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SRI VASAVI ENGINEERING COLLEGE

(Sponsored by Sri Vasavi Educational Society)
Approved by AICTE, New Delhi and Permanently Affiliated to JNTUK, Kakinada
Pedatadepalli, **TADEPALLIGUDEM – 534 101,** W.G. Dist, (A.P.)

Department of Electronics and Communication Engineering

Subject: EDC **Class: II ECE, I-SEM** **Ac.Year: 2017-18**

QUESTION BANK
UNIT: I

1. a) Define insulators, semiconductors and conductors.

   b) List out the properties of semiconductor

2. a)Define Fermi-level? Explain that the Fermi level in an 'n'-type material is much closer to conduction band.

   b) Explain the concept of Hall Effect and derive its expression.

3. a) Show that the Fermi energy level lies in the centre of forbidden energy band for an intrinsic semiconductor.

   b)Find the concentration of holes and electrons in a p-type Silicon at 300K assuming resistivity as 0.02Ω-cm. Assume μp=475m2/V-sec, ni=1.45*1010/cm3

4. a) Obtain the expression for Continuity Equation.

   b) Calculate the intrinsic concentration of Germanium in carriers/m3 at a temperature of 3200K given that ionization energy is 0.75eV and Boltzmann's constant K=1.374*10-23J/0K. Also calculate the intrinsic conductivity given that the motilities' of electrons and holes in pure germanium are 0.36 and 0.17m2/volt-sec respectively.

5. a) Define any four of the following terms

   I) Drift Current II) Diffusion Current III) Mobility IV) Conductivity V) Charge Density

   b) Explain the reason why silicon is preferred than germanium.

6. Explain about Hall Effect? Obtain an expression for hall coefficient?
7. Explain drift and diffusion currents for semiconductors.
8. Define law junction?
9. Explain Fermi- Dirac function.

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UNIT: II

1. Describe any two of the following terms related to the PN Junction diode
   a) Static and Dynamic Resistance
   b) Transition and Diffusion Capacitance
   c) Depletion Layer and Barrier Potential
2. Discuss the operation of UJT and explain the IV Characteristics
3. Describe the following terms related to the SCR
   a) Latching Current and Holding Current
   b) Forward break over voltage and reverse break-over voltage
3. Explain briefly about any two of the following
   a) LED b) LCD c) Photodiode d) Thyristor
4. a) Explain the principle of operation of Varactor diode and give its applications
   b) Explain the concept of tunnelling with energy band diagrams.
5. Explain the formation of depletion region in an open-circuited PN-junction with neat sketches.
6. With a neat diagram explain the working of an open circuited PN junction. Give necessary response curves.
7. Explain the volt-ampere characteristics of tunnel diode.Indicate the negative resistance portion.
8. Give short note on
   a) i)SCR ii)Photo diode
   b)Explain briefly about avalanche breakdown and Zener breakdown

UNIT: III

1. 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.
2. 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.

3. a) A voltage of 500 cos(wt) is applied to Half Wave Rectifier with load resistance of 5KΩ define and derive the values of Maximum DC Voltage component, R.M.S. current, Ripple Factor, Transformer Utilization Factor, PIV and Rectifier Efficiency of the rectifier.

   b) Explain full wave rectifier with capacitor filter with help of waveforms.

4. a) Explain the operation of Full Wave Rectifier with L-Section filter. Explain the necessity of a bleeder resistor.

   b) A diode whose internal resistance is 20Ω is to supply power to a 100 Ω load from 110V (R.M.S) source of supply. Calculate i) Peak Load Current ii) DC Load Current iii) AC Load Current iv) % Regulation from No load to given load.

5. a) Compare Half Wave Rectifier, Centre tapped Full Wave Rectifier and Bridge Rectifier

   b) A sinusoidal voltage whose Vm=24V is applied to half-wave rectifier. The diode may be considered to be ideal and RL=1.8K Ω is connected as load. Calculate peak value of current, RMS value of Current, DC value of current and Ripple factor.

