

PSG COLLEGE OF ARTS & SCIENCE  
(AUTONOMOUS)MSc DEGREE EXAMINATION DECEMBER 2018  
(Third Semester)

Branch - CHEMISTRY

**INORGANIC CHEMISTRY - III**

Time : Three Hours

Maximum : 75 Marks

Answer ALL questions

ALL questions carry EQUAL marks

(5 x 15 = 75)

- 1 a Describe the structure of zinc blende. (5)  
b How are X-rays generated? (4)  
c Discuss the principles of electron diffraction. How is it useful for structural elucidation of compounds? (6)  
OR  
d Discuss briefly the application of X-ray diffraction. (5)  
e Discuss briefly the structure of graphite. (4)  
f Discuss briefly the experimental method and application of neutron diffraction in the structural elucidation of compounds. (6)
- 2 a Discuss briefly the structure and applications of metalcluster compounds with suitable examples. (7)  
b Explain briefly the importance of Hume-Rothery ratio. (4)  
c What are semiconductors? How are they classified? Explain them. (4)  
OR  
d Discuss briefly the band theory on solids. (7)  
e What are crystal defects? How are they classified? Explain Schottky and Frenkel defects. (6)  
f What is metallic bond? Give one example. (2)
- 3 a Discuss briefly the mass defect and binding energy. (6)  
b Describe the properties of nucleus. (4)  
c Discuss in details the Meson field theory. (5)  
OR  
d Explain the Liquid drop model and its importance. (5)  
e What is atomic mass? How is it measured? (5)  
f What is Fermi gas model? Explain briefly. (5)
- 4 a Discuss the principle and working of G.M Counter. (6)  
b Explain the characteristics of  $\alpha$ ,  $\beta$  and  $\gamma$  rays. (5)  
c What is Cherenkov counter? Explain. (4)  
OR  
d Discuss briefly the principle and working of cyclotron. (5)  
e Discuss briefly the principle and working of scintillation counter. (5)  
f Describe briefly the importance of cloud chamber. (5)
- 5 a Explain the principle and applications of isotopic dilution analysis. (6)  
b What are fissile and fertile isotopes? Explain with suitable examples. (4)  
c What is meant by nuclear transmutation? Explain briefly the nuclear transmutation brought out by alpha particles. (5)  
OR  
d Discuss briefly the principle of atom bomb. (5)  
e Describe briefly the preparation of transuranic elements. (4)