Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION, DECEMBER 2018

Course Code: EC205

Course Name: ELECTRONIC CIRCUITS (EC, AE)

Max. Marks: 100 Duration: 3 Hours

PART A

Answer any two full questions, each carries 15 marks.

Marks

1 a) Define stability factor for leakage current and derive its general expression. Derive the expression for stability factor for leakage current of emitter stabilized biasing circuit. (8)

b) Draw the small signal low frequency hybrid π model for common emitter configuration. Derive the expression for voltage gain, input and output impedance. (7)

2 a) Derive the condition that must be satisfied by a RC circuit to behave as a integrator. Design an integrator circuit to integrate a square wave of 2KHz frequency. (5)

b) Sketch the response of a RC high pass circuit to a pulse input if RC>> tp and RC<< tp. (3)

c) Determine the bias voltage V_{CE}, current I_C and stability factor S_{ICO} for the voltage divider configuration with V_{CC}=20V, V_{BE}=0.7V, R_1=30K, R_2=4K, R_C=3K, R_E=0.5K and β=120. (7)

3 a) Calculate the small signal voltage gain, input impedance and output impedance of emitter follower having R_1=50K, R_2=10K, R_E=2K, R_S=0.5K, V_{CC}=15V, V_{BE}=0.7V, V_A=80V and β=50 (8)

b) Using hybrid π model, obtain the expression for input impedance, output impedance and mid band voltage gain of a common emitter amplifier. (7)

PART B

Answer any two full questions, each carries 15 marks.

4 a) With neat diagram explain cascode amplifier and its main characteristics. (7)

b) Explain shunt - shunt feedback topology with neat diagram. Derive the expression for net input and output impedance. (8)

5 a) With the small signal high frequency hybrid π model of a common emitter amplifier without bypass capacitor and derive the expression for upper cut off (8)

frequency.

b) With neat diagram derive the expression for frequency of oscillation of RC phase shift oscillator. (7)

6 a) Derive the expression for upper cut off frequency of a common base amplifier using high frequency hybrid π equivalent model. (8)

b) Draw the circuit of Colpitts oscillator and outline its working principle. (7)

PART C

Answer any two full questions, each carries 20 marks.

7 a) With neat diagram explain the working of astable multivibrator. Derive the expression for time period of the astable multivibrator. (10)

b) With neat diagram explain how voltage regulation is achieved in series voltage regulator. (10)

8 a) Explain class A power amplifier. Show that the maximum conversion efficiency of the transformer coupled class A power amplifier is 50%. (10)

b) Determine drain to source voltage of a MOSFET common source circuit using voltage divider bias and source is directly grounded. Given that V_{DD}=10V, R_1=10MΩ, R_2=10MΩ, R_D=2KΩ, Vt= 2V, and I_D= 2 mA. State which region, the MOSFET is working in the circuit with supportive computations. (7)

c) Determine g_m for enhancement type MOSFET if $V_{GS(th)}$=3V and it is biased at V_{GSQ}=8V. Assume k=0.3x10^{-3} mA/ V^2. (3)

9 a) With neat diagram explain Schmitt trigger. (7)

b) What is meant by cross over distortion. How it is eliminated. (3)

c) Derive expression for voltage gain, input impedance and output impedance of Enhancement MOSFET drain feedback configuration. (10)

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