Roll No. | | | | | | | | | | | | |

Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Chemistry) (2018 Batch) (Sem.-2)

CHEMISTRY OF MATERIALS

Subject Code : CHL-415A-18

M.Code : 75985

Time : 3 Hrs. Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains EIGHT questions carrying FIVE marks each and students have to attempt any SIX questions.**
3. **SECTION-C will comprise of two compulsory questions with internal choice in both these questions. Each question carries TEN marks.**

SECTION-A

1. Write briefly :

(a) Write down the electrical characters of the following monoxides of 3d metal :

CaO_x, FeO_x.

(b) How the micelles are formed?

(c) Why turbidity is observed in liquid crystals?

(d) Mention the number of occupation factor of spinel and inverse spinel.

(e) Why does white ZnO (solid) become yellow upon heating?

(f) Classify which of the following oxides forming glass and non-glass :

BeO, TiO_2, La_2O_3, B_2O_3.

(g) What is the general formula of perovskite and zeolites?

(h) Aqueous gold solution is yellow while nano-gold is never yellow-Why?

(i) Mention the number of pentagons and hexagons present in C_{60}.

(j) What is graphene? How is it related with graphite?

SECTION-B

2. What is CNT? How is it related with graphene?

3. Describe very briefly about smectic liquid crystal and nematic liquid crystal.

4. Why the Neel temperature increases from Mn to Ni oxides in a periodic table?

5. Fluorescence emissions of the semiconductor quantum dots are generally sharp and intense-Why?

6. MnO is semiconductor in nature while TiO is metallic conductor. Explain the reason.

7. What is bukcminster fullerene? Give the structural features of fullerene. How can you prepare fullerenes?

8. Briefly describe the ReO_3 corundum structure.

9. Explain the term 'top-down approach' for the synthesis of nanoparticles.

SECTION-C

10. Discuss the properties and applications of MOF in terms of their structural features.

OR

10. Mention the applications of nanomaterials in catalysis and energy science. Discuss the important methods to prepare CNTs.

11. Write a detailed note on aluminophosphates and there applications.

OR

11. What do you mean by organic-inorganic hybrid nanomaterials? Give one method to synthesize such material.

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.