RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

SECOND YEAR

B.A./B.SC. FOURTH SEMESTER (January – June) 2013

Mid-Semester Examination, March 2013

Date : 05/03/2013 **PHYSICS (General)**

Time : 12 noon – 1 pm Paper : IV Full Marks : 25

Answer any five questions from Gr-A, Gr-B and Gr-C.

Use three answer scripts, one for each group.

Group -A

Answer any one question.

1. Derive an expression for the intensity distribution at a point due to interference of two coherent monochromatic light beams of same wave length in Young's double slit experiment. 5

2. a) Using Huygens' principle, explain how light propagate in the medium. 2
b) Prove laws of reflection with help of wave theory. 3

Group - B

Answer any one question.

3. What do you mean by static and dynamic resistances of a diode? How does the dynamic resistance varies with temperature? Explain. 1+1+3

4. What is a Zener diode? Distinguish between avalanche breakdown and Zener breakdown. 1+4

Group -C

Answer any three questions.

5. Using the invariance of the law of momentum conservation derive the formula for the variation of the relativistic mass with velocity. 5

6. a) What must be the velocity of a body in uniform motion for its length to be halved. 2
b) Establish the relativistic relation $E^2 = p^2 c^2 + m_o^2 c^4$, where the symbols have their usual meanings. 3

7.a) State and explain Bragg's law of x-ray diffraction. 2
b) A KCl crystal has a density of $1.98 \times 10^3\ Kgm^{-3}$ and its molecular weight is 74.55. Find out the distance between the adjacent Bragg's planes. 3

8.a) State Moseley's law for characteristic x-ray spectrum. ` 2
b) Explain Moseley's law from Bohr theory of atom. 3