14/05/19

B.E/ B.Tech END SEMESTER EXAMINATIONS - APRIL / MAY 2019

Electrical and Electronics Engineering

EC8304 ELECTRONIC DEVICES AND CIRCUITS

Semester III (Regulation 2012)

Time: 3 Hours Answer ALL Questions Max.marks: 100

PART-A (10 x 2 = 20 Marks)

1. Differentiate Avalanche breakdown and Zener breakdown phenomenon.
2. Sketch I-V characteristic of a Zener diode and mark significant points.
3. State the biasing conditions for terminal voltages $V_{BE}$, $V_{CE}$ of BJT operating in forward active region.
4. Calculate $I_C$ and $I_E$ for a transistor that has $\alpha$=0.95 and $I_B$=200uA. Determine the value of $\beta$ for the transistor.
5. Draw small signal equivalent circuit of BJT in CE configuration.
6. What is meant by Body Effect in MOSFET?
7. Define Common Mode Rejection Ratio.
8. Define Q of tuned amplifier.
9. State the conditions required for sustained oscillation.
10. List the advantages of negative feedback in amplifiers.



PART-B (5 x16 = 80 Marks)

11. i. Explain the structure of pn junction diode and draw its I-V characteristics. (6)
ii. Derive p-n junction diode current equation under forward and reverse bias condition. (10)

12. A.i.Draw the structure of n channel MOSFET and explain its principle of operation. (8)

ii. Derive the drain current equation of NMOS transistor operating in linear region and in saturation region and draw its I-V characteristics. (8)

(OR)

12. B. i. Draw the structure of n channel JFET and explain its principle of operation. (8)
ii.Derive drain current equation of a JFET device under various region of operation and draw its I-V characteristics. (8)

13.A. For the amplifier circuit shown in Fig.1 draw the small signal equivalent circuit. Derive the expression for small signal voltage gain and output impedance. (16)

(OR)

13.B. Draw the small signal equivalent circuit of the amplifier circuit shown in Fig.2. Derive the small signal voltage gain and input impedance. (16)

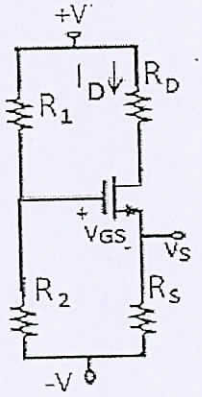


Fig. 1

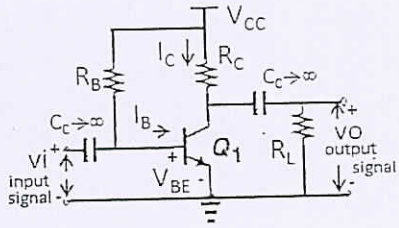


Fig. 2

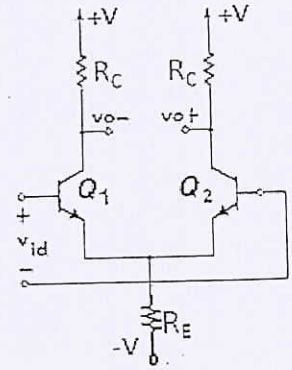


Fig. 3

14.A. For the differential amplifier circuit shown in Fig.3 derive the expression for differential mode gain and common mode gain. (16)

(OR)

14.B. Explain the principle of operation of a single tuned amplifier. Derive its maximum voltage gain and its frequency response characteristic. (16)

15. A. Draw the functional block diagram of a current series negative feedback amplifier topology and derive its gain, input impedance and output impedance with feedback. (16)

(OR)

15. B. Draw the circuit schematic of a BJT based Wein Bridge oscillator. Derive the expression for frequency of oscillation and the condition for sustained oscillation. (16)