19101042

QP CODE: 19101042

Reg No : .....

Name : .....

B.Sc.DEGREE (CBCS) EXAMINATION, DECEMBER 2018

First Semester

Complementary Course - PH1CMT01 - PHYSICS-PROPERTIES OF MATTER & ERROR ANALYSIS

(Common toB.Sc Mathematics Model I, B.Sc Statistics Model I)

2017 Admission (Reappearance)

D3F8AFE7

Maximum Marks: 60 **Time: 3 Hours**

Part A

Answer any **ten** questions.

Each question carries **1** mark.

1. Draw the load extension graph for an elastic body and explain various points
2. What are the limiting values of Poisson's ratio of a material?
3. Explain the term flexural rigidity.
4. What are cohesive and adhesive forces?
5. What is the effect of temperature on viscosity of liquids?
6. Write down Poiseuille's equation and explain the symbols.
7. What do you mean by Brownian motion?
8. If $V=a^3$, relative error in V would be how many times the relative error in a .how?
9. What is the importance in estimating errors?
10. The radius of the sphere is measured with an error of 2%. What would be the percentage of error in its volume?
11. Give the formula for standard deviation
12. What is the error in the measurement of the speed of a vehicle which covered a distance of 60 km in 3 seconds?

(10×1=10)

Part B

Answer any **six** questions.

Each question carries **5** marks.

13. A wire, 4 m long and 0.3 mm in diameter, is stretched by a force of 0.8 kg wt. If the extension in length amounts to 1.5 mm, calculate the energy stored in the wire.

14. A uniform metal disc of diameter 10 cm and mass 1 kg is fixed symmetrically to the lower end of a torsion wire of length 1 m and diameter 1 mm, the upper end of which is fixed. The time period of the torsional oscillations is 2 s. Calculate the modulus of rigidity of the material of the wire.

15. Find the load required to stretch a steel wire of diameter 1 mm by 0.04% of its original length. Young's modulus of steel is 2×10^{10} N/m^2

16. Find the work done in splitting a spherical water drop of 1 cm radius into 100 droplets of equal size. Surface tension of water is 75×10^{-3} N/m.

17. Give Poiseuille's formula for the rate of flow of a liquid through a capillary tube. What are the limitations of Poiseuille's formula?

18. Explain the meaning of errors in measurement. Mention any five important types of errors usually occur in doing measurements.

19. Give any five rules for finding the number of significant digits in a quantity

20. A capacitor of capacitance C= (3.0 ± 0.1) μf is connected across a potential difference V of (2 ± 0.2) V. Calculate the charge Q with error limits. (C=Q/V)

21. Show that the fractional error in the product of two measured quantities is the sum of the fractional uncertainities in individual quantities

(6×5=30)

Part C

Answer any **two** questions.

Each question carries **10** marks.

22. What do you mean by Rigidity modulus of the material? Explain with necessary theory how rigidity modulus of material, taken in the form of a rod, can be determined using static torsion apparatus.

23. Explain the different factors affecting surface tension and discuss various applications of surface tension.

24. Derive Bernoulli's equation for the streamline flow of liquid. Discuss some applications of Bernoulli's equation.

25. a) Discuss the various types of errors in measurement? b) Explain the need for calibration of an instrument. Discuss some metods for calibration

(2×10=20)