Reg. No ..... Name **22U131**

B. Sc. DEGREE END SEMESTER EXAMINATION : OCTOBER 2022

SEMESTER 1 : PHYSICS

COURSE : **19U1CRPHY1 : METHODOLOGY AND PERSPECTIVES OF PHYSICS**

(For Regular – 2022 Admission and Improvement / Supplementary - 2021/2020/2019 Admissions)

Time : Three Hours Max. Marks: 60

PART A

Answer any 8 (2 marks each)

1. Mention the contributions of Rayleigh.
2. Add the binary numbers 101 and 1100
3. Write the BCD and binary of the Decimal number 12 ..
4. How the error propagate in the measurement of difference of two quantities?
5. Discuss geometrical interpretation of a cross product.
6. What is Curie's law?
7. Explain the importance of Chandrasekhar limit
8. State rules of binary subtraction.
9. What is stability and sensibility of a balance?
10. Obtain the decimal equivalent of 32 bit binary word comprising of 1s.

(2 x 8 = 16)

PART B

Answer any 6 (4 marks each)

11. Find the components of the area vector passing through (1,0,0) , (0,2,0) and (0,0,3).
12. Convert 65,535 to its binary and hexadecimal forms.
13. The time period of a simple pendulum is measured five times and the readings obtained are 2.63 s, 2.56 s, 2.42 s, 2.71 s and 2.80 s. determine the mean absolute error, relative error and percentage error.
14. Give an expression for the relative error in Z if $Z = (A B^{1/2}) / (C^{3/2} D)$
15. The refractive index of water measured to have values 1.29, 1.33, 1.34, 1.35, 1.32, 1.36, 1.30 and 1.33. Calculate the mean, absolute error, relative and percentage error
16. Find the decimal equivalents: (i) $FE86.3934_{16}$ and (ii) $AE95.2234_{16}$
17. Find the r, θ and ϕ (spherical polar coordinate system) in terms of x, y and z.
18. The length of a cube is 2.1×10^{-2} m. calculate the volume in correct significant figure

(4 x 6 = 24)

PART C

Answer any 2 (10 marks each)

19. Describe with theory the instruments for measuring current. How will you convert a galvanometer of resistance 12 ohms showing full scale deflection for a current of 3 milli ampere to an Ammeter of range 0 to 6 Ampere?
20. State and prove the fundamental theorems on gradient and divergence.

21. What are the major contribution from C.V Raman, S. N Bose and Meghnad Saha?

22. Find the sum, 10101011.01010111 + 01111101.01111011 using binary addition as well as after obtaining their decimal equivalents. Obtain the hexadecimal equivalent of the sum.

(10 x 2 = 20)