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CONFIDENTIAL

SET A

UNIVERSITI KUALA LUMPUR
Malaysia France Institute

FINAL EXAMINATION
JANUARY 2010 SESSION

SUBJECT CODE	:	FTB 15102
SUBJECT TITLE	:	MATERIALS ENGINEERING
LEVEL	:	BACHELOR
TIME / DURATION	:	12.30pm – 3.00pm (2.5 HOURS)
DATE	:	28 APRIL 2010

INSTRUCTIONS TO CANDIDATES

1. Please read the instructions given in the question paper CAREFULLY.
2. This question paper is printed on both sides of the paper.
3. Please write your answers on the answer booklet provided.
4. Answer should be written in blue or black ink except for sketching, graphic and illustration.
5. This questions paper consists of FIVE(5) questions. Answer FOUR (4) questions only.
6. Answer ALL questions in English.

THERE ARE 3 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

INSTRUCTIONS: Answer only FOUR (4) questions.
Please use the answer booklet provided.

Question 1

(a) Explain the basic difference between materials science and materials engineering.

(5 marks)

(b) Describe using an example the important characteristics of the following materials:-

i. metals

(5 marks)

ii. semiconductors

(5 marks)

(c) Describe with some simple examples the following inter-atomic bonds:-

i. ionic bonding

(5 marks)

ii. covalent bonding

(5 marks)

Question 2

(a) Explain with simple examples the following types of crystalline unit cell structures:-

i. face-centered cubic (FCC)

(6marks)

ii. body-centered cubic (BCC)

(6marks)

(b) Describe briefly the term 'direct' forging.

(4 marks)

(c) A 50 cm long square rod 15 mm on a side is loaded with a 750 kN compressive force. If the cross-sectional area of the rod increases by 10 %, determine the:-

i. stress in the rod

(3 marks)

ii. strain in the rod

(3 marks)

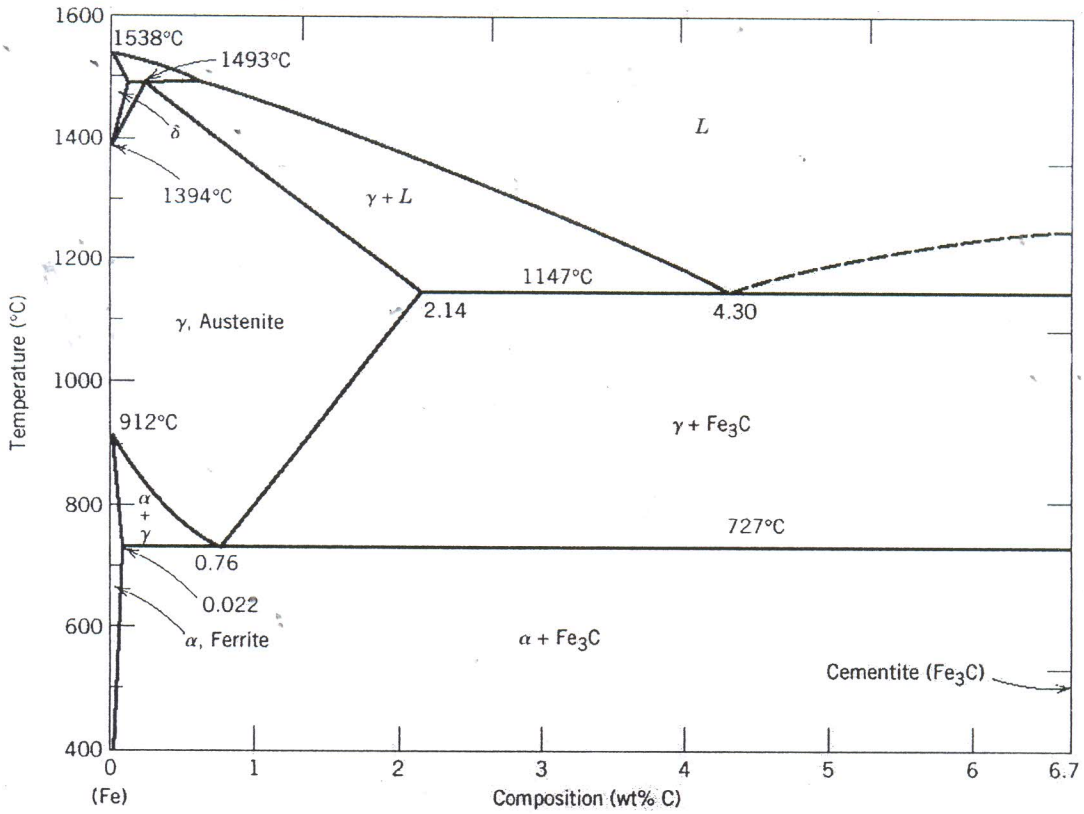
iii. final side length/dimension of the rod

(3 marks)

Question 3

Describe in detail the important phases in the Fe-Fe_3C phase diagram shown below.

(25 marks)



Question 4

(a) Explain on the aspect of impurities in ceramics.

(12 marks)

(b) Describe some the imperfection in ceramics called 'non-stoichiometry'.

(13 marks)

Question 5

(a) Explain the different types of polymer molecular structures.

(12 marks)

(b) List down and explain the important factors that influence the 'degree of polymer crystallinity'.

(13 marks)

END OF QUESTION