

E 1155

(Pages : 2)

Reg. No.....

Name.....

B.Sc. DEGREE (C.B.C.S.S.) EXAMINATION, MARCH 2018

Sixth Semester

Core Course—RELATIVITY AND SPECTROSCOPY

[Common for B.Sc. Physics Model I, Physics Model II, Physics EEM and Physics Instrumentation]

(2013 Admission onwards)

Time : Three Hours

Maximum Marks : 60

Part A

Answer all questions

Each question carries 1 mark.

1. The special theory of relativity was proposed in the year _____.
2. An inertial frame of reference is one in which a body moves with _____ velocity.
3. The Zeeman Effect is a clear confirmation of _____ quantization.
4. _____ electron is responsible for ESR spectroscopy.
5. In Bohr atom model 'n' denotes _____ quantum number.
6. The IR absorption line in Raman spectra in the frequency difference between modified and _____ line.
7. The spectrum of a rigid molecule consists of _____ spaced lines.
8. In Stern-Gerlach experiment the magnetic dipole is placed in a _____ magnetic field.

(8 × 1 = 8)

Part B

Answer any six questions.

Each question carries 2 marks

9. State the postulates of special theory of relativity.
10. Distinguish between inertial and non-inertia frame of reference.
11. Give the significance of Michelson-Morley experiment.
12. What is anomalous Zeeman Effect ?
13. What is LS coupling ?

Turn over

14. What is the difference between absorption and emission spectra ?
15. What is called phosphorescence ?
16. What is Paschen Back effect ?
17. What is Raman Effect ?
18. List the different molecular energies.

(6 × 2 = 12)

Part C

*Answer any four questions.
Each question carries 4 marks.*

19. Write a note on general theory of relativity.
20. What is the mean life of a meson travelling with a velocity 70% of the velocity of light? The proper mean life time is 2.2×10^{-8} s.
21. Write a note on fine structure of Sodium D-line.
22. Mention the applications of NMR.
23. Explain rotational spectra in terms of rigid rotator.
24. Describe the quantum theory of Raman Effect.

(4 × 4 = 16)

Part D

*Answer any two questions.
Each question carries 12 marks.*

25. Derive the basic equations of Lorentz transformation.
26. What is electron spin resonance ? Describe the principle and working of an ESR spectrometer.
27. Obtain the mass energy relation.
28. Describe about infra-red spectroscopy in detail.

(2 × 12 = 24)