B.E./B.Tech. DEGREE EXAMINATION, APRIL/MAY 2010
Third Semester
Electrical and Electronics Engineering
EE2203 — ELECTRONIC DEVICES AND CIRCUITS
(Regulation 2008)

PART A — (10 × 2 = 20 Marks)

1. What is meant by diffusion current in a semi conductor?
2. A silicon diode has a saturation current of 7.5µ A at room temperature 300°K. Calculate the saturation current at 400°K.
3. Draw the input and output characteristics of a transistor in CE configuration and mark the cutoff, saturation and active regions.
4. State the advantages of optocoupler. (Write any four).
5. Compare JFET with BJT.
6. Define amplification factor in JFET.
7. Define CMRR and write its significance in differential amplifiers.
8. List the advantages of negative feedback amplifiers.
9. Sketch the idealized characteristics for the filter types.
(a) Low pass
(b) High pass
(c) Band pass
(d) Band reject filters.
10. Define intrinsic stand off ratio of UJT and draw its equivalent circuit.

PART B — (5 × 16 = 80 Marks)

11. (a) With a neat diagram explain the working of a PN junction diode in forward bias and reverse bias and show the effect of temperature on its V-I characteristics. (16)
Or
(b) (i) Explain V-I characteristics of Zener diode. (8)
(ii) Draw the circuit diagram and explain the working of full wave bridge rectifier and derive the expression for average output current and rectification efficiency. (8)

12. (a) (i) Draw the h-parameter equivalent circuit of a transistor in CE configuration. (8)
(ii) Describe the methods of determination of h-parameters from its static Input and output characteristics. (8)
Or
(b) (i) Explain the important characteristics of optocoupler. (6)
(ii) Explain the switching characteristics of transistor with neat sketch. (10)

13. (a) (i) Explain how the transconductance of a JFET varies with drain current and gate voltage characteristics and transfer characteristics. (12)
(ii) A JFET has the following parameters IDDS = 32 mA, VGS(off) = -8 Volts, VGS = -4.5 Volts. Find the values of drain current. (4)
Or

(b) (i) Explain the working of n-channel enhancement type MOSFET.
Sketch its typical characteristics. (10)
(ii) Explain the application of FET as a voltage variable resistor. (6)

14. (a) (i) Draw the block diagram of a voltage series feedback amplifier and derive the equation for input impedance, output impedance and the voltage gain. (10)
(ii) Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having AV = 300, Ri = 1.5 k, Ro = 50 k and β = 1/15. (6)
Or
(b) (i) Differentiate oscillator with amplifier. (4)
(ii) Draw the circuit of a Hartley oscillator and derive the condition for the frequency of oscillation. (12)

15. (a) (i) Describe the operation of UJT and its emitter characteristics. (8)
(ii) Describe the working of a Schmitt trigger circuit with the help of necessary waveforms.(8)
Or
(b) (i) Sketch the response of RC high pass filter for the following inputs and explain.
(1) Ramp
(2) Pulse. (8)
(ii) Explain the operation of a bistable multi-vibrator circuit with neat sketch. (8)

B.E. / B.Tech. Degree Examination, April / May – 2010
Electrical and Electronics Engineering
EC 1211 – Electronic Devices

PART – A (10 X 2 =20 marks)

1. Define Barrier Potential.

2. State the applications of PN junction diode.

3. What is emitter follower? State the applications of the same.

4. Which transistor configuration is mostly used as an amplifier, why?

5. Why do you call FET as field effect transistor?

6. Define Pinch off voltage.

7. What is the principle behind solar cell?

8. Name any four Optoelectronic Devices.

9. Draw the symbol of tunnel diode and state its applications.

10. What is Zener Breakdown?

PART – B (5 X 16 = 80 marks)

11. (a) Explain the working of PN junction diode with forward and reverse characteristics.

Or
(b) Write in detail on Transition and Diffusion capacitance.

12. (a) Explain CB Transistor configuration with input and output characteristics.

Or
(b) Explain in detail about power transistors and its characteristics.

13. (a) Explain the operation of enhancement mode MOSFET with neat diagram and compare it with JFET.

Or
(b) (i) Describe the working principle of UJT. (12)
(ii) What are unipolar and bipolar devices? Give examples. (4)

14. (a) Explain the construction and characteristics of LED.

Or
(b) Explain the function of Phototransistor and state its applications.

15. (a) Explain the operations of SCR in detail and compare it with TRIAC.

