【 July 2014 】

2014

Interdisciplinary Graduate School of Medicine and Engineering, Doctoral Course, University of Yamanashi

Entrance Examination

Course or Program	Special Doctoral Program for Green Energy Conversion Science and Technology	Subject	Materials Engineering

Question 1

Space charge layer is formed at the junction interface between p-type and n-type semiconductors. Explain “space charge layer”, using following six words; “carrier”, “diffusion”, “ionized donor”, “ionized acceptor”, “electric field”, and “depletion layer”.

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Question 2

Explain the difference between direct and indirect semiconductors.

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Question 3

Select all measurement techniques from the following options which is suitable for the evaluation of epitaxial films on single crystalline substrates, and describe the feature of the techniques.

(a) Conventional XRD measurement
(b) Grazing incidence X-ray diffraction (GIXRD) measurement
(c) Out-of-plane rocking curve measurement
(d) In-plane rocking curve measurement

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Question 4

Describe the deference between energy dispersive x-ray fluorescence spectrometry (EDXRF) and wavelength dispersive x-ray fluorescence spectrometry (WDXRF) and their advantages and disadvantages.