n+ → P
P+ → n

Basics of electronics eng. Date

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1. Insulator has full valence band & ~~empty~~ conduction band.
2. Adding impurity to the pure semiconductor is doping.
3. If the electron (CB) & hole (VB) are created by thermal excitation of a VB to the CB are called electron hole pair (EHP)
4. Atomic density of Si 5×10^{22} atoms/cm^3
5. No. of EHPS at 300K in Si is only about 10^{10} EHP/cm^3
6. for every ē moving with a given velocity, there is an equal & opp. motion.
6. current density can be expressed as In a unit Volume.
7. In intrinsic material no of ē is same as no. of holes.
8. In a P-type semiconductors ē are minority & Holes are majority
9. In a P-type we add trivalent impurity Like Boron
10. In n-type ē are majority & Holes are minority
11. In an n-type we add pentavalent impurity like Phosphorus
12. direct semiconductors are used in LED's & semiconductor lasers
13. diode is a device which allows I in one direction. * 1 Joule of energy is = to $1(1.6 \times 10^{-19})$ eV

* charge of an e is 1.602×10^{-19} coulomb

Teacher's Signature :

Knee volt → current start rapidly

Depletion region → current ↑ abruptly

18. What is the barrier volt of Si — 0.7
19. When pn junction is reversed biased, depletion layer has only immobile +ve & -ve Ions called transition capacitance / depletion region.
20. This region is depleted of mobile charges & acts like a dielectric with fixed opp. charges at both ends of the dep. layer called depletion region
21. Who acts electrodes in depletion region capacitor & are conducting P region & n region
22. When reverse volt ↑ thickness of the dep layer is ↑ & mobile charges are removed
23. Abrupt change from acceptor Ions in the P region to donor Ions in the n region N_A & N_D are unequal are step graded junction
24. Depletion region capacitance of step graded junction is inversely proportional to square root of the reverse volts
25. When pn junction is FB, potential barrier ↓ it is dlg Diffusion capacitance
26. its charge carrier density is High the ↑ in FB volt →
27. ratio of change in stored charge outside depletion region to the change in applied voltage is known as Diffusion capacitance or storage capacitance
28. diffusion capacitance is ∝ to the forward current of the diode

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23. Rectifier is a device convert Ac to dc
24. In centre tap full wave rectifier efficiency is high
25. After rectifier we use capacitor for smoothing
26. Zener diode is a heavily doped specially designed to operate in the breakdow region.
27. Who inverted Zener diode clarence Melvin Zener used as a volt regulation;
28. P-n junction diode is lightly doped & has thick depletion region
29. Zener diode has thin depletion region.
30. Pn junction diode has weak electric field
31. Zener diode has strong electric field
32. In Pn junction diode here occurs avalanche breakdown collision & has high voltage & Pn junction destroys
33. Zener diode doesn't generate heat & doesn't destroy & has low volt
34. knee voltage for Ge is 0.3 V & for Si is 0.7V
35. Who invent BJT William Shockley in 1952
36. In BJT Charge carriers are Holes & electrons
37. emitter is heavily doped & has moderate size
38. Base is lightly doped & has thin
39. collector is moderate doped & has large size
40. In active region emitter is F.B & collector is R.B used for amplifier
41. saturation region → F.B, C → F.B short circuited or switch ON
42. cut off → OPEN or switch off R.B. R.B

Teacher's Signature :

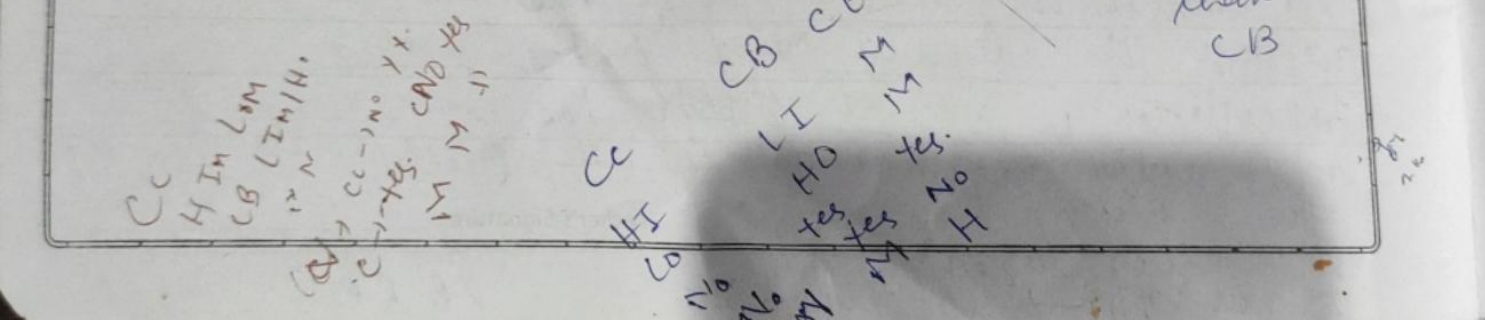
43. CC has High I/impedance low output Im low(I) High(o)
, CB _____ ,
CE Medium , medium .

44. volt gain in CC No CB, Yes CE Yes
I current gain in CC Yes CB No, CE Yes.
I Power gain in CC medium CB medi. CE High.

45. Phase shift in CC 0° CB 0° CE 180°

46. CC is used in Impedance matching CB High frequency application.
CE audio frequency.

leakage current CC CB CE larger than CB



Test

current flow in one direction from positive to negative

Bridge		centre
four diode		2.
Volt dop high		low
Good volt re		Better volt re.
PIV	Vm	2Vm
TUF	0.816	0.692
Diode forward resi	Rf	2Rf
η	81.2%	81.2%
ripple factor	0.40	0.40
form factor	1.11	1.11
peak factor	√2	√2.
~~fre 100Hz~~		
o/p frequency	2f	2f.

transformer utilization factor

Full Wave		half Wave	F	F:
η =	0/π2	2.57	1.11	1.57
form factor	1.11	η 1.21	81.2	40.6
ripple factor	0.40		0.40	1.21
Dc power out	I_m^2/π^2		I_m/π	I_m/π^2
	I_m/π 0.692	TUF 0.287	2Vs	
rec. η	81.2	rect. η 40.6		
PIV	2Vs	Vs		
2 diode		1 diode		