

TB231437Q

Reg. No :

Name :

BACHELOR'S DEGREE (C.B.C.S) EXAMINATION, NOVEMBER 2023

2018, 2019, 2020, 2021, 2022 ADMISSIONS SUPPLEMENTARY

SEMESTER I - CORE COURSE (PHYSICS)

PH1B01B18 - Methodology and Perspectives of Physics

Time : 3 Hours

Maximum Marks : 60

Part A

I. Answer any Ten questions. Each question carries 1 marks

(10x1=10)

1. Comment on Newton's deterministic universe.
2. State Planck's quantum hypothesis.
3. Define natural radioactivity and give its two characteristics.
4. Write BCD and Binary of decimal 12 and 45.
5. Represent decimal +77 and -17 in 8 bit 2's complement representation.
6. Express curl of a vector field.
7. Find the gradient of function $x^2 y^3 z^4$.
8. Write down the expression for volume element in cylindrical coordinate system.
9. Determine the polar coordinate for the point whose cartesian coordinate is (2,-6).
10. Explain the concept of zero error with respect to a screw gauge.
11. State the number of significant figures in the following. (i) 0.00710 J (ii) 0. 1071 m
12. Estimate the error in the total surface area of a cube if the error in the length of the side of the cube is 2%.



Part B

II. Answer any Six questions. Each question carries 5 marks

(6x5=30)

13. Express Rayleigh-Jean's law and Wein's law. Represent the range of wavelength over which these laws are satisfied in a black body spectrum.
14. State Heisenberg's uncertainty principle. Estimate the uncertainty in velocity If you measure the position of an electron in an atom to an accuracy of 0.0100 nm.
15. Add the following using 2's complement method (a)+118 and -68 (b) +48 and -69
16. State the fundamental theorem of calculus . Give its geometrical interpretation.
17. Express velocity $\frac{d\vec{r}}{dt}$ and acceleration $\frac{d^2\vec{r}}{dt^2}$ in polar coordinates.
18. The angular diameter of a planet is measured to be 44.56" of an arc when it is at a distance of 702.5 million km away from our earth. Calculate the diameter of the planet.
19. Distinguish between random error and systematic error.
20. Define relative error and percentage error. The length of a rod measured in an experiment is recorded as 3.87m, 3.75 m, 3.65 m, 3.82 m and 3.79 m respectively. Find the percentage error.
21. Find the mean value and standard deviation for the given data series 12, 6, 7, 3, 15, 10, 18, 5.

Part C

III. Answer any Two questions. Each question carries 10 marks

(2x10=20)

22. Report Scientific contributions of any three Indian Scientists.