B.Tech III Year I Semester (R07) Supplementary Examinations December 2015

ELECTRONIC CIRCUIT ANALYSIS

(Electronics & Instrumentation Engineering)

(For 2008 regular admitted batch only)

Time: 3 hours Max. Marks: 80

Answer any FIVE questions

All questions carry equal marks

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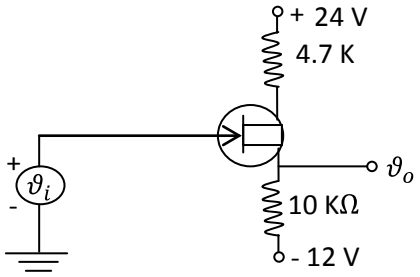
1 (a) Mention any three applications of CB amplifier. List out the characteristics of CB amplifier and mention their typical values. Draw the basic CB amplifier circuit and its equivalent h-parameter model. Derive an expression for its R_i and R_o.

(b) Explain how FET can be used as an amplifier. The circuit shown in the figure below the FET has the following parameters: I_{DSS} = 5.6 mA, and V_P = -4V.



(i) If $\vartheta_i = 0, find\ \vartheta_o$ (ii) If $\vartheta_i = 10\ V, find\ \vartheta_o$ (iii) If $\vartheta_o = 0, find\ \vartheta_i$

2 (a) Three identical non interacting amplifier stages in cascade have an overall gain of 0.3 dB down at 50 kHz compared to midband. Calculate the upper cutoff frequency of the individual stages.

(b) Draw the circuit of two stages R-C coupled JFET amplifier and explain its working.

3 (a) What is the order of magnitude of each resistance in the hybrid-π model?

(b) The h-parameters of a transistor at I_C = 8 mA, VCE = 10 V, and at room temperature are h_{ie} = 1 K, h_{oe} = 2 x 10^{-5} A/V, h_{fe} = 50, h_{re} = 2.5 x 10^{-4}. At the same operating point, f_T = 60 MHz, and C_{ob} = 2 PF. Compute the values of hybrid-π parameers.

(c) Explain how the parameters of hybrid-π model vary with I_C, V_{CE} and temperature.

4 (a) Derive the equation for maximum efficiency of a class A transformer coupled amplifier.

(b) Design a class B power amplifiers to deliver 25 W to a load resistor R_L = 80 ohms, using transformer coupling. $V_m = V_{cc}$ = 25 V. Assume necessary data.

(c) Explain about class S operation.

5 (a) Explain the principle of stagger tuning technique of transformer – coupled amplifier that is used to obtain band pass filter characteristic with pass band of 10 kHz with all necessary diagrams for illustration.

(b) What are the main advantages of class-C operating mode in RF applications?

6 (a) In the single tuned amplifier, the circuit bandwidth is 5 kHz and the voltage gain has a maximum value at 1000 kHz, when the tuning capacitor is adjusted to 500 pf. Calculate the Q of the circuit and the coil inductance.

(b) Draw the circuit of double-tuned transformer-coupled amplifier. Discuss the nature of responses of the amplifier for different values of KQ = 1; KQ>1 and KQ<1.

7 (a) With reference to voltage regulators write about:
(i) Output resistance (ii) Load regulation (iii) Line regulation (iv) Stability factor.

(b) Give the circuit of a short circuit overload protection that is to be provided in voltage regulator circuit and explain its working.

8 (a) Draw the circuit diagram of a dual power supply using three terminal regulators to obtain $\pm 15\ V$ output voltage and explain the operation of the circuit.

(b) What is meant by voltage multiplier? List out the names of four different multipliers.

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