6. a)For a full wave rectifier with shunt capacitance filter derive expression for ripple factor using approximate analysis.

   b) Give the list of different filters used in rectifier and their merits and demerits.

7. Explain the operation of bridge rectifier with circuit and necessary waveforms.

UNIT: IV

1. a) Explain the various current components in a PNP transistor

   b) Explain about Punch through and Base width modulation.

2. a) Explain the various current components in a NPN transistor.

   b) Explain the cut off region, active region and saturation region of CE output characteristics.

3. a) Explain MOSFET V-I characteristics in Enhancement and depletion mode.

   b) List the advantages JFET over BJT?

4. a) Explain the operation of JFET with its VI characteristics

   b) Give the values of I_D and g_m for VGS = -1.5V if I_{DSS} and V_P are given as 8.4mA and – 3V respectively.

5. a) Explain the reason why we call FET as a Voltage Controlled Device.

b) Compare CE, CB, CC configurations.

6. a) Explain the operation of N-channel enhancement type MOSFET with the help of it's (ID-VDS) and (ID-VGS) characteristics.

   b) Distinguish between JFET and MOSFET

7. With the help of neat diagram show different current components in a transistor.

8. With a neat construction diagram explain the principle of operation of JFET. Give its characteristics.

UNIT: V

1. a) Explain in detail about Thermal Runaway and Thermal Resistance

   b) Give the circuit diagram of a fixed bias and self bias circuits and derive the expressions for stability factors.

2. 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.

3. a) Explain compensation techniques.

   b) In a Silicon transistor circuit with a fixed bias, VCC=9V, RC=3KΩ, RB=8KΩ, β=50, VBE=0.7V. Find the operating point and Stability factor.

4. a) Define Biasing? Explain the need of it. List out different types of biasing methods

   b) If the various parameters of a CE amplifier which uses the self bias method are VCC=12V, R1=10KΩ, R2=5KΩ, RC=1KΩ, Re=2KΩ and β=100, find

   i) The coordinates of the operating point and

   ii) The stability factor, assuming the transistor to be of silicon

5. a) Define stability factors S, S'and S"' and determine stability factor for fixed bias

   b) In a Self bias circuit containing R1=80KΩ, R2=25KΩ, Re=2KΩ, RC=2KΩ, β =100, VCC=12V, VBE=0.7V. Find the operating point, S and S'.

6. Explain the transistor biasing circuit using fixed bias arrangement and explain its principle with suitable analysis.

7. a) Distinguish bias stabilization and compensation techniques.

   b) Explain the drawbacks of transistor fixed bias circuits.

8. Explain the need of biasing and stabilization.

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UNIT-VI

1. Write about single stage transistor amplifier using h - parameters.
2. With the help of exact and approximate hybrid model, solve the expressions for current gain (AI), input impedance (Zi), output impedance (Zo) and voltage gain (AV) of CE amplifier.
3. With the help of exact and approximate hybrid model. Solve the expressions for current gain, input Impedance, output impedance and voltage gain of a CB amplifier.
4. Give disadvantages of h-parameter analysis. Derive the approximate h-parameter conversion formulae for CB and CE configuration in terms of CC.
5. a) Compare AV, AI, Ri and Ro of CE, CB and CC configurations
   b) The h-parameters of a transistor used in a CE circuit are hie=1KΩ, hre=0.001. hfe=50, hoe=100K. The load resistance for the transistor is 1KΩ in the collector circuit. Determine Ri, RO, AV, Ai in the amplifier stage (Assume Rs= 1KΩ).
6. a) Compare BJT and FET amplifiers.
   b) Give the approximate h-parameter conversion formulae for CC and CB configuration in terms of CE.
7. Explain A FET amplifier in the common source configuration with a neat circuit diagram.
8. Define h-parameters along with its units.