AI—191—2017

FACULTY OF SCIENCE

M.Sc. (S.Y.) (Fourth Semester) EXAMINATION

OCTOBER/NOVEMBER, 2017

(CBCS Pattern)

INORGANIC CHEMISTRY

Paper XIX (543/1)

(Chemistry of Materials)

(Thursday, 16-11-2017)   **Time : 2.00 p.m. to 5.00 p.m.**

Time— Three Hours   *Maximum Marks—75*

N.B. :— (*i*)   Attempt *All* questions.

   (*ii*)   Figures to the right indicate full marks.

1.   Answer any *three* of the following :   15

   (*a*)   Discuss Screw-dislocation in solids.

   (*b*)   Describe ceramic matrix composite.

   (*c*)   Comment on nano-biomaterials.

   (*d*)   Discuss various composition of alloys of copper with their applications.

   (*e*)   Give various clay products with examples.

2.   Answer any *three* of the following :   15

   (*a*)   Discuss fibre-reinforced composites.

   (*b*)   Define and compare crystalline and non-crystalline materials.

   (*c*)   What is tempering and Anealing process ? Give its effects on metallic properties.

   (*d*)   Explain anelasticity in metals.

   (*e*)   Comment on Abrasives giving examples.

3.   (A)   Answer the following :   7

   Describe the cast alloys of Aluminium.

P.T.O.

Or

Discuss the following :

Sol-gel method for the synthesis of nanomaterials.

(B) Answer the following : 8

Explain the different types of Refractories with the examples of each.

Or

Discuss the following :

The different regions of Iron-Iron carbide phase diagram.

4. (A) Answer the following : 7

Describe the stress-strain behaviour in ceramics.

Or

Discuss the following sputtering chemical process of preparing nanomaterials.

(B) Answer the following :

Explain various types of glasses with their compositions. 8

Or

Discuss the following :

Photolithography.

5. (A) Choose the *correct* alternatives : 5

(*i*) r_C/r_A ratio in trigonal geometry is...........................

    (*a*) < 0.155   (*b*) 0.155-0.225

    (*c*) 0.225 - 0.414   (*d*) 0.414-0.732

(*ii*) C_{60} polymer represents ....

    (*a*) Bucky ball   (*b*) Sauccer ball

    (*c*) Fullerene   (*d*) All of these

(iii) Due to the hardness of ceramic materials, it is used for ....action.

    (a) Abrasive   (b) Cutting

    (c) Pressing   (d) Welding

(iv) The material LCMO represents :

    (a) $LaCaMnO_3$ (b) $LaCeMgO_3$

    (c) $LaCaMgO_3$ (d) $LaCeMnO_3$

(v) Deformation of metal takes place by passing in between two rolls is known as...............

    (a) Drawing   (b) Forging

    (c) Extrusion   (d) Rolling

(B) Write short notes on (any *two*) :   10

(i) Stainless steel

(ii) Carbon nanotubes

(iii) Polymorphism and Allotropy.