

B. Sc. DEGREE END SEMESTER EXAMINATION : NOVEMBER 2023**SEMESTER 1 : PHYSICS****COURSE : 19U1CRPHY1 : METHODOLOGY AND PERSPECTIVES OF PHYSICS***(For Regular 2023 Admission and Improvement/Supplementary 2022/2021/2020/2019 Admissions)*

Time : Three Hours

Max. Marks: 60

PART A**Answer any 8 (2 marks each)**

1. Explain the plum pudding model of atom.
2. Find $10_{10} - 15_{10}$, using binary system.
3. Explain back lash error in a spectrometer and zero error in screw gauge.
4. What is a stationary point?
5. What you mean by significant figures and what are the rules for determining significance figures?
6. Give a short note on BCD.
7. Make a note on integrals associated with a vector.
8. Who discovered electron? Explain how the discovery of electron influenced atom models.
9. What is Raman effect?
10. Find $1001_2 - 110_2$

(2 x 8 = 16)**PART B****Answer any 6 (4 marks each)**

11. Find the best possible representation of 0.76_{10} in binary.
12. The period of oscillation of a simple pendulum is $T = 2\pi\sqrt{\frac{L}{g}}$. L is about 20 cm and have 1 mm accuracy. The period of oscillation is about 0.5 s. The time of 100 oscillations is measured with a watch of 1 s resolution. What is the accuracy in determination of g ?
13. When a current $I (10 \pm 0.1)$ A flows through a resistance R , a potential drop of $(100 \pm 5)v$ is observed. Estimate the percentage error in R .
14. Find the gradient of r (magnitude of position vector).
15. Prove BAC-CAB rule, by writing both sides in component form.
16. Obtain the result using 2's complement : (i) $5 \times 333_{10}$ and (ii) $6 \times -333_{10}$.
17. Find the standard deviation for the following data series 12, 6, 7, 3, 15, 10, 18, 5.9
18. A car travels at a speed of $v = 110 \pm 5$ km/h for $t = 3.4 \pm 0.1$ hours. Calculate the relative error in the distance travelled.

(4 x 6 = 24)**PART C****Answer any 2 (10 marks each)**

19. Make a note on cylindrical coordinate system. Obtain the corresponding formulae of gradient, divergence and Laplacian operations. Show one application of this coordinate system.
20. Explain absolute error and relative error. Derive the formula of error propagation for product and quotients.

21. Find the sum, $10101111.01010001 + 01111101.01111011$ using binary addition as well as after obtaining their decimal equivalents. Obtain the hexadecimal equivalent of the sum.
22. Describe in detail about,
- a) Homi J Bhaba and Indian Nuclear programme.
 - b) Vikram Sarabhai and Indian space program.

(10 x 2 = 20)