R-16

Code: 6310E2/19

Faculty of Science

B.Sc (Physics) III-Year, CBCS-VI Semester Examinations, May/June 2019

PAPER: PHYSICS OF SEMICONDUCTOR DEVICES

Time: 3 Hours

Max Marks: 60

Section-A

I. Answer any Three of the following questions. (3x5=15 Marks)

1. Explain hole current flow mechanism in a semi-conductor.
2. Calculate the density of impurity atoms that must be added to an intrinsic silicon crystal so that it becomes 10^{-2} Ωm P-type silicon.

   [Given: μ_p=0.048 m^2/Vs]
3. Discuss the effect of temperature on diode current.
4. Draw tunnel diode characteristic plot and explain.
5. Mention the advantages and applications of MOSFET.
6. Write a short note on opto-couplers.

Section-B

II. Answer the following questions. (3x15=45 Marks)

7. (a) What is an intrinsic semiconductor? Show that the concentration of free electrons in an intrinsic semiconductor is given by $n = N_c\, e^{-(E_c - E_f)/kT}$

   (OR)

   (b) Classify the solids on the basis of energy band theory. Explain P and N type semiconductors.

8. (a) Explain with diagrams the principle and working of PN junction diode under forward and reverse biasing.

   (OR)

   (b) Explain zener breakdown. Describe the zener diode characteristics.

9. (a) Sketch and describe the CE output characteristics for a NPN transistor.

   (OR)

   (b) Discuss the structure and working of UJT with neat diagrams.

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Code: 6310E1/19

Faculty of Science

B.Sc (Physics) III-Year, CBCS-VI Semester Examinations, May/June 2019

PAPER: BASIC ELECTRONICS

Time: 3 Hours

Max Marks: 60

Section-A

I. Answer any Three of the following questions. (3x5=15 Marks)

1. Define active and passive elements, give examples.
2. State and explain reciprocity theorem.
3. What are extrinsic and intrinsic semi conductors?
4. What is an oscillator? Explain Barkhausen criteria.
5. Convert decimal to Binary 25_{10}
6. Explain 2's compliment method.

Section-B

II. Answer the following questions. (3x15=45 Marks)

7. (a) State and prove superposition theorem.

   OR

   (b) State and prove maximum power transfer theorem.

8. (a) What is transistor amplifier? Explain construction and working of R-C coupled amplifier.

   OR

   (b) Describe the construction and working of phase shift oscillator and derive equation for its frequency?

9. (a) What are the different logic gates? Explain about OR, AND and NOT logic gates giving their truth tables?

   OR

   (b) Explain Binary addition, substraction and Hexadecimal system with examples.

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