

**B.Tech IV Semester End Examination, December 2021**  
**Electronic Circuits-Analysis and Design (19APC0409T)**  
**(Electronics & Communication Engineering)**

Time: 3 hours

Max. Marks: 70

**PART-A**  
**(Compulsory Question)**

(10 X 2 = 20 M)

- 1) Answer the following
- Sketch the small signal equivalent circuit of Common drain amplifier.
  - Compare voltage gain, current gain and input impedance of CE, CB and CC amplifiers.
  - What is meant by miller effect.
  - Sketch high frequency response model for MOSFET.
  - What is the significance of two stage RC coupled amplifier.
  - Draw differential amplifier using BJT and write its significance.
  - Write the difference between positive and negative feedback.
  - Where RC phase shift oscillators are used and write how will get total 360° phase shift.
  - Write about stability in feedback system.
  - Explain significance of crystal oscillator.

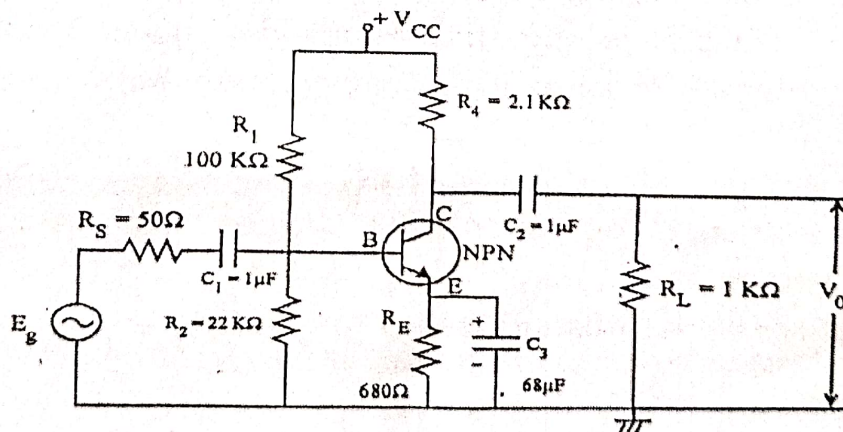
**PART-B**

(5 X 10 = 50 M)

**(Answer ONE question from each Unit; All questions carry equal marks)**

**UNIT -I**

- 2) a) Draw small signal equivalent circuit for common source and derive voltage gain and output resistance. (4 M)
- b) For the circuit shown in Fig. estimate AI and AV using reasonable approximations. The h-parameters for the transistor are given as Solution:  $h_{fe} = 100$   $h_{ie} = 2000 \text{ OHM}$   $h_{re}$  is negligible and  $h_{oe} = 10^{-5} \text{ mhos}$ .  $I_b = 100 \text{ uA}$ . (6 M)



(OR)

- 3) a) Draw small signal hybrid- $\pi$  equivalent circuit for CE configuration and derive different parameters. (7 M)
- b) A JFET has a drain current of 5 mA. If  $I_{DSS} = 10 \text{ mA}$  and  $V_{GS}(\text{off}) = -6 \text{ V}$ , find the value of (i)  $V_{GS}$  and (ii)  $V_P$ . (3 M)



## UNIT -II

- 4) (a) Explain transistor amplifier with load capacitor effects and bypass capacitor effects. (5 M)  
(b) In the Capacitance coupled amplifier,  $A_{vm} = 50$ ,  $f_1 = 50$  Hz and  $f_2 = 100$  KHz. Find the values of frequencies at which the gain reduces to 40 on either side of midband region. (5 M)

(OR)

- 5) (a) Sketch high frequency response model for MOSFET and explain short circuit current gain. (5 M)  
(b) Briefly describe about cascode amplifier analysis. (5 M)

## UNIT -III

- 6) (a) Explain DC transfer characteristics of differential amplifier using BJT. (5 M)  
(b) Describe about differential and common mode input impedance. (5 M)

(OR)

- 7) (a) Explain the operation of MOSFET differential amplifier with active load. (5 M)  
(b) Discuss about Darlington pair amplifier. (5 M)

## UNIT -IV

- 8) (a) Sketch Wien bridge oscillator and derive the expression for frequency of oscillation and condition for sustained oscillation. (5 M)  
(b) Explain operation of crystal oscillator. (5 M)

(OR)

- 9) (a) Analyze the current shunt feedback amplifier and find out different parameters. (5 M)  
(b) Explain operation of Hartley oscillator with neat sketch. (5 M)

## UNIT -V

- 10) (a) Draw the circuit diagram of a class A transformer coupled amplifier and derive an expression for its conversion efficiency. (5 M)  
(b) A single transistor is operating as an ideal class B amplifier with a  $10\text{K}\Omega$  load. A dc meter in the collector circuit reads 8mA. How much signal power is delivered to the load. (5 M)

(OR)

- 11) (a) Explain class AB operation with output stage utilizing the Darlington configuration. (5 M)  
(b) Write difference between all power amplifiers. (5 M)

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