor of safety.
6. A spherical ball of radius 2.2mm and density 8X 10^3 kg/m^3falls through liquid of density 1.3X 10^3 kg/m^3. Coeficient of viscosity= 0.45Ns/ m^2.Find the Terminal velocity.
7. Explain Molecular theory of Surface tension.

Physics

Unit test 2

Question bank

Chapter 3: Thermal properties of matter

1. Define: a) Absolute zero temperature. b) Steady state c) Temperature gradient (04)

d) Coefficient of thermal conductivity.

2. 'we do not receive heat from the Sun by conduction' give reason (03)

3. Explain good and bad conductor of heat with two examples of each. (03)

4. Explain modes of transmission of heat. (03)

5. Find quantity of heat conducted in 5 minutes across a silver sheet of size 40cm × 30cm (04)

of thickness of 3mm. if its two faces are at temperatures of 40o C and 25o C, K for silver

=0.1kcal/m o Cs.

6. A metal rod of length 0.20 m has one of its ends at 20^{o} C, while the other end is at 50^{o}C the temperature gradient. (03)

7. State Boyle's law and Charles' law. (03)

8. Write general gas equation with meanings of each symbol used. Hence define universal gas

constant. State its S.I. unit. (03)

9. Define specific heat of a gas at constant pressure and specific heat of gas at constant gas

volume. Explain why Cp > cv (04)

10. Distinguish between isothermal and adiabatic expansion (process) of a gas. (04)

11. A balloon of maximum capacity of holding 2000 litres of gas.it is filled with 1800 litres of gas at 27^{o} C

Find its pressure at which the burst occurs. (04)

12. Certain mass of gas occupies 40 cc at 27o C and 780 mm of pressure. Find its volume at 47^{o}C

and 680mm of pressure and 74cm of Hg and is allow to rise in air. It burst at some time at

temperature 37^{o} C (04)

Chapter 4: Optics

1. What is refraction? State Snell's law of refraction.(03)

2. Derive prism formula.(04)

3. Define: a) minimum deviation. b) Total internal reflection c) Critical angle. d) Acceptance angle. (04)

4. Draw a neat labelled diagram of optical fibre. And state principle of it. (04)

5. Define numerical aperture. Derive an expression for numerical aperture. (03)

6. How long will light take in travelling a distance 500 m in water? R.I. of water is 4/3 and velocity of light in vacuum. Is 3 × 108 (03)

7. An optical fibre has a numerical aperture of 0.2, a core of refractive index 1.40.Calculate: a) Refractive index of cladding, b) the acceptance angle of a fibre. m/s. (03)

8. The refractive index of glass w. r. t. air is 1.33 and R. I. of Water w. r. t. air is 1.54. Find: a) R. I. of glass w.r.t. water b) R.I. of water w.r.t. glass. (04)

Chapter 5: Wave motion and Resonance

1. Define: a) Amplitude b) Periodic time c) Frequency (03)

2. Define a) Wavelength b) SHM c) Period d) Displacement (04)

2. State relation between velocity, frequency and wavelength (03)

3. Derive equation of SHM. (03)

4. Derive expression for velocity of particle in SHM. (03)

5. Derive expression for acceleration in SHM. (03)

6. Distinguish between transverse wave and longitudinal wave. (04)

7. A particle perform SHM. Its amplitude is 3cm. When a particle reaches at 2cm from the . Calculate: (a) period (b) frequency (c) (04)

8. A particle performing SHM along a straight line. At a distance of 3 cm from the mean mean position its acceleration becomes 3 cm/s2 maximum velocity (d) maximum acceleration. position its velocity becomes 12cm/c and at a distance 4cm from the mean position its velocity becomes 9cm/s. Calculate: (1) Amplitude of SHM, (2) Frequency of SHM. (04)

9. State the principle of superposition of waves. (03)

10. How are stationary waves formed? (03)

11. The velocity of wave is 320 m/s. if the frequency of vibration of wave is 480 Hz. Calculate the Wavelength. (03)

12. Find the corrected length of air column in a resonance tube of diameter 2.5 cm, if the length of the resonating air column, for the first resonance is 16 cm. (04)

-By Ravi Kolhe Sir