21102441

B.Sc DEGREE (CBCS) EXAMINATIONS, OCTOBER 2021

First Semester

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

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

2017 Admission Onwards

2EBA11A7

Time: 3 Hours   Max. Marks : 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Why is steel preferred in structural design?

2. Is rigidity modulus is higher for thinner or thicker wire of the same material? Justify your answer.

3. Explain the term torsional rigidity of material.

4. What is surface energy?

5. Why does a liquid move faster when it is hot?

6. Define coefficient of viscosity of a fluid. Determine its dimensional formula.

7. What are the features of Bernoulli's theorem?

8. Distinguish between the measurements 5.0 and 5.00.

9. What do you mean by spurios response rejection in a measurement?

10. What is the importance in estimating errors?

11. How will you determine the error in the measured value q of where q =a+b?

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. Two cylinders of same length, mass and density but one solid of radius r and the other hollow of inner and outer radii r_1 and r_2 respectively. Which one requires more couple to twist through same angle? Explain.

14. A body, suspended symmetrically from the lower end of a wire, 1 m long and 1.22 mm diameter, oscillates about the wire as axis with a period of 1.25 sec. If the modulus of rigidity of the material of the wire is 8×10^{10} N/m^2. Calculate the moment of inertia of the body about the axis of rotation.

15. A steel wire of radius 1 mm is bent to form a circle of radius 50 cm. Calculate the bending moment if the Young's modulus is 2×10^{10} N/m^2

16. Derive equation of continuity for the flow of an incompressible fluid.

17. Derive Bernoulli's equation for the streamline flow of a liquid.

18. Differentiate between precision and accuracy.

19. The length, breadth and thickness of a metal block are 4,234m, 1.005m and 2.01cm. Its mass is 601.2 kg. Find its density to correct significant figures.

20. In an experiment, refractive index of glass was observed to be 1.45, 1.56, 1.54 and 1.53. Calculate the mean value of refractive index, mean absolute error and percentage error.

21. A student measures the acceleration due to gravity by measuring the time t for a stone to fall from a height h above the ground. He measured t as 1.6 ± 0.1 s and h as 12.5 ± 0.02m. What is the uncertainity in measurement of g?

(6×5=30)

Part C
*Answer any **two** questions.*
*Each question carries **10** marks.*

22. Explain the Hook's law. Determine the work done per unit volume when a body undergoes longitudinal strain and shearing strain.

23. Explain surface tension. Discuss the molecular theory of surface tension.

24. Discuss Poiseuille's method of determining the viscosity of liquid by constant pressure head method.

25. a)Explain how errors are estimated and reported? b)What do you mean by random errors and systematic errors? How can they be reduced?

(2×10=20)