(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 130401 Roll No. | 1 | 2 | 0 | 3 | 2 | 3 | 1 | 1 | 2 | 5 |

B.Tech.

(SEM. IV) THEORY EXAMINATION 2013-14

ELECTRONICS CIRCUITS

Time : 3 Hours   *Total Marks : 100*

Note :– Attempt **all** Sections.

SECTION–A

1. Attempt **all** parts :   (10×2=20)

    (a) Explain the basic current mirror with suitable diagram.

    (b) Explain the properties of Negative Feedback.

    (c) Define the Barkhausen criteria for oscillators.

    (d) Define the pinch-off and threshold voltage of MOSFET.

    (e) Calculate β and α for a transistor if emitter current is 10 mA and collector current is 9 mA.

    (f) What are AC and DC Coupled Amplifiers ?

    (g) What are Error Correcting Amplifiers ?

    (h) Why voltage divider biasing is preferred ?

    (i) For NOMS transistor, write the drain current expression in Triode region and Saturation region.

    (j) Define Trans-resistance amplifier.

SECTION–B

2. Attempt any **three** parts : (3×10=30)

(a) Explain Input and Output characteristics of Bipolar Transistors in case of common emitter.

(b) Explain the operation of Depletion-type MOSFET with its current voltage characteristics of MOSFET.

(c) Calculate A_f, R_{if}, for series-series feedback amplifier.

(d) Explain the frequency response of the CE Amplifier.

(e) What is emitter stabilization in self-bias circuit of an n-p-n transistor in CE configuration ? Derive the mathematical expressions for stability factors in this.

SECTION–C

Note :– Attempt **all** questions.

3. Attempt any **two** parts : (5×10=50)

(a) For the CS amplifier, determine its low frequency transfer function.

(b) Explain the four feedback topologies.

(c) Draw the high frequency equivalent circuit model for the MOSFET and list all MOSFET Internal Capacitances.

4. Attempt any **two** parts :

(a) For the given RC phase shift oscillator calculate the frequency of oscillation.
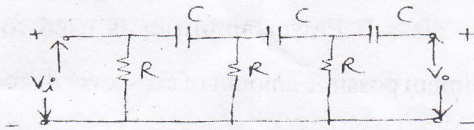
(b) Explain Piezoelectric type crystal oscillator in detail.

(c) Draw the circuit diagram of LC oscillators. What is the condition of oscillation.

5. Attempt any **two** parts :

(a) Determine the value of R_S required to bias a P-channel JFET whose parameters are :

$I_{DSS} = 18$ mA, and $V_p = -8$V. The JFET is used in self bias arrangement shown in figure. Required gate-source voltage is 4V.
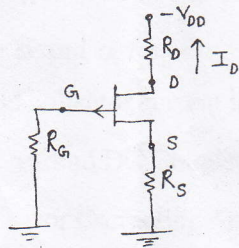
(b) Consider a MOSFET for which W = 8μm, L = 0.4μm, $to_x = 8$mm, μn = 450 cm²/V and $V_t = 0.7$. Find : C_{ox}, K_n.

(c) Draw the circuit diagram of CB amplifier and calculate expression for short-circuit current gain with T-model.

6. Attempt any **two** parts :

(a) How class-B Power amplifier is used for generating minimum possible amount of crossover distortion.

(b) Draw the architecture for the three-stage amplifier. Explain all three-stages in power amplifier.

(c) Explain how Negative feedback affects Gain and Noise.

7. Attempt any **two** parts :

(a) Explain BJT as an amplifier and as a switch.

(b) Explain large signal operation of BJT differential pair.

(c) Compare the characteristics of BJT and MOS Amplifier.