Reg No.:_____   Name:_____

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

Third Semester B.Tech Degree (S,FE) Examination December 2020 (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) Design and draw an RC differentiator circuit for a given input frequency of   (4)
       2KHz.

   b) What are the functions of various capacitors used in RC coupled amplifier?   (3)

   c) Define stability factor. Derive an expression for the stability factor for leakage   (8)
       current of a voltage divider bias circuit. How does the voltage divider bias
       improve the stability of an amplifier circuit?

2 a) With neat circuit diagrams, derive the design criteria for an RC circuit to function   (8)
       as

       (i)   Differentiator
       (ii)   Low pass filter

   b) In the given circuit, Assume $\beta=100$, Vcc = 5 V, V_{BEON} = 0.7V, Rc = 15 KΩ,   (7)
       R_B = 650 KΩ, V_{BB} = 2V, Determine I_{CQ}, V_{CEQ}, $r\pi$ and gm. What will be the small
       signal voltage gain? Assume values for parameters that are not given.
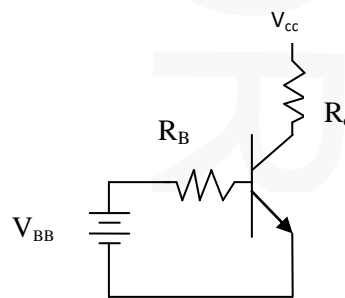
3 a) Explain the small signal hybrid pi model of transistor in the CE configuration   (8)
       with neat schematics. Derive the expression for voltage gain without bypass
       capacitor.

   b) For a voltage divider bias circuit using Vcc=12V, Rc = 2.2KΩ, R_E = 1.5 KΩ,   (7)
       R_1 = 7.2 KΩ, R_2 = 2.2 KΩ, R_L = 1 KΩ, draw AC and DC load lines and locate the
       Q point. Assume values for parameters that are not given.

PART B
Answer any two full questions, each carries 15 marks.

4 a) Explain various feedback topologies with neat sketches and derive the expressions for input and output impedances for all configurations. (9)

   b) Draw high frequency equivalent circuits of BJT and discuss Miller effect.. (6)

5 a) From the high frequency equivalent circuit, derive the expression for beta cut off frequency of a bipolar transistor. Draw the frequency response for short circuit current gain. (8)

   b) Draw the circuit diagram of a tuned amplifier and explain its working (4)

   c) Write short notes on cascade amplifers with a neat sketch. (3)

6 a) Draw the circuit diagram of RC phase shift oscillator. Derive an expression for the frequency of oscillation. (9)

   b) Draw circuit diagrams of the feedback amplifier circuits using voltage series feedback and current series feedback. (6)

PART C
Answer any two full questions, each carries 20 marks.

7 a) Draw the circuit diagram of a transistor bootstrap generator and explain its working. What are its applications? (10)

   b) Explain various types of biasing methods used for MOSFET amplifiers. (6)

   c) Draw the small signal equivalent circuit of the MOSFET. (4)

8 a) Explain the working of monostable multi-vibrator with a neat circuit diagram and relevant waveforms. (10)

   b) Explain the working of transistor-based series voltage regulator with a neat circuit diagram. (10)

9 a) Explain the working of transformer coupled Class A power amplifier with a neat circuit diagram and collector waveforms. Derive the expression for collector efficiency. (10)

   b) Draw and explain the hysteresis curve in Schmitt Trigger. (5)

   c) How short circuit protection is achieved in series voltage regulator? Explain with a neat circuit diagram. (5)

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