4/10/13

Roll No. | | | | | | | | | | 5 |

B.E / B.Tech (Full Time) DEGREE ARREAR EXAMINATIONS, NOV / DEC 2013

BIOMEDICAL ENGINEERING BRANCH

SECOND Semester

BM 8202 ELECTRON DEVICES AND CIRCUITS

(Regulation 2012)

Time : 3 Hours | Answer ALL Questions | Max. Marks 100

PART-A (10 x 2 = 20 Marks)

1. What is meant by peak inverse voltage (PIV) of a diode?
2. How is a laser diode derived from light-emitting diode?
3. What is meant by early voltage?
4. Give the expression for collector current equation of an npn transistor operating in active region.
5. Draw the small signal circuit model of BJT.
6. Give the factors deciding transconductance (gm) of MOSFET.
7. Define common mode rejection ratio (CMRR) of a differential amplifier .
8. Give the efficiency of class A power amplifier.
9. Give the condition under which sustained oscillation can be obtained from an amplifier.
10. Define phase margin.

PART-B (5 x 16 = 80 Marks)

11.(i) Explain the principle of operation of a half wave rectifier circuit and derive the expressions for peak to peak ripple voltage, average value of diode current. **(10)**

(ii) Explain the principle of operation of zener diode used as voltage regulator. **(6)**

12.(a)(i) Describe the operation of an npn transistor in active mode and derive the expressions for collector current, base current and emitter current. **(8)**

(ii) Draw the current-voltage characteristic of npn transistor in common emitter configuration and derive the transistor parameters current gain β, output resistance r_o, and saturation collector to emitter voltage V_{CEsat} from the current-voltage characteristic. **(8)**

OR

12.(b)(i) Explain the structure and physical operation of an enhancement type n-channel MOSFET. **(8)**

(ii) Derive the current voltage i_d-V_{DS} characteristic of the enhancement type n-channel MOSFET. **(8)**

13.(a)(i) Using small signal equivalent circuit determine the voltage gain and current gain of a Common emitter amplifier. **(8)**

(ii) Using high frequency small signal model derive unity gain frequency of common emitter amplifier. **(8)**

OR

13.(b)(i) Using small signal equivalent circuit, determine the voltage gain and output resistance of a common source amplifier. **(8)**

(ii) Using high frequency small signal circuit model, derive the unity gain frequency of a common source amplifier. **(8)**

14.(a)(i) Explain the large signal operation of differential amplifier using BJT and derive its common mode voltage gain. **(8)**

(ii) Derive the small signal differential gain of the differential amplifier using BJT. **(8)**

OR

14.(b)(i)Explain the principle of operation of a single tuned amplifier with LC tank circuit. Derive the resonant frequency, gain at resonance and Q of the tuned amplifier. **(16)**

15.(a)(i) Give the advantages of negative feedback amplifier. **(4)**

(ii) With a block diagram explain the various feedback topology of negative feedback Amplifier. **(12)**

OR

15.(b)(i) Explain the principle of operation of Wein-bridge oscillator and derive an expression for its resonant frequency **(8)**

(ii) Explain the principle of operation of Hartley oscillator and derive its resonant frequency. **(8)**