Or
(b) Explain the function of varactor diode and state the applications.

B.E Electrical and Electronics Engineering
EE2203 - ELECTRONIC DEVICES AND CIRCUITS
April/May 2011 Question paper
(Regulation 2008)
Third Semester

Time: Three hours Maximum: 100 Marks

Answer ALL Questions

PART A - (10 × 2 = 20 Marks)

1. What is meant by diffusion current in a semi-conductor?
2. A silicon diode has a saturation current of 7.5 pA at room temperature to 300 °K. Calculate the saturation current at 400 ° K.
3. Draw the input and output characteristics of a transistor in CE configuration and mark the cutoff, saturation and active regions.
4. State the Advantages of optocouplers. (Write any four).
5. Compare with JFET BJT
.6. Define the amplification factor in the JFET.
7. Define CMRR and write its significance in the differential amplifiers.
8. List the Advantages of negative feedback amplifiers
.9. Sketch of the idealized characteristics for the filter types.(A) Low Pass(B) high pass(C) band-pass(D) Band reject filters.
10. Define intrinsic stand off ratio of UJT and draw its equivalent circuit.

PART B - (5 × 16 = 80 Marks)

11. (A) With a neat diagram explain the working of a PN junction diode in forward bias and reverse bias and show the effect of temperature on its V-I characteristics. (16)

Or

(B) (i) Explain VI characteristics of the zener diode. (8)
(Ii) Draw the circuit diagram and explain the working of full wave bridge rectifier and derived the expression for average output current and rectification efficiency. (8)

12. (A) (i) Draw the h-parameter equivalent circuit of a transistor in the CE configuration. (8)
(Ii) Describe the methods of determination of h-parameters from its Input and output static characteristics. (8)

Or

(B) (i) Explain the important characteristics of the optocoupler.
(6)(Ii) Explain with neat sketch the switching characteristics of transistors.(10)

13. (A) (i) Explain how the trans conductance of a JFET drain Varies with current and gate voltage transfer characteristics and characteristics.

(12)(Ii) has the following, the parameters A JFET IDDS = 32 mA, VGS (off) = -8 Volts, VGS = -4.5 Volts. Find the values of the drain current. (4)

Or

(B) (i) Explain the working of the n-channel enhancement type MOSFET. Sketch its typical characteristics. (10)
(II) Explain the application of the FET as a voltage variable resistor. (6)

14. (A) (i) Draw the block diagram of a voltage series feedback amplifier and derived the equation for the input impedance, output impedance and the voltage gain. (10)
(Ii) Calculate the voltage gain, input and output resistances of a voltage series feedback amplifier having a AV = 300, Ri = 1.5 k, 50 k Ro =and β = 1/15. (6)

Or

(B) (i) with differentiate oscillator amplifier. (4)
(Ii) Draw the circuit of a Hartley oscillator and derived the condition for the frequency of oscillation. (12)

15. (A) (i) Describe the operation characteristics of UJT and its emitter. (8)
(Ii) Describe the working of a Schmitt trigger circuit with the help of Necessary waveforms. (8)

Or

(B) (i) Sketch of the response of the RC high-pass filter inputs for the following, and explain.
(1) Ramp(2) pulse. (8)
(Ii) Explain the operation of a bistable multi-vibrator circuit with neat sketch. (8)

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2009

Third Semester

Electrical and Electronics Engineering

EE 2203 — ELECTRONIC DEVICES AND CIRCUITS

(Regulation 2008)

Time : Three hours Maximum : 100 Marks

Answer ALL Questions

PART A — (10 × 2 = 20 Marks)

1. What is diffusion current in PN Junction diode?
2. What is LED? Which material is used for LED?
3. Why is collector region wider than emitter region in BJT?
4. In a BJT, the emitter current is 12 mA and the emitter current is 1.02 times the collector current. Find the base current.
5. What are the special features of FET?
6. Define:
(a) Pinch off voltage and
(b) Amplification factor in JFET.
7. What is meant by Common mode Rejection Ratio?
8. Give the Barkhausen's criterion for oscillators.
9. Mention some applications of UJT.
10. What is a multivibrator?

