Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

THIRD SEMESTER B.TECH DEGREE EXAMINATION(S), MAY 2019

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 β variation. Derive the expression for stability factor for leakage current of voltage divider biasing circuit. (7)

b) Using hybrid π model, obtain the expression for input impedance, output impedance and mid band voltage gain of a common collector amplifier. (8)

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

b) Sketch the response of a RC low pas circuit to a pulse input if RC>> t_p and RC<< t_p. (3)

c) Draw a two stage CE cascade amplifier. Derive an expression for its input resistance, output resistance and voltage gain. (7)

3 a) Draw the circuit of CE voltage amplifier with potential divider bias .Mention use of each component in it. What do you mean by half power points in its frequency response? (7)

b) Calculate the small signal voltage gain, input impedance and output impedance of common emitter amplifier having R_1=56K, R_2=15K, R_C=2K, R_E=1K, R_S=0.5K, V_{CC}=20V, V_{BE}=0.7V, V_A=∞ and β=50 (8)

PART B

Answer any two full questions, each carries 15 marks.

4 a) Draw the high frequency hybrid π equivalent model of BJT. Derive an expression for short circuit gain (5)

b) Outline Millers Theorem in a two port electrical circuit. (3)

c) Explain series - series feedback topology with neat block diagram. Derive the expression for net input and output impedance. (7)

5 a) Draw the small signal high frequency hybrid π model of a common emitter (8)

amplifier with bypass capacitor and derive the expression for upper cut off frequency.

b) With neat diagram derive the expression for frequency of oscillation of wien bridge oscillator. (7)

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

b) Explain Hartley oscillator with neat diagram. (7)

PART C

Answer any two full questions, each carries20 marks.

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

b) What are the factors affecting the variation in output voltage of voltage regulator? With a circuit diagram, explain how load and line regulations are achieved in a shunt voltage regulator. (10)

8 a) Explain class B power amplifier. Show that the maximum conversion efficiency of the idealized class B push pull amplifier is 78.5% (7)

b) Determine W/L ratio of a MOSFET amplifier which is biased in such a way that V_{GSQ}=2V, Vt= 1V and μC_{ox} = 0.3 mA/V^2 for a drain current 2mA. (8)

c) Determine g_m for enhancement type MOSFET if Vt= 3V and it is biased at V_{GSQ}=8V. Assume μC_{ox} W/L=0.2x10^{-3}mA/V^2 (5)

9 a) With neat diagram explain bootstrap sweep circuit. Derive an expression for its retrace period. (8)

b) How even harmonics are eliminated in push pull operation of power amplifiers? (4)

c) Derive expression for voltage gain and output impedance for a common source amplifier using small signal model in mid frequency. (8)

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