Reg No.:_____ Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree (S,FE) Examination December 2022 (2015 scheme)

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) What do you mean by load line? Explain DC load line of an amplifier? (3)

b) Design a differentiator for a frequency of 2 kHz. (4)

c) Consider a voltage divider circuit with the following parameters. (8)

$R_1 = R_2 = 100$ KΩ, $R_C = 4.3$ KΩ, $R_E = 6.8$ KΩ, $V_{CC} = 15$ V, $V_{BE} = 0.7$ V and $\beta = 100$.

Find the Q point.

2 a) Find the voltage gain, input impedance and output impedance of a common emitter amplifier. Use hybrid π model for the derivation. (7)

b) Calculate the small signal voltage gain, input impedance and output impedance of a common emitter amplifier for the following parameters. (8)

$V_{CC} = 10$ V, $R_E = 2$ KΩ, $R_1 = 27$ KΩ, $R_2 = 15$ KΩ, $R_S = 0.5$ KΩ, $V_{BE} = 0.7$ V, $V_A = \infty$ and $\beta = 50$.

3 a) Derive the expressions for the voltage gain and input impedance of a common collector amplifier. (8)

b) Plot the response of a low pass RC circuit to pulse for two different values of the time constant. What happens when the time constant becomes higher? (4)

c) Explain the classification of the amplifiers based on the position of Q point. (3)

PART B

Answer any two full questions, each carries 15 marks.

4 a) State Miller theorem. Find the effect of feedback component in the input side and output side using miller effect. What happens to the total capacitance at the input side if the feedback element is a capacitor? (7)

b) Find the expression for cut off frequency in a common emitter amplifier. Use small signal high frequency hybrid π model. (8)

5 a) Compare synchronous tuning with stagger tuning. (3)

b) Explain series-shunt feedback topology. Derive the expression for input and output impedances. (8)

c) Explain the effect of positive and negative feedback on gain. (4)

6 a) Draw the circuit diagram of a Wien Bridge oscillator. Derive the expression for frequency of oscillation and condition for oscillation. (8)

b) Draw the circuit diagram and high frequency model of a cascode amplifier. Derive the expression for its voltage gain. (7)

PART C

Answer any two full questions, each carries20 marks.

7 a) Draw the circuit diagram of a bootstrap sweep circuit. Explain how it produces sweep waveform. (8)

b) Explain the working of class A power amplifier. Find the maximum conversion efficiency attainable. (8)

c) Compare Class A, Class B, Class AB and Class C amplifiers (4)

8 a) Calculate the output voltage and Zener current in the regulator circuit shown in figure 1. (8)

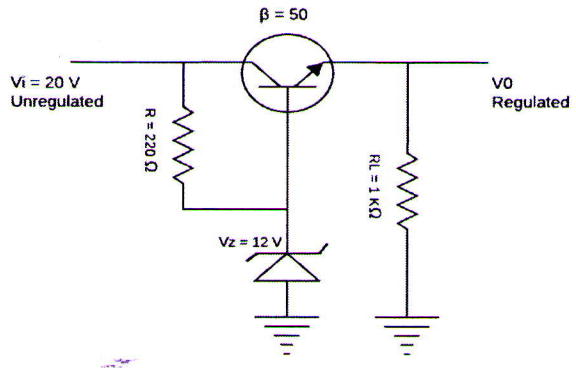

Figure 1

b) Explain load regulation and line regulation (5)

c) Find the voltage gain and input impedance of a common source amplifier without a bypass capacitor across the source resistance. (7)

9 a) Describe the working of an astable multivibrator. Derive the expression for the time period. (10)

b) Draw the small signal equivalent circuit of MOSFET (2)

c) Explain any two techniques used to bias enhancement MOSFET (8)

*****