PART B — (5 × 16 = 80 Marks)

11. (a) (i) Draw and Explain the VI characteristics of a PN Junction diode. (6)
(ii) Explain the operation of a Full wave Rectifier and derive its Ripple factor. (10)

Or

(b) (i) Explain the working of a Zener diode as a Regulator. (8)
(ii) Discuss the working principle, characteristics and applications of LED in detail. (8)

12. (a) (i) Draw and explain the Input and Output characteristics of a BJT in CE configuration. (12)
(ii) Write a note on optocouplers. (4)

Or

(b) (i) Draw the Hybrid model of CE configuration and also derive the expressions for its Input and Output Impedances, current and voltage gain. (12)
(ii) Explain the switching characteristics of a transistor. (4)

13. (a) Explain in detail the construction and working principle of Depletion MOSFET. Also explain how Depletion MOSFET acts both in enhancement and depletion mode.

Or

(b) (i) With a neat circuit diagram explain the operation of a common source amplifier. (6)

(ii) From the low frequency model, determine the input and output impedances and the voltage gain of a JFET. (10)

14. (a) (i) Discuss the various topologies of feedback amplifier. (8)
(ii) Discuss the operation of a colpitts oscillator in detail. (8)

Or

(b) (i) Explain the effects of negative feedback in amplifiers. (8)
(ii) Describe the operation of a typical voltage shunt feedback amplifier. (8)

15. (a) (i) What is a clipper and clamper? Explain the concept of a positive clipper and a clamper. (12)
(ii) Distinguish between Astable and Bistable multivibrators. Mention some applications. (4)

Or

(b) (i) What is a Schmitt Trigger? Discuss any two applications of Schmitt Trigger. (8)
(ii) Explain the application of UJT as a Sawtooth oscillator. (8)

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2010

Third Semester

Electrical and Electronics Engineering

EE 2203 — ELECTRONIC DEVICES AND CIRCUITS

(Regulation 2008)

Time : Three hours Maximum : 100 Marks

Answer ALL questions

PART A — (10 × 2 = 20 Marks)

1. Define Knee voltage of a diode.
2. What is peak inverse voltage?
3. Name the operating modes of a transistor.
4. What are hybrid parameters?
5. Draw the high frequency model of JFET.
6. Write the AC input impedance of a Darlington Transistor.
7. Mention the operating modes of MOSFET.
8. Mention any two high frequency LC oscillators.
9. Write the frequency equation of an Astable multivibrator.
10. What is Schmitt Trigger?

PART B — (5 × 16 = 80 Marks)

11. (a) (i) Explain the operation of FWR with centre tap transformer. Also derive the following for this transformer. (6)
(ii) dc output voltage (4)
(iii) dc output current (2)
(iv) RMS output voltage. (4)

Or

(b) Explain the following regulator circuits :
(i) Transistorized shunt regulator. (8)
(ii) Zener diode shunt regulator. (8)

12. (a) Describe the static input and output characteristics of a CB transistor with neat circuit diagram. (16)

Or

(b) Derive the expression for current gain, input impedance and voltage gain of a CE Transistor Amplifier. (16)

13. (a) Explain the construction of N channel JFET. Also explain the drain and transfer characteristics of the same. (16)

Or

(b) (i) Describe the operation of common drain FET amplifier and derive the equation for voltage gain. (12)
(ii) In the common drain FET amplifier. Evaluate the voltage gain V A . (4)

14. (a) Derive the equation for differential mode gain and common mode gain of

a differential amplifier. (8 + 8 =16)

Or

(b) Draw and explain the operation of a Hartley oscillator. (16)

15. (a) Explain the working of UJT as a relaxation oscillator with necessary wave forms and equations. (16)

Or

(b) (i) Draw the circuit of a monostable multivibrator and explain. (14)

(ii) What are the applications of monostable multivibrator? (2)

ELECTRONIC DEVICES AND CIRCUITS EE2203 MODEL QUESTION PAPER

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2011.

Third Semester

Electrical and Electronics Engineering

EE 2203 — ELECTRONIC DEVICES AND CIRCUITS

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is meant by dynamic resistance of diode?
2. Differentiate between zener breakdown and avalanche breakdown.
3. Draw the h-parameter equivalent circuit of a CE BJT configuration.
4. What is the application of optocoupler?
5. What is pinch off voltage?
6. Give any two differences between E-MOSFET and D-MOSFET.
7. What are the advantages of differential amplifier?
8. State Barkhausen criteria.
9. Sketch the output waveform for the clipper shown in the figure below.
Neglect the drop across the diode.
10. What is intrinsic standoff ratio in UJT?

