No. of Printed Pages : 3

ET-204(A)

B.Tech. Civil (Construction Management)

Term-End Examination

June, 2018

00083

ET-204(A) : MATERIALS SCIENCE

Time : 3 hours *Maximum Marks : 70*

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

1. (a) Can the same material exist in crystalline and amorphous form ? Give examples. Also define metals, ceramics and polymers. 5

(b) Discuss the selection parameters for any building material. 5

2. (a) Explain the different types of bonding in solids. 5

(b) (i) In ZrO_2, what is the CN for zirconium and oxygen ? $2\frac{1}{2}$

(ii) What are degenerate levels ? $2\frac{1}{2}$

3. (a) How do you determine the packing fraction for a BCC structure ? With a neat figure, show the direction in a cubic crystal. *5*

(b) Explain the principle of X-ray diffraction. *5*

4. Explain

(a) Iron-Carbon phase diagram *5*

(b) Micro structured evolution for simple systems *5*

5. Define *10×1=10*

(i) Creep
(ii) Creep rate
(iii) Shear
(iv) Ductile material
(v) Elastic deformation
(vi) Elasticity
(vii) Slip
(viii) Viscoelasticity
(ix) Plastic deformation
(x) Hooke's Law

6. (a) Explain super conductivity in metals and alloys. *5*

(b) A piece of copper 305 mm long is pulled in tension with a stress of 276 MPa. If the deformation is elastic, what will be the resultant elongation ?

$E_{copper} = 11 \times 10^4$ MPa. *5*

7. Discuss the following with suitable example : *5+5*

(a) Kinetic aspects of corrosion

(b) Principle of electrochemical cell

8. Write short notes on any ***two*** of the following : *2×5=10*

(a) TTT diagram

(b) Burgers vector

(c) Point defects in crystals