Code No:- R21026 R10 SET - 1

II B. Tech I Semester, Supplementary Examinations, May - 2012

ELECTRONIC DIVICES 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) Derive an expression for electrostatic deflection sensitivity
   b) An electron having an initial velocity of 5.93 X 10^6 m/sec enters a magnetic field with density of 0.05 Weber / sqm at an angle of 45^0 to the field. Estimate the electron position after it has made one revolution in the field.

2. a) Give the classification solids based on their energy band diagrams
   b) Explain the need for doping and discuss different types.

3. a) Discuss temperature dependence PN diode VI characteristics.
   b) Calculate the factor by which the current will increase in a silicon diode operating at a forward voltage of 0.5 Volts, when the temperature is raised from 25^0C to 125^0 C.

4. a) With circuit and necessary waveforms explain the operation of HWR
   b) Derive the expression for ripple factor for the circuit FWR with capacitor filter.

5. a) With neat sketch explain the different current components of transistor.
   b) Explain output characteristics transistor CE configuration.

6. a) What are the draw backs in transistor fixed bias circuit?
   b) Derive an expression for stability factor S in self bias circuit.

7. a) Discuss how h – parameters can be obtained from transistor characteristics.
   b) Find expressions for voltage gain, current gain, Input impedance and output impedances of CB amplifier using simplified hybrid model.

8. a) Discuss about small signal model of FET's.
   b) Discuss the VI characteristics of depletion mode MOSFET.

Code No:- R21026 R10 SET - 2

II B. Tech I Semester, Supplementary Examinations, May - 2012

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Time: 3 hours Max Marks: 75

Answer any FIVE Questions
All Questions carry Equal Marks
****

1. a) Derive an expression for magnetic deflection sensitivity.
   b) How much voltage is required between plates separated by 1 cm to deflect an electron beam to 1^0 if the effective length of plates is 2 cm and accelerating voltage is 1000 Volts?

2. a) Discuss the different types of current component mechanisms in semiconductors.
   b) Explain about mass – action law

3. a) Discuss zener and avalanche break down mechanisms.
   b) Determine the forward resistance of a PN diode, when the forward current is 6 mA at $T = 300^0$ K. Assume the diode is silicon.

4. a) With circuit and necessary waveforms explain the operation of Bridge Rectifier.
   b) Derive the general expression for ripple factor in rectifier circuits.

5. a) Explain how transistor will act as an amplifier.
   b) Discuss in detail about early effect and its consequences.
   c) Derive the relation base current and collector current.

6. a) Explain diode compensation circuit for variations in V_{BE} for self bias circuit.
   b) Derive an expression for stability factor 'S' in self bias circuit.

7. Derive the expressions for voltage gain, current gain, Input impedance, output impedance, voltage gain with respect to source and current gain with respect to source for generalized transistor amplifier at low frequencies.

8. a) Discuss the relationship between FET parameters.
   b) Discuss voltage divider biasing of JFET.

Code No:- R21026 R10 SET - 3

II B. Tech I Semester, Supplementary Examinations, May - 2012

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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 the applications of CRO.
   b) An electron is released with zero initial velocity from the lower pair of plates, which are 3 cm apart. The accelerating voltage V_A = 0 Volts at t=0 seconds and V_A = 10 Volts at t=1 u seconds. Find the time of travel to reach point, which is 2.8 cm from the lower plate.

2. a) Discuss about Hall Effect.
   b) Discuss about continuity equation of semi conductors.

3. a) Clearly explain about V-I characteristics of P-N diode.
   b) The voltage across a silicon diode at room temperature is 0.7 Volts when 2 mA current flows through it. If the voltage increases to 0.75 Volts, Calculate the diode current.

4. a) With simple circuit explain how Zener diode will act as a regulator.
   b) In a bridge rectifier, the transformer is connected to 220 Volts, 60 Hz mains and the turns ratio of the step down transformer is 11:1.Assuming the diodes to be ideal, find
      i) Voltage across the load
      ii) D.C. Current
      iii) PIV

5. a) Explain input characteristics transistor CE configuration.
   b) A transistor with α = 0.97 has a reverse saturation current of 5 uA in CB configuration. Calculate the value of leakage current in the CE configuration. Also find the collector current and the emitter current if the value of base current is 40 uA.

6. a) Explain diode compensation circuit for variations in I_C for self bias circuit.
   b) How self bias circuit will eliminate drawbacks in fixed bias circuit.

7. a) Give the comparison of CE, CC and CB amplifiers with respect to voltage gain current gain, Input impedance and output impedance.
   b) Find expressions for voltage gain, current gain, Input impedance and output impedances of CC amplifier using simplified hybrid model.

8. a) With neat structure explain the principle of operation of JFET.
   b) Explain how FET acts as VVR.

Code No:- R21026 R10 SET - 4

II B. Tech I Semester, Supplementary Examinations, May - 2012
ELECTRONIC DIVICES 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) Discuss a path of charged particle in parallel electric and magnetic fields
   b) The electrons are emitted from cathode ray tube and accelerated potential of 400 Volts. Find the deflection sensitivity. Given data: L = 19.4 cm, l = 1.27 cm, d = 0.475 cm

2. a) Describe the position of Fermi Level in P and N type semiconductors
   b) Explain Diffusion Current mechanisms in semiconductors.

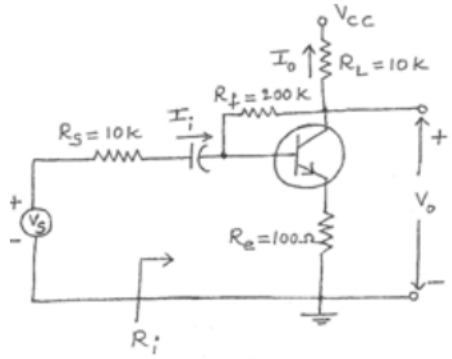
3. a) Discuss zener and avalanche break down mechanisms.
   b) Calculate the factor by which the current will increase in a silicon diode operating at a forward voltage of 0.4 Volts, when the temperature is raised from 25^0C to 150^0 C.

4. a) With circuit and necessary waveforms explain the operation of centered tapped FWR
   b) Derive the expression for ripple factor for the circuit FWR with inductor filter.

5. a) With neat sketch explain the different current components of transistor.
   b) In an NPN transistor emitter is grounded, base is connected with 4 Volts supply in series with 100 K ohms resistor and collector base is connected with 4 Volts supply in series with 2 K ohms. Assume V_{CC} = 12 Volts, V_{BE} = 0.7 Volts, β = 100. Find I_B, I_C and I_E

6. a) Derive an expression for stability factor 'S' in self bias circuit.
   b) What is thermal runaway and what is the condition for thermal stability in CE configuration.

7. For the transistor amplifier shown below, Compute $A_I = I_o / I_i$, A_v, A_{vs} and R_i .Assume h_{ie} = 1100 ohms, h_{fe} = 50 , h_{re} = 2.5 X 10^{-4} h_{oe} = 24 uA/V



8. a) With neat structure explain the principle of operation of depletion MOSFET.
   b) Explain drain characteristics of JFET