QP CODE: 20100436

20100436

Reg No : .....

Name : .....

BSc DEGREE (CBCS) EXAMINATION, MARCH 2020

Sixth Semester

Core course - PH6CRT10 - RELATIVITY AND SPECTROSCOPY

B.Sc Physics Model I,B.Sc Physics Model II Computer Applications,B.Sc Physics Model III Electronic Equipment Maintenance,B.Sc Physics Model II Applied Electronics

2017 Admission Onwards

6DD1DCF3

Time: 3 Hours Marks: 60

Part A

*Answer any **ten** questions.*

*Each question carries **1** mark.*

1. Distinguish between inertial and non-inertial frame of reference.
2. What is the importance of Michelson-Morley experiment?
3. Discuss the concept of space and time in the special relativity theory.
4. Explain gravity waves.
5. How is a continuous spectrum produced?
6. What is the direction of spin magnetic moment of an electron with respect to its spin angular momentum?
7. What are the possible values for the total angular momentum quantum number J for an atom with orbital angular momentum quantum L and spin angular momentum quantum number S?
8. What is anomalous Zeeman effect?
9. Iron could not be heated with a Microwave oven. But microwave oven can be used to heat food materials. Why?
10. Briefly explain the experimental arrangement of Raman effect.
11. What is the use of Raman spectroscopy?
12. Give the equation resonance condition in NMR.

(10×1=10)

Part B

*Answer any **six** questions.*

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

13. Obtain Galilean transformation equations.

14. Calculate the length of rod of length one meter moving with a speed of 2.5×10^8 m/s.

15. Find the speed and momentum of a proton whose total energy is 3.5GeV.

16. The series limit wavelength of Balmer series in Hydrogen spectrum is 364.6 nm . Find the wavelength of the first member of this series.

17. Explain the concepts underlaying vector atom model.

18. How is anomolous Zeeman Effect is exaplained using quantum theory?

19. Derive the expression for energy of a diatomic molecule from the theory of a harmonic oscillator

20. Obtain a simple relation for the relative intensity of Stokes lines and anti Stokes lines. How does the intensity varies with temperature?

21. A free electron is placed in a magnetic field of strength 1.3 T. Calculate the resonance frequency if g=2.0023.

(6×5=30)

Part C

*Answer any **two** questions.*

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

22. Derive the basic equation of Lorentz transformation.

23. Derive Einstein's mass energy relation. Give examples to prove the mass energy equivalence.

24. Explain how Rutherford developed the nuclear theory of the atom.

25. Explain the occurrence of Raman effect based on the Classical theory.

(2×10=20)