Roll No.

Total No. of Pages : 01

Total No. of Questions : 08

Ph.D in Faculty of Applied Science (Physical Science) METHODS IN PHYSICS

M.Code : 77378

Time : 3 Hrs.

Max. Marks : 100

INSTRUCTIONS TO CANDIDATES :

- 1. Attempt any FIVE questions out of EIGHT question.
- 2. Each question carry TWENTY marks.

Q1. What do you understand by anharmonic solids? Explain the theory of anharmonic solids	
Q2. a) What is the importance of NMR techniques? Discuss in detail NMR techniques for material characterization.	(20)
b) Write a note on transferability and hardness of pseudopotentials.	(5)
Q3. a) Discuss about hypothesis and derivation of Hohenberg-Kohn theorem in explaining electronic properties of material.	(15)
b) What is the importance of Kohn-Sham equations?	(5)
Q4. Discuss the brief outline of density functional theory and Various hypothesis proposed study electronic properties of materials.	to (20)
Q5. a) Describe the quark model of particle physics. Draw the diagram of the lowest baryon octet. Write its spin and parity. Label the particles with their charge (Q), isospin (I), third component of isospin (I3), strangeness (S), quark content and point the direction of increasing order of mass. (15)	
b) What is the role of symmetries? Explain SU(2) and SU(3) symmetries.	(5)
Q6. a) What do you understand by CPT invariance? Explain.	(15)
 b) Comment if the following two reactions are possible or not. Give reasons to suppor your answers : i) K+ [] []+ +[]]+[]][]]- 	t (5)
ii) K+ 0 0+ +000	
Q7. Discuss Hartree-Fock theory of nuclear shapes and states? Discuss its various applic	ations. (20)
Q8. Discuss about Bethe-Goldstone equation and emergence of G-matrices.	(20)

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.