B.Tech. Civil (Construction Management)

Term-End Examination

ПП327   December, 2017

ET-204(A) : MATERIALS SCIENCE

Time : 3 hours   *Maximum Marks : 70*

Note : *Answer any **seven** questions. All questions carry equal marks. Support your answers with neat sketches. Use of calculator is permitted.*

1. (a)   Differentiate between an alloy and a compound, with the help of examples.   *5*

    (b)   Write down the fracture toughness value for the following materials (in 10^6 Pa.m$^{1/2}$) :   *5*

           (i)   Low carbon steel

           (ii)   Titanium alloys

           (iii)   Silicon carbide

           (iv)   Nylon

           (v)   Alumina

2. Explain the following :   *10*

    (a)   Bonding electron

    (b)   Lattice

    (c)   Quantum number

    (d)   Energy level of hydrogen atom

    (e)   Atomic orbitals

3. (a)   Fill the given table : (Any *five*)   *5*

S. No.	Crystal System	Cell dimension and angles	Bravais Lattice
1	Cubic		
2	Tetragonal		
3	Orthorhombic		
4	Rhombohedral		
5	Hexagonal		
6	Monoclinic		
7	Triclinic		

    (b)   Determine the packing fraction for BCC structure.   *5*

4. Draw the phase diagram for : (Any *two*)   *2×5=10*

    (a)   Pure Iron

    (b)   Water

    (c)   Iron-Carbon

5. Explain the following defects : $5\times2=10$

(a) Interstitial

(b) Edge dislocation

(c) Mixed dislocation

(d) Burgers circuit

(e) Screw dislocation

6. Define and explain Stress, Strain and S-S diagram. Explain the Strain-Time diagram for elastic and inelastic behaviour. $5+5$

7. Write the application of TTT diagram. Explain TTT diagram for Eutectoid steel. $4+6$

8. Write short notes on any *two* of the following : $5+5$

(a) Types of bonding in solids

(b) Selection parameters for building materials

(c) Superconductivity in metals