

Branch: B. Tech. (Group A/Group B)

Sem.:- I

Subject with Subject Code:-Basic Electronics Engineering (EXE105/EXE205)

Date: 11/12/2018

Marks: 60

Time:- 3 Hr.

**Instructions:-**

1. Attempt any *Five* questions.
2. All questions carry equal marks.
3. Illustrate your answer with neat sketches, diagrams etc. wherever necessary.
4. Necessary data is given in the respective questions. If such data is not given, it means that the knowledge of that component is a part of examination.
5. If some part or parameter is noticed to be missing, you may appropriately assume and state it clearly in the answer-book.

Q.1. A] Classify the engineering materials from materials science point of view. 06

B] Compare insulator, semiconductor and conductors. 06

Q.2. Attempt any *two* of the followings:

A] Describe the direct and indirect band gap semiconductors. 06

B] The resistivity of Cu is  $1.72 \times 10^{-8}$  ohm- m. Calculate the mobility of electrons in Cu. Given that the number of electrons per unit volume is  $10.41 \times 10^{28}/m^3$ . 06

C] Determine the concentration of conduction electrons in a sample of silicon, if one in every million silicon atom is replaced by a phosphorus atom. Assume every phosphorus atom to be singly ionized. Silicon has a molar mass of 0.028 kg/mole and density of 2300 kg/m<sup>3</sup>. 06

Q.3. A] Find the built-in voltage for a Si p-n junction with  $N_A = 10^{15} cm^{-3}$  and  $N_D = 10^{17} cm^{-3}$  06

B] Write a note on depletion layer capacitance and diffusion capacitance. 06

Q.4. Define transistor biasing. List and explain different transistor biasing techniques with suitable diagram and expressions. 12

Q.5. Attempt any *two* of the followings:

A] Describe the working of bridge rectifier with neat diagram and waveforms. Explain: Peak inverse voltage, ripple factor and efficiency with respect to a center tap full wave rectifier. 06

B] Explain different types of inductors in detail. 06

C] Describe construction and working of a LVDT. State any two advantages and disadvantages of LVDT. 06

Q.6 A] Do as directed: 06

- a) Obtain 2's complement of 00111001
- b) Add  $(AFF.B3)_H + (FFF.E)_H$
- c) Determine the floating point representation of  $(-142)_{10}$  using IEEE single precision format.

B] What are the Universal Gates? Realize a NAND gate using universal gates. 06

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