



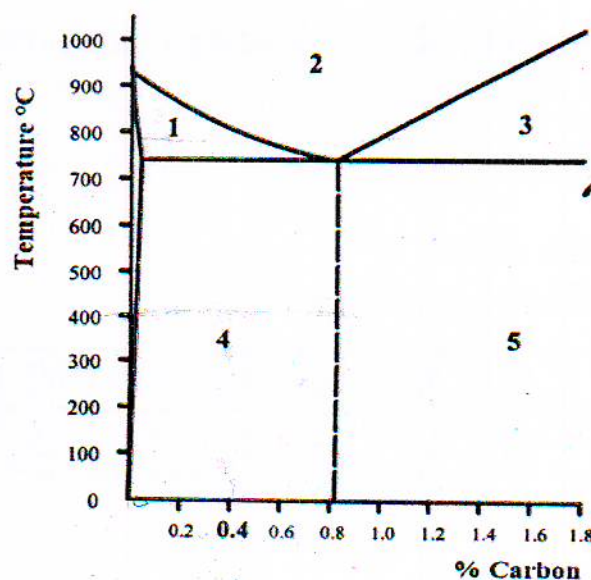
Answer 4 questions only

Q1- Explain two of the following with aid diagrams:-

- Drive the atomic packing factor (APF) for HCP.
- The difference between BCC and FCC crystal structures includes:-
Atoms basic- Atomic packing factor -Coordinate number.
- The layers of ingots solidification and explain the main factor affecting on ingots solidification.

Q2- A section of the iron-carbon equilibrium diagram as shown:

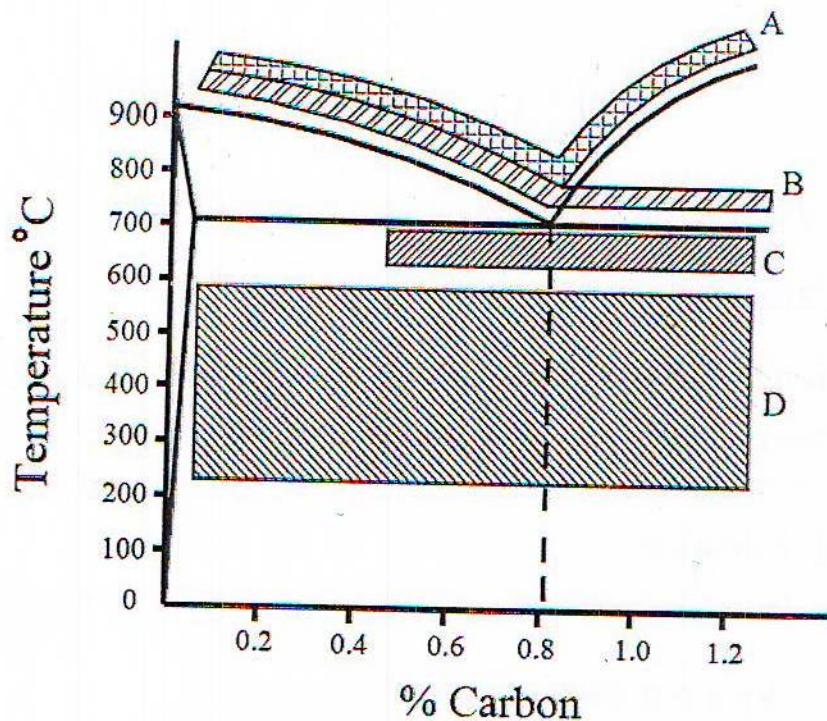
- Name the regions represented at 1, 2, 3, 4 and 5.
- Describe the main transformation occur (writ the formula) and drawing the microstructure.
- Determine the Wt. % for phases for 0.4% carbon at 800C and 400C.



- Explain the term of allotropy in Fe-c carbon diagram with aid diagram.

Q3-a -Temperature zones, A, B, C and D, for a range of heat-treatment processes for carbon steel are shown below.

Select any Two zones and explain the heat-treatment process that they represent.



b- Explain the term of TTT diagram.

Q4-a- The following data was obtained from a tensile test on a specimen of 10mm diameter and gauge length(L₀) 60mm.

Using the graph paper supplied, plot the load-extension diagram and determine:-

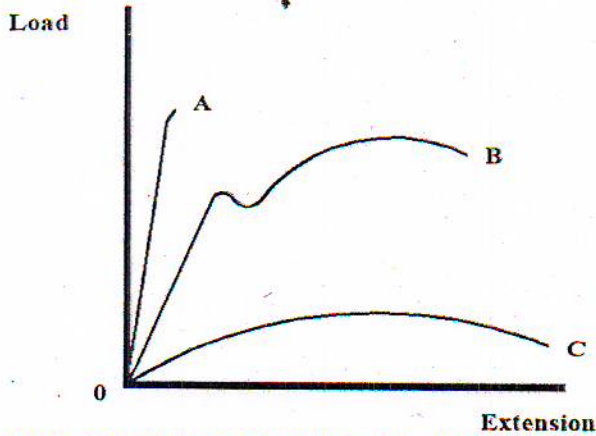
a- proof stress

b- The maximum tensile stress

C-Young's Modulus for the specimen

Load (kN)	16	32	56	72	95	110	132	142	140	135
Extension (mm)	0.2	0.4	0.7	0.9	1.5	2.5	5.0	8.5	10.0	12.0

b- With reference to the graph shown below with materials A, B and C). Give The examples of this material and which one is more ductility and toughness explain why??.



Q5-Describe, with the aid of suitable diagrams,

A-Differences between Vicker and Brinnel hardness test with refer to formula test and indenter.

b- Differences between Izod and Charpy impact test.

اهم المفردات التي قد يحتاجها الطاب:-
 With aid diagrams : مع اضافة مخططات
 Drive : اشتق
 Difference : الاختلاف
 Ingots solidification : تجمد الصبات
 Layers : طبقات
 Describe : أوصف
 Ductility : المطيلية
 Toughness : المتانة
 Occur : يحدث
 Plot : ارسم
 With refer to : مع الاشارة الى
 Formula test : قانون الاختبار
 Indenter : الجزء المتغلغل

Good luck