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Reg No.: \_\_\_\_\_

Name: \_\_\_\_\_

APJ ABDUL KALAM TECHNOLOGICAL UNIVERSITY

B.Tech Degree S3 (S, FE) / S1 (PT) (S, FE) Examination December 2023 (2015 Scheme)

Course Code: EC205

Course Name: ELECTRONIC CIRCUITS (EC,AE)

Max. Marks: 100

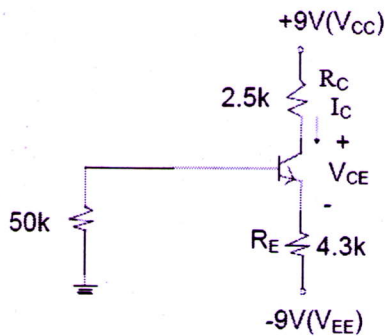
Duration: 3 Hours

PART A

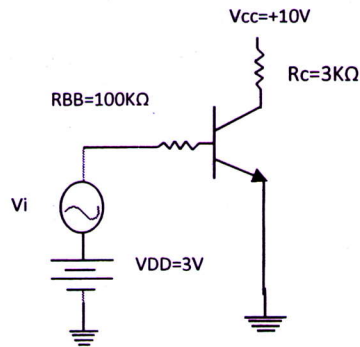
Answer any two full questions, each carries 15 marks.

Marks

- 1 a) Define operating point of BJT. How does amplifiers are classified according to operating point? (4)
- b) The operating point values in the circuit  $I_{CQ}$  and  $V_{CEQ}$  have magnitudes of 0.9 mA and 3.72 V respectively when the current gain  $\beta$  for the transistor is 100. The transistor in the circuit is replaced by another one with  $\beta = 200$ . Calculate the new values of  $I_{CQ}$  and  $V_{CEQ}$ .? (6)



- c) Explain a fixed bias circuit with neat sketches and derive the expression for its stability factor. (5)
- 2 a) Derive the expression for input impedance, output impedance and mid band voltage gain of a common emitter amplifier using hybrid  $\pi$  model (7)
- b) Explain the working of RC coupled amplifier with neat sketches. Explain the factors which affects the low frequency and high frequency response of RC coupled amplifier? (8)
- 3 a) With the help of hybrid pi model calculate the voltage gain of the amplifier given below. Assume  $\beta=100$  (10)



- b) Under what condition an RC circuit can be used as an integrator? Design an RC integrator circuit for an input square wave of frequency 2 KHz. (5)

### PART B

*Answer any two full questions, each carries 15 marks.*

- 4 a) Explain the working of RC phase shift oscillator with a neat diagram. Also derive the expression for frequency of oscillation. (10)
- b) Explain the working of a stagger tuned amplifier with neat sketches (5)
- 5 a) Draw the small signal high frequency hybrid  $\pi$  model of a transistor in Common Emitter configuration and derive the expression for short-circuit current gain also derive the expression for short circuit gain bandwidth product. (9)
- b) State and explain Miller theorem and its dual. (6)
- 6 a) Derive the expression for input and output impedances of voltage series, voltage shunt, current series and current shunt feedback configurations with necessary diagrams. (12)
- b) Draw the circuit diagram of a Cascode amplifier. (3)

### PART C

*Answer any two full questions, each carries 20 marks.*

- 7 a) Explain the working of a transformer coupled Class B push pull amplifier circuit with neat sketches. Derive the expression for its collector efficiency. (10)
- b) Design an Astable multivibrator circuit for generating a symmetrical square wave of frequency 1 KHz. (6)
- c) Derive the expression for the frequency of Oscillation of the BJT Astable multivibrator (4)
- 8 a) Explain the working of a Bootstrap sweep circuit with neat sketches (10)

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- b) Explain the short circuit protection for the series voltage regulators (6)
- c) Draw the small signal equivalent circuit of MOSFET. (4)
- 9 a) Design a series regulated power supply to provide a nominal output voltage of (10)  
25 V and supply load current of  $I_L \leq 1A$ . Unregulated power supply has  
following specifications:  $V_i = 50 \pm 5$  V,  $r_0$  or  $R_s = 10\Omega$ .  
Assume  $h_{fe1} = 100$ ,  $h_{fE1} = 125$ ,  $h_{fe2} = 200$ ,  $h_{fE2} = 220$ .  
Make any other suitable assumptions if required
- b) Explain various biasing methods used for MOSFET amplifier with necessary (6)  
sketches.
- c) Explain the Hysteresis curve of the typical Schmitt trigger (4)

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