

D 32236

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Name.....

Reg. No.....

**FIRST SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION  
NOVEMBER 2022**

Physics/Applied Physics

PHY 1B 01/APY 1B 01—METHODOLOGY OF SCIENCE AND PHYSICS

(2017—2018 Admissions)

Time : Three Hours

Maximum : 80 Marks

**Part A***Answer all questions.**Each question carries 1 mark.*

1. Write the unit of Boltzman's constant ?
2. Write down the unit of frequency.
3. Write down Rayleigh-Jean formula.
4. The energies of photoelectrons liberated by light depends on \_\_\_\_\_ of light.
5. What is Photon ?
6. What is the value of Boltzmann's constant ?
7. In Rutherford scattering experiment, the \_\_\_\_\_ particles were used for scattering.
8. Unit vector along  $z$  direction is \_\_\_\_\_.
9. Dot product is a \_\_\_\_\_ product (scalar/vector)
10. Write down the  $\nabla$  operator.

(10 × 1 = 10 marks)

**Part A***Answer all questions.**Each question carries 2 marks.*

11. Explain photoelectric work function.
12. Explain proper length.
13. Explain the significance of peer review.

**Turn over**

14. What are de-Broglie waves ?
15. Explain Quantum theory.
16. Define Relativity of Simultaneity.
17. Explain the role of mathematics in physics.

(7 × 2 = 14 marks)

### Part C

Answer any **five** questions.

Each question carries 4 marks.

18. Write down the consequences of special theory of relativity.
19. Write a note on black body radiation.
20. Write notes on Auxiliary hypothesis and Ad-hoc hypothesis.
21. What are the significance of peer review.
22. Write a note on ultraviolet catastrophe.
23. Explain the role of mathematics in physics.
24. Explain the three different operations of  $\nabla$ .

(5 × 4 = 20 marks)

### Part D

Answer any **four** questions.

Each question carries 4 marks.

25. A proton has kinetic energy  $E = 100\text{keV}$  which is equal to energy of a photon. Let  $\lambda_1$  be the de-Broglie wavelength of the proton and  $\lambda_2$  be the wavelength of the photon. Find the ratio  $\lambda_1/\lambda_2$ .
26. A spacecraft is moving relative in the earth. An observer on the earth finds that, between 1 P.M. and 2 P.M. according to her clock, 3601 s elapse on the spacecraft's clock. What is the space crafts speed relative to the earth ?
27. When radiation of certain wavelength shines on the cathode of the photoelectric cell, the photocurrent produced can be reduced to zero by applying stopping potential of 2.63 V. If the work function of the photo emitter is 4 eV, find the wavelengths of radiation.