Code No: R21026 **R10** SET - 1

II B. Tech I Semester Supplementary Examinations, September - 2014
ELECTRONIC DEVICES AND CIRCUITS
(Com. to EEE, ECE, EIE, ECC, CSE, IT, BME)

Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Explain about one dimensional motion of charged particles in electric field.
   b) Define the term current density and derive the expression for current density of conductor. (8M+7M)

2. a) Describe Hall Effect. Give the applications of it.
   b) What is meant by intrinsic and extrinsic semiconductors? Explain. (8M+7M)

3. a) Explain operation of PN junction diode when it is connected in reverse bias and forward bias.
   b) The voltage across silicon diode is 0.7 V when 3mA current flows through it. If the voltage increases to 0.75 V then find the current in silicon diode. (8M+7M)

4. a) Define ripple factor and calculate the ripple factor of a half wave rectifier.
   b) Define rectifier efficiency and derive the expression for rectifier efficiency of full wave rectifier. (8M+7M)

5. a) Discuss about transistor current components.
   b) What is early effect? Explain the effect of early effect on transistor characteristics. (8M+7M)

6. a) Give the construction details and characteristics of enhancement mode MOSFET.
   b) Define the following terms:
   i) Drain resistance ii) Transconductance iii) Amplification factor. (8M+7M)

7. a) What is meant by transistor biasing? Describe various biasing methods.
   b) Draw the collector-Base bias circuit and derive the expression for stability factor. (8M+7M)

8. a) Find voltage gain, current gain, input impedance and output impedance of transistor CC amplifier using simplified hybrid model.
   b) Compare transistor CE, CB and CC amplifiers. (10M+5M)
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Code No: R21026 **R10** SET - 2

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Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Describe the parallel and perpendicular electric and magnetic fields.
   b) Write the applications of CRO. (10M+5M)

2. a) Explain the following terms:
      i) Drift current ii) Diffusion current
   b) Explain the energy band theory of crystals. (8M+7M)

3. a) Explain the volt ampere characteristics of zener diode and give the applications of it.
   b) Calculate the reverse saturation current for a silicon PN junction diode which passes a current of 15 mA at 27^0C when the forward bias voltage is 680 mV. (8M+7M)

4. a) Explain the operation of bridge rectifier with relevant waveforms.
   b) Derive the expression for ripple factor of a half wave rectifier with L-section filter. (8M+7M)

5. a) Explain the input and output characteristics of transistor in common base configuration.
   b) Draw the Ebers-Moll model of transistor and explain. (8M+7M)

6. a) Discuss about the operation of depletion mode MOSFET.
   b) Compare the Bipolar Junction transistor and Field effect transistor. (10M+5M)

7. a) Explain how the stability is improved in self bias circuit.
   b) Discuss about bias compensation using sensistors. (8M+7M)

8. a) Determine voltage gain, current gain, input impedance and output impedance of transistor amplifier at low frequencies.
   b) What are the advantages of h-parameters? (10M+5M)
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Code No: R21026 **R10** SET - 3

II B. Tech I Semester Supplementary Examinations, September - 2014
ELECTRONIC DEVICES AND CIRCUITS
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Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Derive the expression for electrostatic deflection sensitivity in cathode ray tube.
   b) Explain the terms electric field and electric potential. Give the relationship between these two terms. (10M+5M)

2. a) Explain the following terms:
      i) Mobility ii) Conductivity
   b) a block of silicon is doped with a donor atom density of $N_D= 3x10^{14}$ atoms/cm^3 and with an acceptor atom density of $N_A=0.5x10^{14}$ atoms/cm^3. Determine the resultant densities of free electrons and holes. Given intrinsic carrier concentration of silicon is $1.5x10^{10}$ per cm^3. (8M+7M)

3. a) Draw and explain about VI characteristics of PN diode.
   b) Explain the operation of tunnel diode with the help of energy band diagrams. (8M+7M)

4. a) Explain how the zener diode works as a regulator.
   b) Compare the various types of rectifiers. (8M+7M)

5. a) Explain the input and output characteristics of transistor in common emitter configuration.
   b) Explain how transistor acts as an amplifier. (10M+5M)

6. a) Explain the working of SCR and give the applications.
   b) What are the advantages of JFET compared to BJT? (10M+5M)

7. a) Explain the self bias circuit and derive the expression for stability factor.
   b) Draw the circuit diagram for compensation of I_{co} using diode and explain. (8M+7M)

8. a) Explain the determination of h-parameters from transistor characteristics.
   b) Draw the simple hybrid model of transistor. What are the conditions to use simple hybrid model. (8M+7M)
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Code No: R21026 **R10** SET - 4

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Time: 3 hours Max. Marks: 75

Answer any **FIVE** Questions
All Questions carry **Equal** Marks
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1. a) Discuss about the force on charged particles in magnetic field.
   b) Compare electrostatic deflection and magneto static deflection. (8M+7M)

2. a) Discuss about continuity equation.
   b) Explain the effect of heat on conductors and semiconductors. (8M+7M)

3. a) Discuss about Varactor diode and give the applications.
   b) A silicon PN junction has reverse saturation current of 30 nA at a temperature of 300 K. Calculate the junction current when the applied voltage is i) 0.7 V forward bias ii) 10 V reverse bias. (8M+7M)

4. a) Explain the operation of full wave rectifier. Write the merits of it when compared to half wave rectifier.
   b) Draw the circuit diagram of full wave rectifier with π section filter and explain. (8M+7M)

5. a) Discuss about photo transistor and list out the applications.
   b) Define the terms α and β of transistor. Derive the relationship between these two. (8M+7M)

6. a) Explain the drain to source characteristics of JFET.
   b) Draw the characteristics of UJT and describe various regions. (8M+7M)

7. a) Define the operating point. Explain the various reasons for instability in operating point.
   b) What is meant by thermal runaway and write the condition to avoid thermal runaway in transistor. (8M+7M)

8. Draw the h-parameter model of transistor. Derive the general expressions for voltage gain, current gain, input impedance and output impedance of generalized transistor. (15M)
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