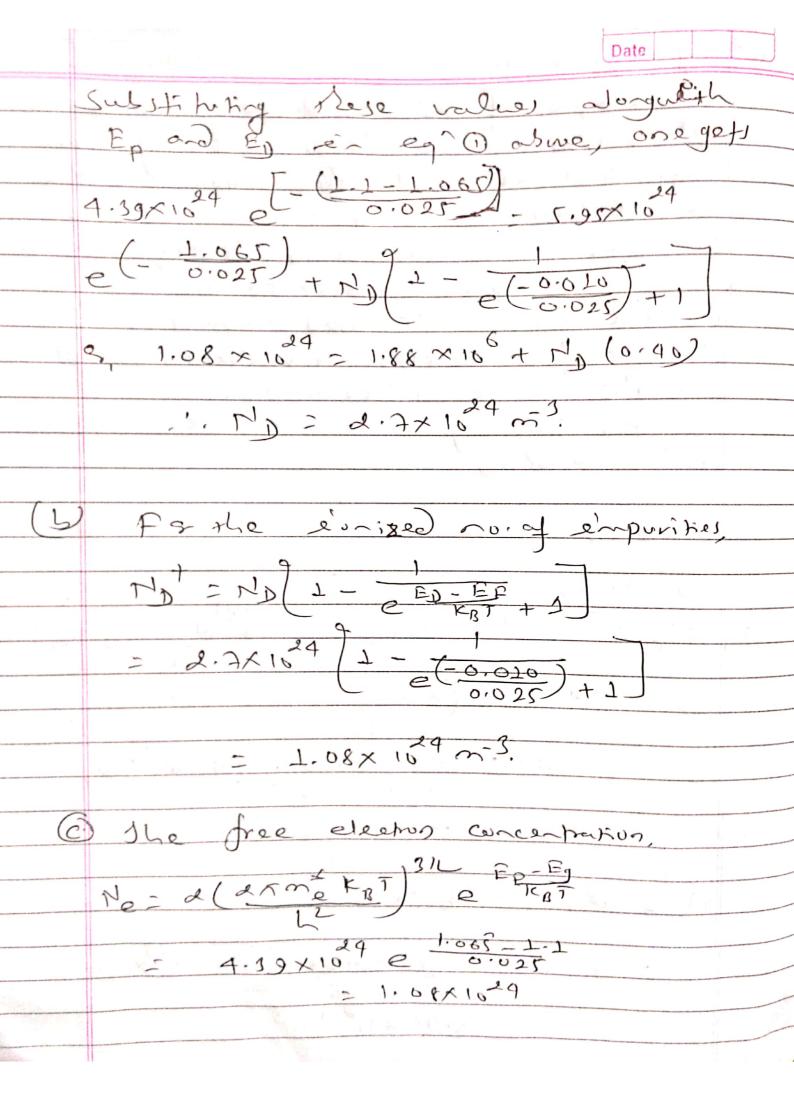
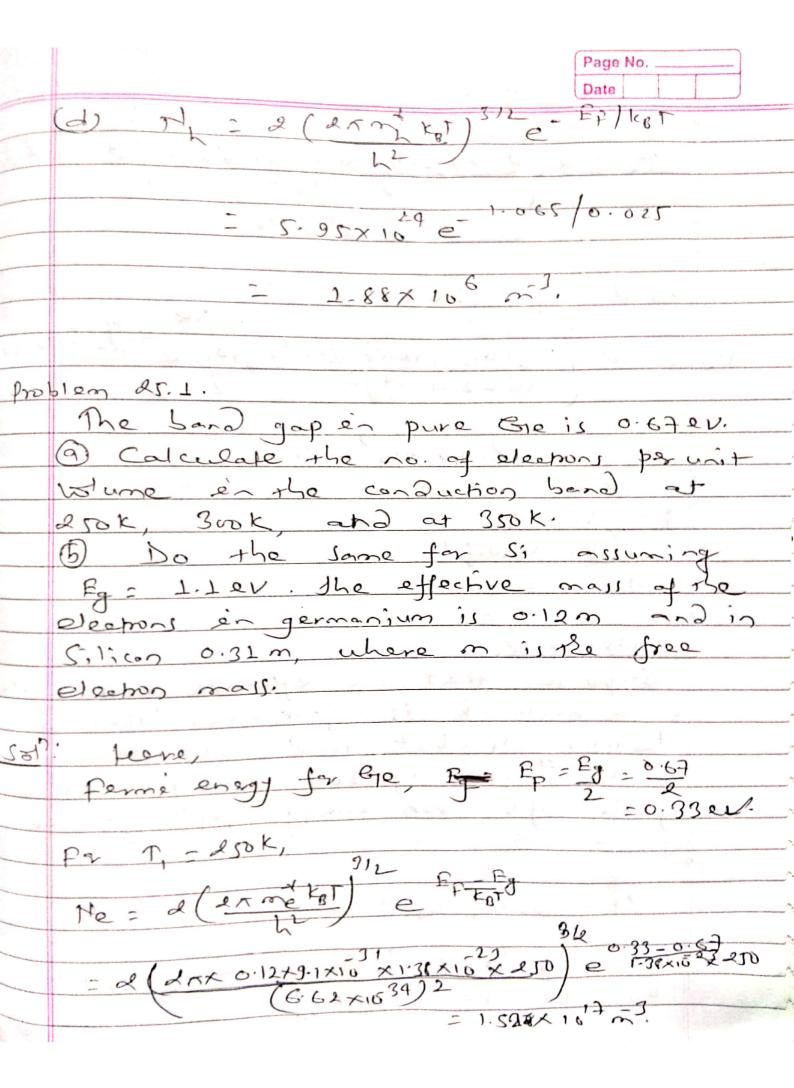
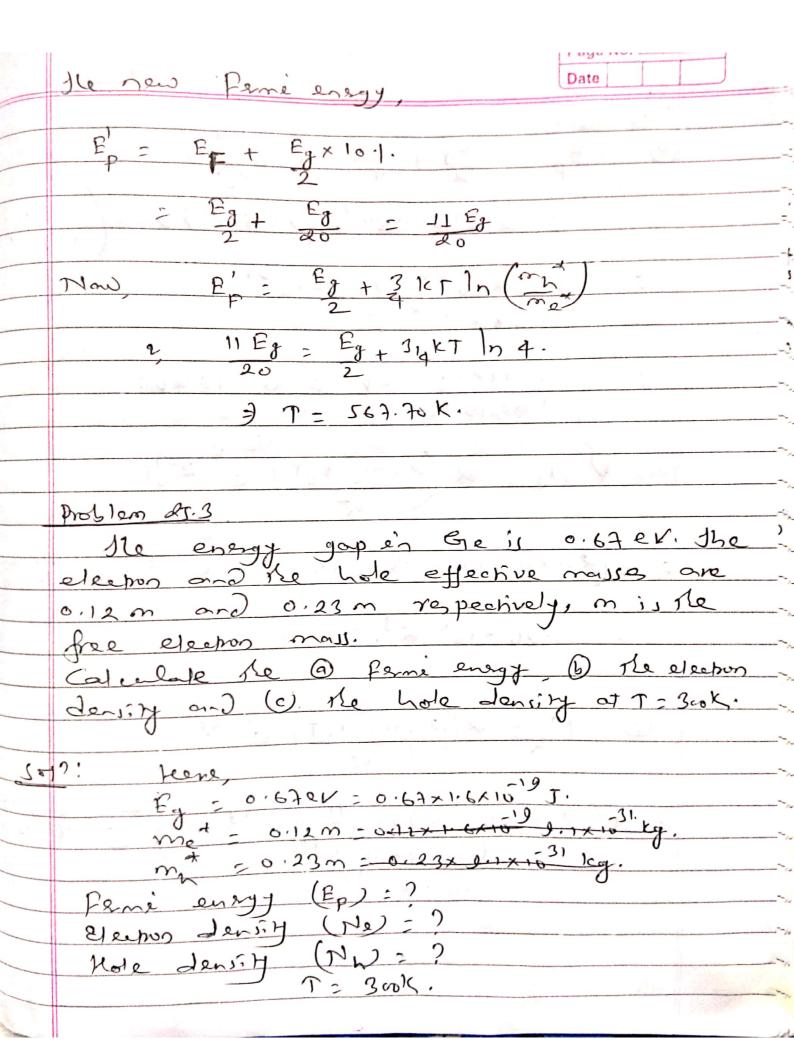
	Example) T. U. Microsyllabus Date Date
2-7	The energy goop Eg in silicon is I.I eV. The average electron effective mass is 0.31 mg, where m is the
3	1.1 eV, the average election effective
	may is 0.31 man where mis the
	free electron mass, calculate the
	electron concentration in the conduction
	hand) at (3 at now temp T = 300 K.
