

TMP161070A

Reg. No:

Name:

M. Phil. DEGREE EXAMINATION, MARCH, 2017
SEMESTER I - PHYSICS
PH1C2MP - GENERAL PHYSICS

Time: Three Hours

Maximum Marks: 75

PART A

I. Answer any nine questions. Each question carries 5 marks.

1. Explain the idea of gauge invariance in electrodynamics.
2. Write a short note on Feynman diagram.
3. What are the differences between quantization rules of fermions and bosons?
4. Show that the set of rotations in three dimensions form a subgroup $O(3)$.
5. Explain the terms a) Discrete group b) continuous group c) abelian group d) nonabelian group e) homomorphism f) proper subgroup.
6. WDFB.
7. Explain the determination of lattice strain in a powder specimen by x-ray peak broadening analysis.
8. What do you mean by field emission? How is it made used in SEM?
9. Explain the basic principle of Scanning tunneling spectroscopy.
10. Briefly explain the classification of low dimensional structures into quantum wells, quantum wires and quantum dots?
11. Explain the synthesis of nanoparticles through homogeneous nucleation with an example?
12. Explain the properties of graphene which makes it suitable for optoelectronic applications.

(9x5=45)

PART B

II. Answer all questions. Each question carries 15 marks.

13. Describe the theory of quantization of Klein-Gordon fields.

OR

Discuss various continuous and discrete symmetries related to space and time.

14. Derive the principles of quantum confinement effects for a particle in a 3-D potential well within the frame work of effective mass approximation?

OR

Describe the basic principles and applications of UV visible spectroscopy.

(2x15=30)

