Academic year: 1st Year
Programme: Chem./Phys .
Date: 17 /01 /2012 **Final Exam**
Total assessment mark: 55

Department: **Physics**
Subject Title & code: **Properties of Matter**, p111
Time allowed: **3 hour**
No. of pages: (4)

جامعة الفيوم
Fayoum University

كليه العلوم

الفرقة الأولى (خواص مادة)

Answer ALL the following questions

Q1: A- Define all of the following and write the dimensional Formula:- (6 Marks)

1- Kinematic Viscosity 2- Compressibility

3- Reynold's Number 4- Specific Gravity

Q1: B- Check if the following two equations are dimensionally correct or not: (4 Marks)

1- $v = (Y/\rho)^{1/2}$ where v is the velocity of the longitudinal waves in a rod, Y is Young's modulus and ρ is the density.

2- $v = \dfrac{1}{18}\left[\dfrac{(\rho_s - \rho_f)gD^2}{\eta}\right]$ where v is the velocity of falling sphere (of density ρ_s and diameter D) in a fluid of viscosity η and density ρ_f.

Q2:- A- Differentiate between (فرّق بين) **each two of the following :-** (6 Marks)

1- The simple harmonic motion and the uniform circular motion

2- Plastic materials and ductile materials

3- A molecule at the water surface and another molecule below its surface.

4- Creep and Fatigue.

Q2:- B- Give the scientific reasons:- (2 Marks)

1-Water has a high value of surface tension coefficient.

2-The viscosity of liquids generally decreases with temperature whereas for gases it increases with temperature.

Q2:- C- A capillary tube can support a liquid of weight 6.28×10^{-4}N. If the surface tension of this liquid is 5×10^{-2} N/m. then calculate the radius of this capillary tube.(2 Marks)

Q3:- A- State Poiseuille law. Then derive Bernoulli's equation. (4 Marks)

Q3:- B- Write briefly (بإختصار) on :- (4 Marks)

1- Venturi tube 2- Open-tube manometer

Q3:- C- What is the weight of the heaviest needle, of length of 3.2 cm, that can be float when placed gently on the surface of the water (γ =0.073 J/m^2). (2 Marks)

10- The value given to standard pressure in Torr is:

   A- 540   B- 670   C- 760   D- 780

11- The bulk modulus of a fluid is inversely proportional to the

   A- Change in pressure   B- Volume of the fluid

   C- Density of the fluid   D- Change in its volume

12- The density of seawater is greater than that of fresh water. A boat will float:

   A- Higher in fresh water than in seawater.

   B- Lower in fresh water than in seawater.

   C- At the same level in both.

   D- Any of the above, depending upon its shape.

13- In an experiment to determine the Young's modulus of the material of a wire, the length of the wire and the suspended mass are doubled. Then the Young's modulus of the wire

   A- Becomes double   B- Becomes four time

   C- Remain unchanged   D- Becomes half

14- According to Hooke's law of elasticity, within elastic limits, if the stress is increased, the ratio of stress to strain

   A- Increases   B- Decreases   C- Becomes zero   D- Remains constant

15- The bulk modulus of a gas is 6×10^3 N/m^2. The additional pressure needed to reduce the volume of the gas by 10% is:

   A- 300 N/m^2 B- 400N/m^2 C- 1000N/m^2 D- 600N/m^2

16- The maximum velocity of a body in SHM is 0.25 m/s and the maximum acceleration is 0.75 m/s^2, the period of SHM is:

   A- $\left(\dfrac{\pi}{3}\right)$ sec   B- $\left(\dfrac{\pi}{2}\right)$ sec   C- $\left(\dfrac{2\pi}{3}\right)$ sec   D- π sec.

17- The modulus of elasticity is dimensionally equivalent to:

   A- Strain   B- Stress   C- Surface tension   D- Poisson's ratio

18- If a simple pendulum oscillates with an amplitude 50 mm and time period 2s, then its maximum velocity is: (A- 0.1   B- 0.157   C- 0.8   D- 0.18) m/s.