	Allune Ep = Eq.
	2
8	12:
	We have,
	3
	Ne = 2 (2 me kgT) = Ep-Fg L2
	$\frac{1}{2}$
	tere, ne = 0.31 ne = 0.31 x 9.1 x 10 1 kg.
	1.38×10-23 [K]
	$k = 1.38 \times 10^{-23} \text{ Fe}^{-1}$ $k = 6.62 \times 10^{-34} \text{ Fs}^{-1}$
	· Ne = 4.36 × 10 8 (0.55 RV × 1.6 × 10 9)
	Ne = 4.36 × 103 e 1.38 × 1523 × 300)
	$E_{p} = E_{g}/o$
	7 0/2
	= 2.6×10 ¹⁵ /m ³ #
	$-\alpha.6\times10$ /m -1
	The state of the s
	· was because as the contract and a second

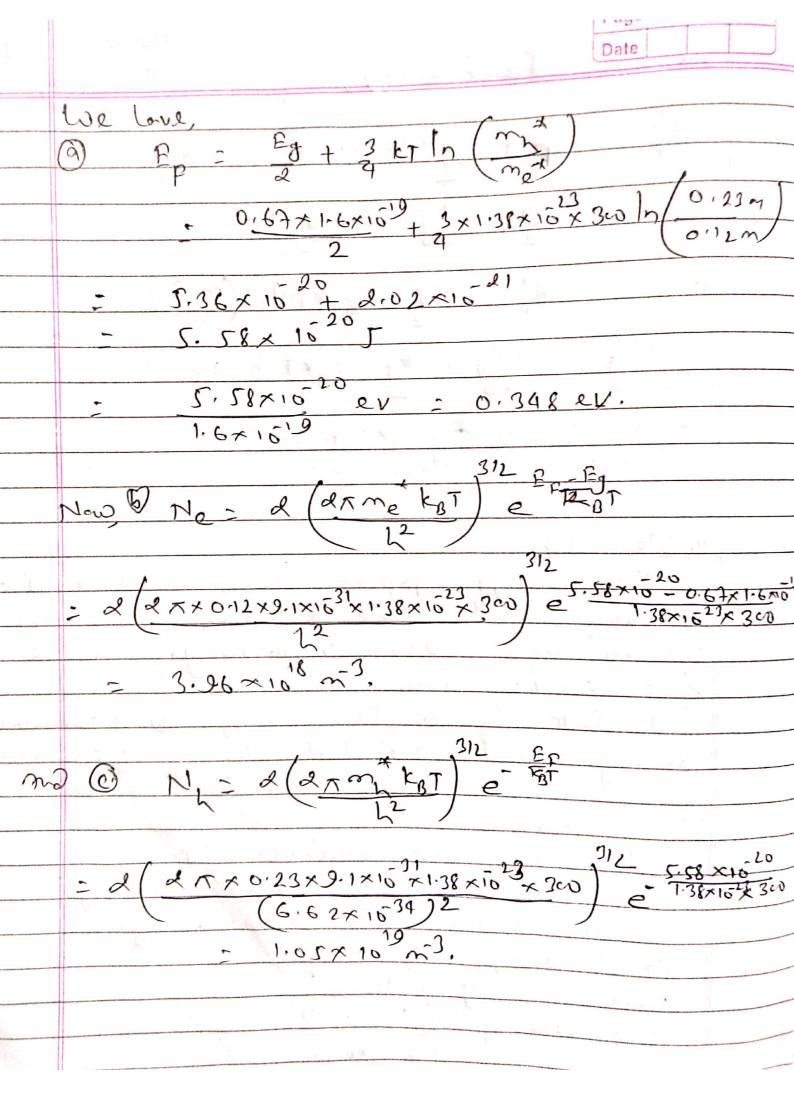
	(Page No.
