

Code No: 54020

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year II Semester Examinations, November/December - 2015

## ELECTRONIC CIRCUIT ANALYSIS

(Common to ECE, EIE, ETM)

Time: 3 hours

Max. Marks: 75

Answer any five questions  
All questions carry equal marks

- 1.a) A transistor in CB circuit has the following set of 'h' parameters.  $h_{ib} = 20$ ,  $h_{fb} = 0.98$ ,  $h_{rb} = 3 \times 10^{-4}$ ,  $h_{ob} = 0.5 \times 10^{-6}$ . Find the values of  $R_i$ ,  $R_o$ ,  $A_i$  and  $A_v$  if  $R_s = 600 \Omega$  and  $R_L = 1.5 \text{ k}\Omega$ .
- b) Draw the CE amplifier with un bypassed emitter resistance and derive the expression for its  $R_i$  &  $A_v$ ? [8+7]
- 2.a) Derive expressions for overall voltage gain and overall current gain of a two-stage RC coupled amplifier.
- b) List out the special features of Darlington pair and cascode amplifiers. [8+7]
- 3.a) Derive the equation for the lower 3dB frequency of CE configuration.
- b) Draw the hybrid- $\pi$  model of common emitter configuration and describe each component in the  $\pi$ -model. [8+7]
- 4.a) Discuss the effect of different types of loads to a common source MOS amplifier.
- b) Differentiate between cascode and folded cascode configurations. [8+7]
- 5.a) The open loop gain of an amplifier is 100. What will be the overall gain when a negative feedback of 0.5 is applied to the amplifier?
- b) What are the different mixing techniques used in any feedback system? Explain.
- c) State the condition in terms of  $(1+A\beta)$  which a feedback amplifier must satisfy in order to be stable. [5+5+5]
- 6.a) Substantiate the requirement of positive feedback in amplifier for oscillations. Relate the requirement to Barkhausen Criterion.
- b) With the help of neat circuit diagram, explain how sustained oscillations are obtained in RC phase shift BJT based oscillator. Derive the expression for frequency of oscillation. [7+8]
- 7.a) Show that the maximum conversion efficiency of the idealized class B push-pull circuit is 78.5%.
- b) For an ideal class B transistor amplifier the collector supply voltage  $V_{cc}$  and the effective load resistance  $R'_L = (N_1/N_2)^2 R_L$  are fixed as the base current excitation is varied. Show that the collector dissipation  $P_c$  is zero at no signal, rises as  $V_m$  increases and passes through a maximum at  $V_m = 2V_{cc}/\pi$ . [7+8]
- 8.a) Derive an expression for the bandwidth of a synchronous tuned circuit.
- b) Discuss the necessity of stabilization circuits in tuned amplifiers. [8+7]