Paper / Subject Code: 40802 / Electronics Devices and Circuits-II

9-Dec-2019   1T01024 - S.E.(Electronic & Telecommunication Engineering)(SEM-IV)(Choice Based) / 40802 - Electronics Devices and Circuits-II   77808

(3 Hours)   **[Total Marks: 80]**

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 **05**
         in detail.
    (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 **05**
         efficiency of Class A, Class B and Class C Amplifiers respectively.
    (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**
         $A_v \geq 750$, $S \leq 10$, $R_i \geq 1\,M\Omega$, $V_{cc} = 10\,V$.
         Assume the following data: $\beta_{typ} = 290$, $h_{ie} = 4.5k\Omega$, $g_{mo} = 5000\mu\mho$, $I_{DSS} = 7mA$,
         $r_d = 50k\Omega$, $V_P = -4V$.
    (b) List various negative feedback topologies. Sketch any one topology.   **05**

3. (a) Sketch Circuit Diagram, AC equivalent Model and Derive expressions for Input **10**
         impedance, Output Impedance, Voltage Gain and Current Gain of a two stage CE
         Amplifier.
    (b) For a 'n' stage cascaded amplifier, show that overall lower 3 dB cut – off frequency is **10**
         $f_{LT} = \dfrac{f_L}{\sqrt{2^{1/n}-1}}$ and overall higher frequency is $f_H' = f_H\left(\sqrt{2^{1/n}-1}\right)$.

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 **10**
         same.
    (b) Enumerate the effects of negative feedback on Gain, Bandwidth, Distortion, Input and **10**
         Output Impedance.

6. (a) Compare Small Signal and Large Signal Amplifer.   **05**
    (b) Calculate frequency of Oscillation for Hartley Oscillator if $L_1 = 5mH$, $L_2 = 2mH$ and **05**
         $C = 0.5\ \mu F$.
    (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, **05**
         why it is known as depletion MOSFET?

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