

**EC - 304****B.E. III Semester**

Examination, June 2014

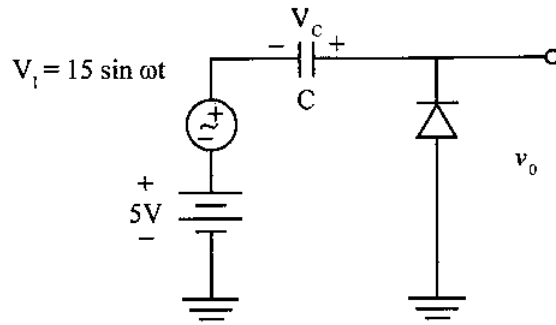
**Electronics Devices***Time : Three Hours**Maximum Marks : 70*

- Note:** i) Answer five questions. In each question part A, B, C is compulsory and D part has internal choice.  
ii) All parts of each question are to be attempted at one place.  
iii) All questions carry equal marks, out of which part A and B (Max. 50 words) carry 2 marks, part C (Max. 100 words) carry 3 marks, part D (Max. 400 words) carry 7 marks.  
iv) Except numericals, Derivation, Design and Drawing etc.
1. a) What condition must exist for diffusion to occur? 2  
b) Define an eV? 2  
c) A semiconductor has donor and acceptor concentration of  $N_D$  and  $N_A$  respectively. What relationship must be used to determine the electron  $n$  and hole  $P$  concentration. 3  
d) Draw and explain VI characteristic of p-n junction. 7

OR

Explain Hall effect? 7

2. a) Explain a clipper circuit? 2
- b) Find the steady state output of the diode clamper circuit shown in the fig. 2



- c) Consider a full wave rectifier circuit with a 60 Hz i/p signal and a peak output voltage of  $V_M = 10V$ . Assume the output load resistance  $R = 10 K\Omega$  and ripple voltage is to be limited to  $V_r = 0.3 V$ . Determine capacitance required to yield a particular ripple. 3
- d) Explain a sampling gate circuit. 7

OR

Explain working of a full wave bridge rectifier. 7

3. a) Describe the physical mechanism for avalanche breakdown. 2
- b) What is a light emitting diode? 2
- c) What are the two important difference between schottky diode and PN junction diode? 3
- d) Sketch the Volt Ampere characteristic of a tunnel diode. Indicate the negative resistance portion. 7

OR

Draw the Volt Ampere characteristic of photodiode and write the equation for the volt ampere characteristic. 7

4. a) State true or false giving reasons. 2
- i) Emitter area is smaller than the collector area
- ii) Emitter is heavily doped than collector.
- b) Define common emitter short circuit gain in words and by an equation. 2
- c) What are the values of  $V_{CE}$  at the edge of saturation  $V_{BE}$  at cut in and  $V_{BE}$  in active region? 3
- d) Define four modes of BJT operation and indicate the principle behavior in each mode. 7

OR

Draw a circuit of a transistor in CE configuration sketch the output characteristics. 7

5. a) Define pinch off voltage  $V_p$ . 2
- b) State three properties of an ideal voltage controlled current source. 2
- c) Why are NMOS devices preferred over PMOS. 3
- d) Explain what is meant by channel length modulation. 7

OR

Explain an NMOS enhancement device connected as a resistance. 7