W.	25.2 (worked gample) Page No.
	A sample of Si is dopped with
	phosphorus. The donor impurity level
	lies 0.045er below the bottom of the
	conduction band. At T= 300K, Ep is
	0.010 eV above the donor level. Calculate
(a) the empurity concentration,
	(b) the no. of excised empurities,
	(c) the tree election concentration and
	de the concentration.
	(Pg Sq, Ea = 1.1 ev, me = 0.31m,
	$m_{1}^{2} = 0.38m$
_	Solution:
	Ne lave, Ne Ep-Eg/kgt = Ne Ep/kgt] - FD-EP
9	NCO = Ne + N) - ED-EP
	7 +1 37 - 0
	Jeone, No- de (de moket)
	-31 -23
	$= 2 \left(2 \times 4 \cdot 31 \times 9 \cdot 1 \times 10^{-31} \cdot 1 \cdot 1 \times 10^{-23} \cdot 1 \times$
	(6.62×10 31) = 24 3
	$=4.39\times10^{24}$ -3
	$\frac{1}{2}$
	Nu= a (annh kgT)
	2 (2 - 22 - 21 - 21 - 22 - 23 - 21 - 21
	= 2 (2/1×0.38×209.1×10 ×138×10 × 300) (6.62×10-34) 2 138×10 × 300)
	$= 5.95 \times 10^{24} \text{ m}^{-3}$





Page No. Date Par To = Book, Ne = 2 (2/1×0.1×0.1×10 ×1.31×10 ×300) e 1.38×10
(6.62×1634) 2 = d.63×1018 ~3. m) T3 = 350 Ky The = 2 / 2 / × 0.12 × 9.1 × 10 × 1.38 × 10 × 350 / e 1.38 × 1623 × 350 / e 1.38 × 1623 × 350 = d. v9 × 10 m3. Pa Silicon (Do urself) Problem 25.2 Suppose Reat the effective mass of hole en a material is four times that of electrons. At what temps would the fame level shifted by to 1. from the middle of the fortidan energy gap? Eg = 1 ev. 201: Kene, må - 4 met Let Ey be the forbidden energy Jop an





	Page No.
PX A	Problem 25.13
_	
	A certain intrinsic semiconductor has a
	bond gap F is a cold Measurement shows
	band gap Eg is 0.2 eV. Measurement shows that it has a resistivity at room tempt.
-	Book of 0.3 Mm. What would you predict
	et verisiste to 1. + 200 Kg
	éts resistivity to be at 250 K?
	C)/13 = 541
72)	l' lene,
101	Eg = 0.2ev. = 0.2x1.6x10'9 J.
	P = 300K = 0.3 Mm = P =?
	g at 350 k = ? = ? = ?
	For intrinsic Jeniconductor, Mezzy = a (arkyr)
	Dram 0 - ney (me m) 2 Egletys.
	o= lel Né (Me+Mh)
	1
	:, S= = = Pel Ne (Me+Mh)
	=) P1 -1e(Ne)2 (Me+Mh)
	3, 1e1 (No), (Me+Mh)
	312 34 Eg / 21cm
	= 2/ de (2 x 1cy 12) ((me + m +) 3/4 e Eg/21cr_ - 2/ de (2 x 1cy 1) (me + m +) 3/4 e Eg/21cr_
7, 1	= 2/2 (e s lu s) (m, * m, x) 3/4 e = = 9/2-11
	312 En (7P.)
	$\frac{1}{2}\left(\frac{1}{2}\left(\frac{1}{2}\right)\right) = \frac{1}{2}\left(\frac{1}{2}\left(\frac{1}{2}\right)\right)$
1	

