Roll No.

B.Tech.
THIRD SEMESTER EXAMINATION 2015-16
EEC309
ANALOG & DIGITAL ELECTRONICS

Time: 3 hours **Max Mark: 100**

Note

- Attempt all questions.
- Marks and number of question to attempt from the section is mentioned before each section.
- Assume missing data suitably .Illustrate the answer with suitable sketch.

1. Attempt any four parts of the following: [4x5]
   a. Briefly, discuss the use of LED. Comment on their relative merits and demerits.
   b. Sketch the curve of photodiode current as a function of the position of a narrow light source from the junction? Give its one or two applications?
   c. A varactor diode with a linearly graded doping profile has a capacitance of 50pF when no bias is applied to the diode. Determine the junction capacitance for the silicon diode when the reverse bias applied to the diode is of 7V?
   d. Draw and explain the volt-ampere characteristic of a tunnel diode?
   e. Explain the working of Schottky diode?
   f. Discuss the capacitance-voltage characteristics of varactor diodes with their applications?

2. Attempt any two parts of the following: [2x10]
   a. Discuss the effect of voltage series feedback on the input and output resistances of a feedback voltage amplifier by deriving the necessary expression?
   b. Sketch a single stage, R.C. coupled transistorized, common emitter amplifier using NPN transistor. Draw its frequency response. Why the gain is low at very low and very high frequencies? How the bandwidth of the amplifier is determined from this response?
   c. What are the advantages of negative feedback in amplified? Explain them.

3. Attempt any two parts of the following: [2x10]
   a. Draw asimple phase shift oscillator using three sections of R-C circuit and an op-amp and explain whythree sections of R-C circuits are cascaded? Also derive the formula for frequency of oscillation.
   b. Explain why does crystal controlled oscillator give very good frequency stability? The parameters of a crystal oscillator equivalent circuit are L_s=0.8H; C_s=0.08pF; R_s=5kΩ and C_p=1.0pF. Determine the resonance frequencies f_s and f_p.
   c. State and explain the Barkhausen conditions for sustained oscillations.

4. Attempt any two parts of the following: [2x10]
   a. (i) Explain the function of "De-multiplexer" and "Multiplexer".
   (ii) Implement the function:
   $F(W,X,Y,Z) = \sum m(0,1,3,4,8,9,15)$

   using an 8:1 multiplexer with W, X and Z as select lines.
   b. Briefly describe J.K. Flip Flop and how can a D Flip Flop be implemented using a JK Flip Flop.
   c. (i) Explain the difference between a Synchronous and Asynchronous counter. Give a few example of each of them.
   (ii) What is a twisted ring counter? Explain its operation giving the states.

5. Attempt any two parts of the following: [2x10]
   a. Explain with diagram the principle of operation of an A/D converter based on "Successive approximation method."
   b. Design an A stable Multi-vibrator using 555 IC to generate a square wave of 10KHz with 60% duty cycle, Use a capacitor of 500pF. Explain the circuit operation with waveform?
   c. Draw a BJT RAM cell and explain how data can be stored and retrieved from it?