

Menoufia University
Faculty of Engineering, Shebin El-Kom
Basic Engineering Science Department
First Semester Examination, 2016-2017
Date of Exam: 31 / 5 / 2017



Subject: Electrical properties and Solar
Energy Materials
Code: BES525
Year: Postgraduate (Engineering Physics)
Time Allowed : 3 hours
Total Marks : 100 marks

Answer the following questions.

Question 1

(15 marks)

Show the meaning of the characteristic solar cell parameters, J_{SC} , V_{OC} , FF and P_{max} , with clarify how they are referring to the solar cell performance.

Question 2

(10 marks)

Clarify the difference between external quantum efficiency and internal quantum efficiency of solar cell?

Question 3

(15 marks)

Write short notes on the development of solar cells in view of which so called solar cell generations? Declare the advantages and disadvantages for each generation?

Question 4

(30 marks)

Discuss with draw the energy diagram for the process of charge generation and transport within organic photovoltaic cells and clarify the efficiency of all steps through the process and their effect in the performance of solar cell?

Question 5

(15 marks)

Show that, how the energy levels for the nanoparticles and polymer, in photoactive layer of bulk heterojunction solar cell, should be chosen in order to promote the charge separation and transfer?

Question 6

(15 marks)

For photoactive layer of organic/inorganic photovoltaic cells, explain to obtain morphologies in order to minimize surface the recombination losses by controlling the aggregation of the nanoparticles?

With my Best Wishes