Reg. No.										

Manipal Institute of Technology, Manipal

(A Constituent Institute of Manipal University)

IIISEMESTER B.TECH (AUTOMOBILE ENGINEERING)

END SEMESTER EXAMINATIONS, DEC 2015/JAN 2016

SUBJECT: MATERIALS SCIENCE AND METALLURGY [AAE2153]

REVISED CREDIT SYSTEM

Time: 3 Hours MAX. MARKS: 50

Instructions to Candidates:

- Answer **ALL** the questions.
- Missing data may be suitable assumed.

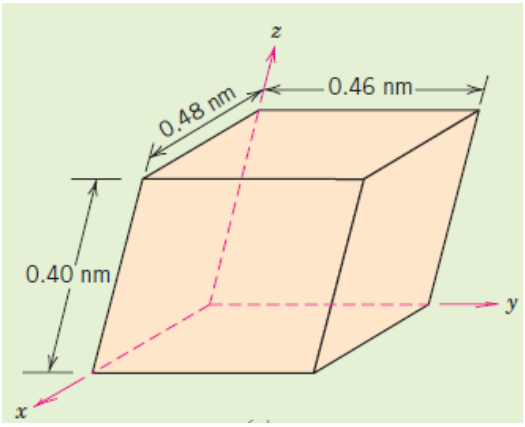
1A. What is space lattice and coordination number? **(02)**

1B. List the seven basic types of unit cells. **(03)**

1C. Calculate the coordination number for BCC, FCC and HCP types crystal structures **(05)**

2A. What are lattice parameters? List the lattice parameter relationships for any 3 types of crystal systems. **(04)**

2B. For the unit cell shown in the sketch, locate the point having coordinates [1/4, 1/8, 1/2]. **(03)**



2C. Specify point coordinates for all atom positions for a FCC unit cell. **(03)**

3A. Show pictorially (110) and (111) crystallographic planes inside a cubic unit cell **(02)**

3B. Define linear and planar density **(02)**

3C. Explain the X-ray Diffraction technique of finding the crystal structures. **(06)**

4A. Briefly write about the following: Self interstitial, substitutional and vacancy defects and solid solution. **(04)**

4B. List the factors influencing diffusion and Briefly explain about vacancy and interstitial diffusion. **(05)**

4C. What is strain hardening? **(01)**

5A. What are eutectic, eutectoid and peritectic reaction? **(03)**

5B. Briefly explain about austenite, ferrite and cementite microstructures of iron **(04)**

5C. Differentiate between Frenkel and Schottky defect **(03)**