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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- December-2018

B.Tech. Ist Semester (CSE, ECE,CE,IT)

COURSE CODE: 18B11PH111/10B11PH111

MAX. MARKS:35

COURSE NAME: ENGINEERING PHYSICS –I/Physics-I

COURSE CREDITS: 4

MAX. TIME: Two Hours

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

1. Explain how interference fringes are formed by a thin Wedge shaped film, when examined by normally reflected light? Find the expression for fringe width. [Marks 3]
2. In Newton's ring experiment, the diameter of the 4th and 12th rings is 0.4cm and 0.7cm, respectively. Find the diameter of 20th dark ring. [Marks 2]
3. Distinguish between single slit and double slit diffraction patterns. [Marks 2]
4. Calculate the specific rotation if the plane of polarization is turned through 26.4° on traversing 20cm length of 20% sugar solution. [Marks 2]
5. Show that $x^2 + y^2 + z^2 - c^2t^2 = 0$ is invariant under Lorentz transformation. [Marks 3]
6. If a rod is moving with velocity 0.85c in the direction inclined at 45° to its own length, calculate the percentage of length contracted. [Marks 3]
7. Show that the relation between the momentum and energy of a particle is given by $E^2 = p^2c^2 + m_0^2c^4$, m_0 is rest mass of particle. [Marks 3]
8. Given that total energy of a particle is exactly equal to two times its rest mass energy, what is the velocity of the particle? [Marks 2]
9. Are the states T_1 and T_2 possible or impossible? Justify your answer. [Marks 3]
10. What is normal Zeeman effect? Explain the splitting of spectral lines in normal Zeeman effect and show that a spectral line split into three spectral lines. [Marks 4]
11. The Zeeman components of 500nm spectral lines are 0.0116nm apart, when magnetic field is 1.00T. Find the ratio e/m for the electron from this data. [Marks 2]
12. Calculate the amount of work done during isothermal and adiabatic processes. [Marks 4]
13. In a Carnot's engine the temperature of the source and sink are 500K and 375K, respectively. If the engine consumes 6×10^5 cal per cycle, find (i) efficiency of the engine, (ii) work done per cycle. [Marks 2]