PART B — (5 × 16 = 80 marks)

11. (a) Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier without center tap transformer. Obtain the expression for peak inverse voltage. (16)
Or

(b) (i) With neat diagram explain the construction and working of LED. (8)
(ii) Explain the working of LCD seven segment display using square wave supply. (8)

12. (a) Draw the circuit for determining the transistor common base characteristics and explain how the characteristics are measured and draw the graphs. (16)
Or
(b) For a common emitter circuit draw the h-parameter equivalent circuit and write the expressions for input impedance, output
impedance and voltage gain. (16)

13. (a) Draw the circuit diagram of common source FET amplifier and give the design steps to find the component values used in the circuit. (16)
Or
(b) Explain the construction and working of enhancement MOSFET and depletion MOSFET. Draw the characteristics. (16)
14. (a) Explain the concept of negative feedback in amplifier. Derive the expressions for voltage gain, input impedance and output impedance. (16)
Or
(b) (i) With a neat diagram, explain the construction and working of BJT RC phase shift oscillator. (8)
(ii) Explain the construction and working of Hartley oscillator. (8)

15. (a) (i) Explain the construction, equivalent circuit and operation of UJT. Draw the characteristics of UJT. (8)
(ii) Explain how UJT is used to generate saw tooth waveform. (8)
Or
(b) Explain the operation of collector coupled monostable multivitrator with neat circuit diagram and draw the various waveforms. (16)

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2012.

Third Semester

Electrical and Electronics Engineering

EE 2203/131303/EE 35/10133 EE 305 A/080280018 – ELECTRONIC DEVICES AND CIRCUITS

(Regulation 2008)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Calculate the speed of electron when it falls by a potential of 300 k volts.
2. What are the advantages and limitations of LCD displays.
3. Calculate β of a transistor when $\alpha = 0.98$.
4. Among CE, CB and CC configurations, which one is the most popular? Why?
5. Mention the disadvantages of FET compared to BJT.
6. Define Pinch off voltage of a FET.
7. State Bar Khausen criterion for sustained oscillations.
8. List the advantages of crystal oscillator.
9. What is intrinsic stand-off ratio of a UJT?
10. What are the types of Multivibrators?

PART B — (5 × 16 = 80 marks)

11. (a) (i) How a PN Junction diode is working? Draw and explain V-I characteristics of PN diode with neat diagrams. (10)

(ii) List out and explain the applications of LED and LCD. (6)

Or

(b) In a semiconductor at room temperature (300°K), the intrinsic carrier concentration and resistivity are $1.5 \times 10^{16}/cm^3$ and $2 \times 10^3 \Omega - m$ respectively. It is converted to an extrinsic semiconductor with a doping concentration of $10^{20}/m^3$. For the extrinsic semiconductor. Calculate the

(i) Minority carrier concentration (4)

(ii) Resistivity (4)

(iii) Shift in fermi level due to doping (4)

(iv) Minority carrier concentration when its temperature is increased to a value at which the intrinsic carrier concentration 'n_i' doubles. (4)

Assume the mobility of majority and minority carriers to be the same and kT = 26 meV at room temperature.

12. (a) A common base transistor amplifier is driven by a voltage source V_s and internal resistane $R_s = 1200\ \Omega$. The load impedance is a resistor R_L of $1000\ \Omega$. The 'h' parameters are given below :

$h_{ib} = 220\ \Omega$ $\qquad$ $h_{rb} = 3 \times 10^{-4}$

$h_{fb} = -0.98$ $\qquad$ $h_{ob} = 0.5 \mu A/V$

Compute, current gain (A_i), Input impedance (R_i), Voltage gain A_v, input impedance (R_o) and power gain A_p.

Or

(b) Explain the construction, principle of operating, characteristics and applications of :

(i) Power Transistors (8)

(ii) Opto Couplers (8)

13. (a) Present and explain the structure of Current Flow mechanisms of Metal Semiconductor junction in detail.

Or

(b) Discuss on the following :

(i) JFET Small Signal model. (9)

(ii) Darlington Connection. (7)

14. (a) What do you understand by Differential amplifiers? Draw the circuit diagram and explain the working of differential amplifier. Explain the circuit operations at CM and DM.

Or

(b) Draw the circuit diagram and explain the principle of operation of the following oscillators :

(i) RC phase shift oscillator. (8)

(ii) Any one LC oscillator. (8)

15. (a) Write a detailed technical note on the following :

(i) UJT based saw tooth oscillators. (10)

(ii) Diode clippers. (6)

Or

(b) Explain the following with respect to their construction and working principle.

(i) Schmitt Trigger. (10)

(ii) Diode damper. (6)