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

II B. Tech I Semester Regular Examinations, March – 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. Compare the motion and trajectories of electron when placed
   i) Only in electric field
   ii) Only in Magnetic field
   iii) Combined electric and magnetic fields. (15M)

2. a) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closer to conduction band.
   b) Explain the concept of Hall Effect. (9M+6M)

3. a) Compare the characteristics of a P-N Junction diode, and Zener diode.
   b) Explain the formation of depletion region in an open-circuited PN-junction with neat sketches. (7M+8M)

4. a) Define the terms as referred to FWR circuit.
   i) PIV ii) Average DC voltage iii) RMS current iv) Ripple factor.
   b) In a full wave rectifier the required DC voltage is 10V and the diode drop is 0.5V. Calculate AC r.m.s input voltage required in case of bridge rectifier circuit and centre tapped full wave rectifier circuit. (8M+7M)

5. a) With neat diagram explain the various current components in a PNP transistor.
   b) Explain the input and output characteristics of a transistor in CB configuration. (8M+7M)

6. a) Describe the operation of UJT. Draw its equivalent circuit and hence define the Intrinsic Standoff ratio. Draw its characteristic curve and explain the various Parameters.
   b) Write a note on Silicon-Controlled Rectifier. (9M+6M)

7. a) Derive the condition to avoid the thermal runway.
   b) Draw the circuit diagram of a fixed bias and self bias circuits and derive the expressions for stability factors. (7M+8M)

8. a) Write a short note on Miller's theorem.
   b) Analyze a single stage transistor amplifier using h - parameters. (6M+9M)
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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) List out the advantages and disadvantages of both electrostatic and electromagnetic deflection systems
   b) Explain the terms:
   i) Potential ii) Electron Volt. iii) Charge density iv) Current density. (7M+8M)

2. a) What is Fermi-level? Prove that the Fermi level in a 'p'-type material is much closer to valency band.
   b) What do you mean by step graded junction? Derive the expression for diffusion capacitance. (8M+7M)

3. a) Explain the concept of tunneling with energy band diagrams.
   b) Explain the principle of operation of Varactor diode and photo diode. (7M+8M)

4. a) Define the following for a HWR:
   i) Ripple factor ii) PIV iii) TUF iv) Rectification efficiency
   b) Compare Full wave and Bridge rectifiers with respect to ripple factor, regulation, Rectification efficiency and PIV ratings. (8M+7M)

5. a) With neat diagram explain the various current components in a PNP transistor.
   b) Explain the input and output characteristics of a transistor in CE configuration. (8M+7M)

6. a) Define intrinsic standoff ratio and Draw the symbol and equivalent circuit of a UJT.
   b) Explain principle of the operation of UJT with the help of its V-I characteristics. (8M+7M)

7. a) Explain how self biasing can be done in a BJT, draw the equivalent circuit and find the stability factor for it.
   b) Explain the term "Thermal Runaway" and how to overcome it. (9M+6M)

8. With the help of exact and approximate hybrid model, derive expressions for current gain (A_I), input Impedance (Z_i), output impedance (Z_o) and voltage gain (A_V) of CE amplifier. (15M)

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Code No: R21026 **R10** SET - 3

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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) List out the advantages and disadvantages of both electrostatic and electromagnetic deflection system?
   b) Explain the terms: (i) Potential (ii) Electron Volt (iii) Charge density (iv) Current density (7M+8M)

2. a) What is Fermi-level? Prove that the Fermi level in an 'n'-type material is much closer to conduction band
   b) Define Hall Effect, Diffusion and Continuity Equation. (9M+6M)

3. a) Explain the Zener diode characteristics in Reverse biased condition.
   b) Explain Zener diode as voltage regulator. (8M+7M)

4. a) Define the following terms of a rectifier and filter: i) Ripple Factor ii) Regulation iii) Rectification Efficiency iv) Form Factor v) Peak factor
   b) Explain full wave rectifier with capacitor filter with help of wave forms. (7M+8M)

5. a) With neat sketches explain the cut off region, active region and saturation region of CE output characteristics.
   b) The current gain of transistor in CE circuit is 49. Calculate CB current gain and find the base current where the emitter current is 3 mA. (8M+7M)

6. a) Explain MOSFET V-I characteristics in Enhancement and depletion mode.
   b) What are the advantages JFET over BJT? (8M+7M)

7. a) Define stability factors S, S' and S'' and determine stability factor for collector to base bias
   b) Explain the term "Thermal Runaway" and suggest methods to overcome it. (9M+6M)

8. With the help of exact and approximate hybrid model. Derive the expressions for current gain, input Impedance, output impedance and voltage gain of a CB amplifier. (15 M)
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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. Compare the motion and trajectories of electron when placed (15M)
   i) Only in electric field ii) Only in Magnetic field iii) Combined electric and magnetic fields.

2. a) What is Fermi-level? Prove that the Fermi level in an 'p'-type material is much Closed to conduction band
   b) Explain the concept of tunneling with energy band diagrams. (9M+6M)

3. a) Explain how a variable capacitance can be built using a Varactor diode.
   b) Explain the principle and operation of photo diode with help of neat diagram. Also draw the V-I characteristics. (7M+8M)

4. a) Derive the expression for ripple factor, regulation, rectification efficiency for half wave rectifier.
   b) Define the terms as referred to FWR circuit: i) PIV ii) Average DC voltage iii) RMS current iv) Ripple factor. (7M+8M)

5. a) With neat diagram explain the various current components in an NPN transistor.
   b) Explain the input and output characteristics of a transistor in CB configuration. (8M+7M)

6. a) Describe the operation of UJT. Draw its equivalent circuit and hence define the intrinsic standoff ratio. Draw its characteristic curve and explain the various Parameters.
   b) Explain principle of operation of SCR using its V-I characteristics. (8M+7M)

7. a) Derive the expressions for stability factors in the case of self bias of a CE mode transistor.
   b) Explain biasing compensation techniques. (8M+7M)

8. a) Write a short note on Miller's theorem.
   b) Analyze a single stage transistor amplifier using h - parameters. (7M+9M)
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