

# KANDI RAJ COLLEGE

BSc (3 Yr Degree Course) HONOURS PART III

Internal Examination-2020

Subject - Physics (Honours)

## Paper-VII

Full Marks -16

*The figures in the right hand margin indicate marks*

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(Answer any eight questions)

2x8=16

1. a) At what fraction of the speed of light must a particle move so that its kinetic energy is double its rest energy?
- b) Derive expressions for length contraction and time dilation using Lorentz Transformation equations.
- c) What is meant by displacement current density? Write down Maxwell's equations in free space.
- d) Distinguish between Fresnel and Fraunhofer class of diffractions.
- e) Show that, the equation  $\vec{\nabla} \times \vec{B} = \mu_0 \left( \vec{J} + \frac{\partial \vec{D}}{\partial t} \right)$ , where the symbols have their usual meanings, is consistent with the equation of continuity.
- f) What is a quarter wave plate? How can it be used to produce circularly and elliptically polarized light?
- g) What are the differences between a grating spectra and prism spectra?
- h) What is meant by 'missing order' in a double slit diffraction pattern?
- i) Explain Malus' law.
- j) Obtain the relativistic formula for the addition of velocities.