PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BSc DEGREE EXAMINATION MAY 2019
(Fifth Semester)
Branch – PHYSICS
QUANTUM MECHANICS & RELATIVITY

Time : Three Hours   Maximum : 75 Marks

SECTION-A (20 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (10 x 2 = 20)

1   Define photo electric effect.
2   Define matter waves.
3   State Heisentierg's uncertainty principle.
4   Write any two applications of electron microscope.
5   Write Schrodinger's time dependent and time independent equations.
6   Define tunnel effect.
7   What is inertial and non-inertial frame of reference?
8   What is time dilation?
9   State the principle of equivalence.
10   State Einstein's law of Gravitation.

SECTION - B (25 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 5 = 25)

11   a   Write a note on Gravitational red shift.
                    OR
     b   Explain the dual nature of matter waves and write the quantum properties of micro particles.

12   a   Write in detail about any one application of uncertainty principle.
                    OR
     b   Explain the principle and construction of electron microscope.

13   a   Derive the solution for Schrodinger's equation for a particle in a box.
                    OR
     b   Explain tunnel effect by penetration of a particle through one dimensional potential barrier.

14   a   Derive Lorentz transformation equation.
                    OR
     b   Deduce the mathematical expression for the law of addition of velocities. Show that is no case can the resultant velocity of a material particle be greater than e.

15   a   Explain equality of gravitational and inertial masses and give the except of space and time.
                    OR
     b   Write a short note on Geodesics.

SECTION - C (30 Marks)
Answer any THREE Questions
ALL Questions Carry EQUAL Marks   (3 x 10 = 30)

16   Describe Davison – Germer's experiment for the study of the diffraction of electrons.

17   Illustrate Heinsberg uncertainity principle by any thought experiment.

18   Explain Schrodinger's time independent and time dependent wave equations.

19   Describe Michelson-Morley experiment and explain the physical significance of negative result.

20   What is General theory of Relativity and explain precession of perihelion of Mercury?

Z-Z-Z   END