



MULTIMEDIA UNIVERSITY COLLEGE OF KENYA
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(A CONSTITUENT COLLEGE OF JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY)

FACULTY OF ENGINEERING AND TECHNOLOGY

UNIVERSITY EXAMINATIONS - 2012/2013

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN ELECTRICAL & ELECTRONIC ENGINEERING AND BACHELOR OF SCIENCE IN ELECTRONIC AND COMPUTER ENGINEERING

EEE 2212: PHYSICAL ELECTRONICS

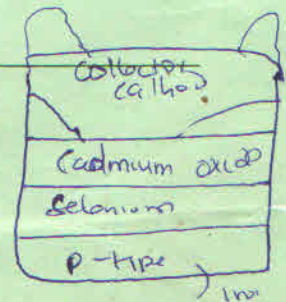
DAY & DATE: Tuesday December 18, 2012

TIME: 8.30 – 10.30 AM

VENUES: ECE: LR2 EEE: LR3

INSTRUCTION TO CANDIDATES

Attempt Question One and Any Other Two questions



QUESTION ONE – 30 MARKS (COMPULSORY)

- a) Briefly explain the phenomenon of *photo – electric emission* (5 marks)
- b) Using relevant sketches, describe the operation of Conventional *PN – junction photo – diode*. (7 marks)
- c) With the help of *V – I* characteristic of *P – I – N* photo – diode, identify and explain the three modes. (8 marks)
- d) State the **main** disadvantage of *P – I – N* photo – diode. *no gain* (2 marks)
- e) Explain how a photo – transistor differs from normal transistors (3 marks)
- f) Compare any **five** characteristics of *LEDs* and *LCDs*. (5 marks)

QUESTION TWO – 20 MARKS

- a) Define *Photo – voltaic effect*. (2 marks)
- b) Using relevant sketches, explain the principle of operation of *Photo voltaic Cells*. (8 marks)
- c) Outline **any three** disadvantages of *Photo – Voltaic cells*. (3 marks)
- d) The sun is a source of free, cheap, clean and readily available energy, explain the main obstacles to its domestic and commercial application in large scale. (6 marks)

12/30

30/30

QUESTION THREE -- 20 MARKS

- a) Briefly explain *photo-conductive effect*. (5 marks)
- b) With the help of energy band diagram, explain the operation of *light emitting diode (LED)*. (8 marks)
- c) Outline any **four** advantages of *LASER* over *light emitter diode*. (4 marks)
- d) State any **three** applications of *light emitting diodes*. (3 marks)

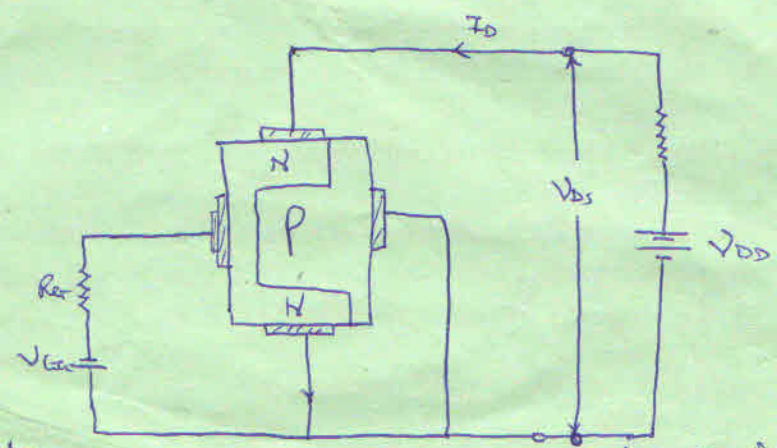
Good approach or highly detailed
 Efficiency is high than
 LED.

QUESTION FOUR- 20 MARKS

- a) Define *opto-couplers* (2 marks)
- b) With the help of a diagram, explain the operation of a *photo-multiplier*. (8 marks)
- c) List any **four** disadvantages of *photo-multiplier*. (4 marks)
- d) Sketch the *seven-segment display* circuit and its output. (6 marks)

QUESTION FIVE - 20 MARKS

- a) Using relevant sketches explain the operation of *n-channel JFET*. (6 marks)
- b) Describe the following characteristics of JFET: (6 marks)
 - (i) *Drain characteristics*.
 - (ii) *Transfer characteristics*.
- c) Explain how the induced channel is achieved in IGFET. (8 marks)



Depletion mode n-channel MOSFET.