

- N.B.: (1) Question No. 1 is **compulsory**.
 (2) Attempt any **four** from the remaining questions.
 (3) Assume **suitable** data if **necessary**.

1. Attempt any **five** :

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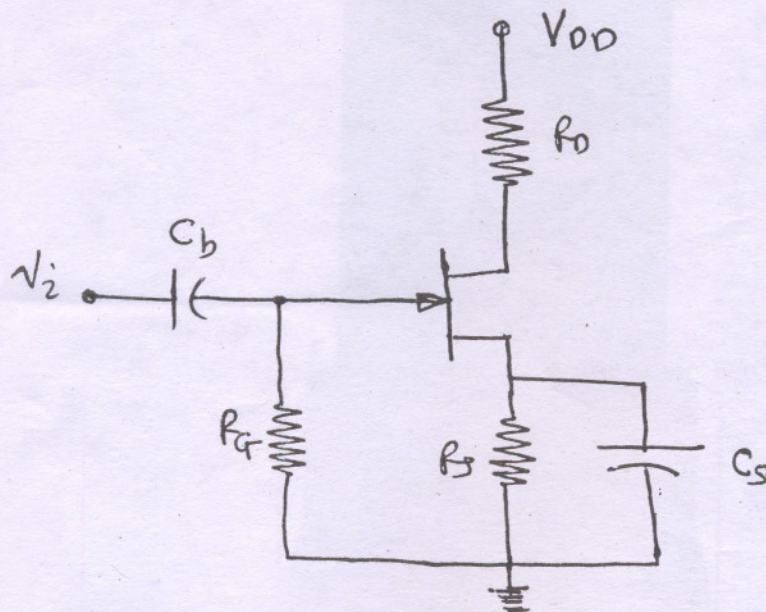
- Explain why common collector is used as buffer.
- Draw the small signal model of common source JFET amplifier.
- Draw and explain the functional diagram of IC 555.
- With the circuit diagram explain inverting summing amplifier.
- Thermal runaway is regenerative destructive process of BJT, why ?

2. Draw small signal h-parameter model of CE amplifier and define the terms h_{ie} , h_{re} , h_{fe} and h_{oe} for the same. How are these parameters obtained graphically using characteristic curves of common emitter amplifier.

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3. (a) The amplifier shown utilizes n-channel JFET for source self-bias circuit for which $V_p = 2.0V$, $g_{mo} = 1.60 \text{ mA/V}$, $I_{DSS} = 1.65 \text{ mA}$. It is desired to bias the circuit at $I_D = 0.8 \text{ mA}$ using $V_{DD} = 24 \text{ V}$. Assume $r_d \gg R_d$. Find (i) V_{GS} (ii) g_m (iii) R_s and (iv) R_d such that voltage gain is 10, with R_s bypassed with large capacitance C_s .

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(b) Using the load-line concept discuss the selection of operating point for application of linear amplifier.

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4. (a) Using IC 555 design and explain symmetrical square wave generator for the output frequency 5 KHz. Draw the concern waveforms. 10
(b) Explain all the features of Op-Amplifier. 10
5. (a) Design the voltage regulator using LM 723 for $V_0 = 12\text{ V}$, $I_0 = 3\text{ Amp}$. 12
(b) Explain the short circuit current limit and foldback-current limit protection of LM 723 using suitable diagrams. 8
6. (a) Explain in detail Instrumentation Amplifier using 3-Op-Amps and derive the expression for voltage gain. 10
(b) Design the practical differentiator for the frequency 5 KHz. 10
7. Write short notes on any **two** : 20
(a) PLL
(b) Digital to Analog converter using R-2R resistors.
(c) Non-inverting Schmitt trigger.
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