Code: **EE2T4**

PVP 12

I B.Tech-II Semester-Regular Examinations - July 2014

ELECTRONIC DEVICES AND CIRCUITS
(Electrical & Electronics Engineering)

Duration: 3 hours Marks: 5x14=70

Answer any FIVE questions. All questions carry equal marks

1. a) Define Ripple factor and form factor. Establish a relation between them. 4 M

   b) Explain the necessity of a bleeder resistor in an L – section filter used with a Full Wave filter. Compute ripple factor of an L – section choke input filter used at the output of a Full wave rectifier. 10 M

2. a) Draw a self-bias circuit? Explain qualitatively why such a circuit is an improvement on the fixed-bias circuit, as far as stability is concerned? 7 M

   b) Explain how to minimize the percentage variations in I_c due to variation in I_{co} and V_{BE} and due to variation in β. 7 M

3. a) Describe the significance of operating point, DC and AC load lines to ensure active region operation of a BJT in CE amplifier application. 7 M

b) Draw the circuit of transistor in the CB configuration and sketch the output characteristics? Indicate the active, saturation and cutoff regions. 7 M

4. a) Draw the hybrid equivalent circuit of an NPN – BJT in CE configuration. Derive the expressions for A_V, A_I, R_I and R_O. 7 M

b) The source and load resistances connected to a BJT amplifier in CE configuration are 680Ω and 1 KΩ respectively. Calculate the voltage gain A_V and the input resistance R_I if the h-parameters are listed as $h_{ie} = 1.1$ kΩ; $h_{re} = 2\times10^{-4}$; $h_{fe} = 50$ and $h_{oe} = 20$ μ mhos. Compute A_V and R_I using both approximate and exact analysis. 7 M

5. a) Sketch the circuit of a source-follower. Derive the expression for the voltage gain at low frequencies? What is the maximum value of A_v.? 7 M

b) How does the drain current vary with gate voltage in the saturation region? How does the transconductance vary with drain current? 7 M

6. a) Draw the symbol and equivalent circuit of a UJT. Explain the operation of UJT with the help of its V – I characteristics. List out its applications? 7 M

b) Explain the operation of UJT, TRIAC and Opto couplers? 7 M

7. a) Derive the expression for input impedance, output impedance and Transresistance of a Voltage Feedback Amplifier with a neat sketch? 7 M

b) Find A_f for a source follower using the feedback method of analysis for a CE stage with an unbypassed emitter resistor? 7 M

8. a) Sketch the circuit of a Wien bridge oscillator? What determines the frequency of oscillation? Will oscillations take place if the bridge is balanced? 7 M

b) Sketch the circuit of a phase-shift oscillator using a FET and a bipolar junction transistor and also explain them? 7 M