QP CODE: 19103041

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Reg No : .....

Name : .....

B.Sc.DEGREE (CBCS) EXAMINATION, NOVEMBER 2019

First Semester

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

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

2017 Admission Onwards

80458CB6

Time: 3 Hours Maximum Marks :60

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 do you mean by torsional couple?
3. Explain the term flexural rigidity.
4. Mercury does not spread on a sheet of glass while water does. Why?
5. Explain why a great force is required to separate two glass plates enclosing a thin water film.
6. What do you mean by Brownian motion?
7. Explain Bernoulli's equation.
8. Why uncertainities are always added?
9. What is meant by precision in measurements?
10. What are random errors?
11. What is least count of an instrument?
12. Determine the error in measurement of speed osf particle using the formula s=d/t where d is the distance moved in time t.

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Part B

*Answer any **six** questions.*

*Each question carries **5** marks.*

13. A spherical ball contracts in volume by 0.2 %, when subjected to a normal uniform pressure of 200 $x10^5$ N/m^2 . Calculate the bulk modulus of the material of the ball.

14. 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.

15. The thickness of an iron plate is 0.75c m. A hole of radius 1.5 cm is to be drilled on the plate. The shear stress is 288×10^5 kg/m^2. Find the force needed to make the hole.

16. Define critical velocity of a fluid flow and Reynolds' number. What is its relation with the nature of the flow?

17. Calculate the terminal velocity of a glass ball of radius 1 mm and density 2000 kg/m^3, falling through an oil column of viscosity 0.27 Ns/m2. Density of the oil is 800 kg/m3 .

18. a)What is the meaning of saying that the result of a measurement has three significant figures?
    b)The mass of an electron is 9.10953×10^{-31} kg. Give the number of significant figures and order of magnitude.

19. The refractive index of water is found to have the values 1.29, 1.33, 1.34, 1.35, 1.32, 1.36, 1.30 and 1.33. Calculate the mean value, absolute error, the relative and the percentage error.

20. Find the standard deviation for the data series 12, 6,7,3,15, 10, 18, 5, 9

21. A physical quantity x is calculated from the relation $x=a^3b^2/\sqrt{}$ (cd).Calculate the percentage error in x if a, b, c, d are measured respectively with an error of 1%, 3%, 4%and 2%.

(6×5=30)

Part C

*Answer any **two** questions.*

*Each question carries **10** marks.*

22. Explain the terms plane of bending and axis of bending. Derive an expression for elevation at the mid-point of beam loaded uniformly on its both end.

23. Obtain an expression for the excess pressure inside a liquid drop and a bubble.

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

25. Discuss how errors propagate in sum, difference, product, division and powers of physical quantities.

(2×10=20)