

Reg. No

Name

18MP106

M Phil. DEGREE END SEMESTER EXAMINATION - MARCH 2018**SEMESTER 1 : PHYSICS****COURSE : 16MP1PHYT2 ; GENERAL PHYSICS***(For Regular - 2017 admission)*

Time : Three Hours

Max. Marks: 75

Section A**Answer any 6 (2 marks each)**

1. Explain continuous group and its generators
2. Explain an SU(2) group.
3. What is meant by symmetry in quantum mechanics?
4. Explain "Pinch effect".
5. Explain Lorentz gauge.
6. What is meant by retarded time?
7. Represent graphically the current voltage characteristic of a probe, inserted in a plasma.
8. What is a virial equation? Also explain virial coefficients.
9. What are "vicinal faces"?
10. "Define" isotropic solid " and "anisotropic" solid.

(2 x 6 = 12)**Section B****Answer any 3 (5 marks each)**

11. Show that α and β in Dirac hamiltonian are not numbers but matrices.
12. Prove that a group of order 4 may or may not be cyclic.
13. A person standing on a platform, close to a running train, is pulled towards the train. Explain
14. Discuss the motion of a particle in plasma if \vec{E} & \vec{B} are uniform but $\vec{E} \perp \vec{B}$ (\vec{E} = Electric field \vec{B} = magnetic field)
15. Write a short note on superfluidity
16. What is the observation of Kossel and Stranski regarding energy released during crystal growth. What is the total energy released.

(5 x 3 = 15)**Section C****Answer any 4 (12 marks each)**

17. Obtain the approximate value of U(t) for a free particle. Also evaluate it by path integral method.
18. What is meant by character table. Prepare the character table of Dihedral D_3 group .
19. Discuss time translational invariance and its physical significance.
20. Derive continuity equation. State, derive and discuss in detail Poynting's theorem.
21. Discuss scalar and vector potentials and derive the equation containing the potentials

Discuss in detail gauge transformation and how it modifies the equation.

22. Explain gravitational red shift . Derive the expression for gravitational red shift.
23. Describe cluster expansion technique for a classical gas. Show that the entropy of a real gas is more than that of corresponding ideal gas.
24. Discuss in detail the application of laser in science and industry.

(12 x 4 = 48)