

SE/EXTC/IV SEM/CBCS



(3 Hours)

[Total Marks: 80]

9 DEC 2019

- N.B. (1) Question No. 1 is compulsory.
 (2) Solve any **three** questions from remaining **five** questions.
 (3) **Figures** to the right indicate **full marks**.
 (4) Assume suitable data if necessary and mention the same in answer sheet.
1. (a) State biasing techniques of Enhancement Type MOSFET and explain any one technique in detail. 05
 (b) Explain Transformer Coupled Amplifier and give its Advantages and Disadvantages. 05
 (c) Define efficiency for a Power Amplifier and write the expression for the same. State the efficiency of Class A, Class B and Class C Amplifiers respectively. 05
 (d) Give the basic principle of an Oscillator. State the types of Oscillators. 05
 2. (a) Design a two stage RC coupled CS – CE Amplifier to meet following specifications: 15
 $A_v \geq 750$, $S \leq 10$, $R_i \geq 1 \text{ M}\Omega$, $V_{cc} = 10 \text{ V}$.
 Assume the following data: $\beta_{typ} = 290$, $h_{ie} = 4.5 \text{ k}\Omega$, $g_{mo} = 5000 \mu\text{S}$, $I_{DSS} = 7 \text{ mA}$, $r_d = 50 \text{ k}\Omega$, $V_p = -4 \text{ V}$.
 (b) List various negative feedback topologies. Sketch any one topology. 05
 3. (a) Sketch Circuit Diagram, AC equivalent Model and Derive expressions for Input impedance, Output Impedance, Voltage Gain and Current Gain of a two stage CE Amplifier. 10
 (b) For a 'n' stage cascaded amplifier, show that overall lower 3 dB cut – off frequency is $f_{LT} = \frac{f_L}{\sqrt{2^{1/n} - 1}}$ and overall higher frequency is $f_H' = f_H(\sqrt{2^{1/n} - 1})$. 10
 4. (a) Draw a neat diagram of Class AB power Amplifier and explain its working. 10
 (b) What is Cascode Amplifier? Explain in detail. 10
 5. (a) Draw RC phase shift oscillator using BJT and derive the frequency of oscillation for same. 10
 (b) Enumerate the effects of negative feedback on Gain, Bandwidth, Distortion, Input and Output Impedance. 10
 6. (a) Compare Small Signal and Large Signal Amplifier. 05
 (b) Calculate frequency of Oscillation for Hartley Oscillator if $L_1 = 5 \text{ mH}$, $L_2 = 2 \text{ mH}$ and $C = 0.5 \mu\text{F}$. 05
 (c) Explain the concept of Heat Sink in detail required for Power Amplifiers. 05
 (d) Sketch Symbol of n-channel and p-channel Depletion MOSFET. State giving reasons, why it is known as depletion MOSFET? 05