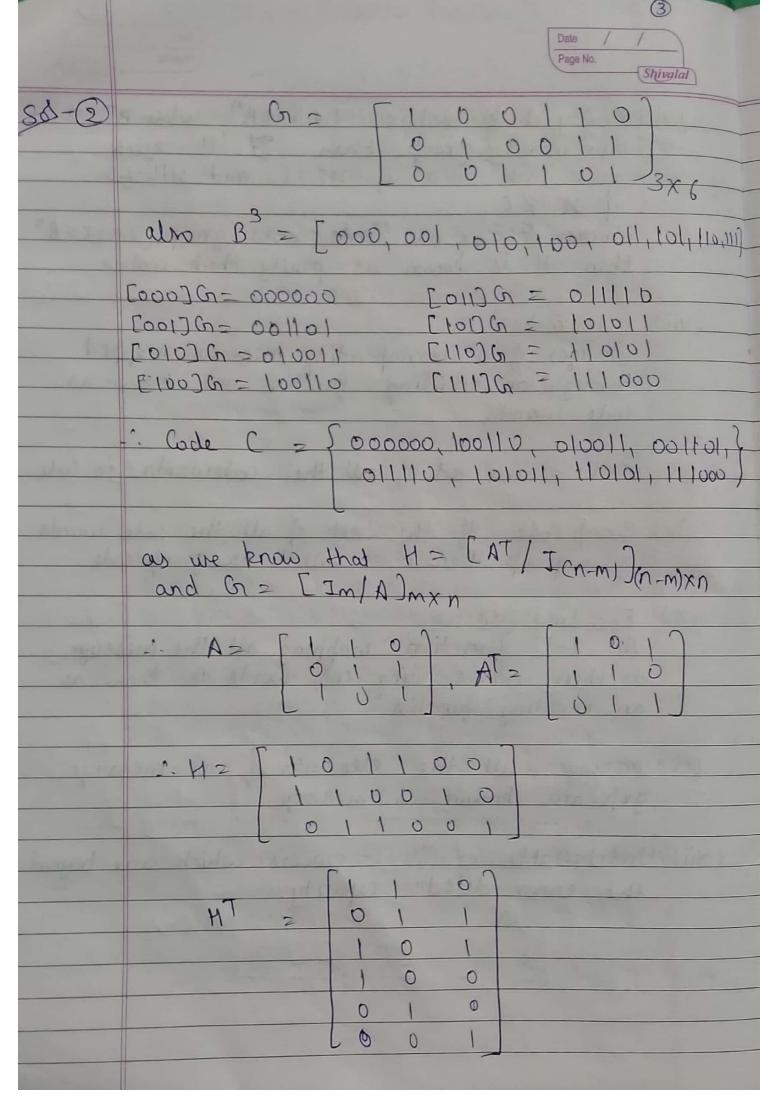
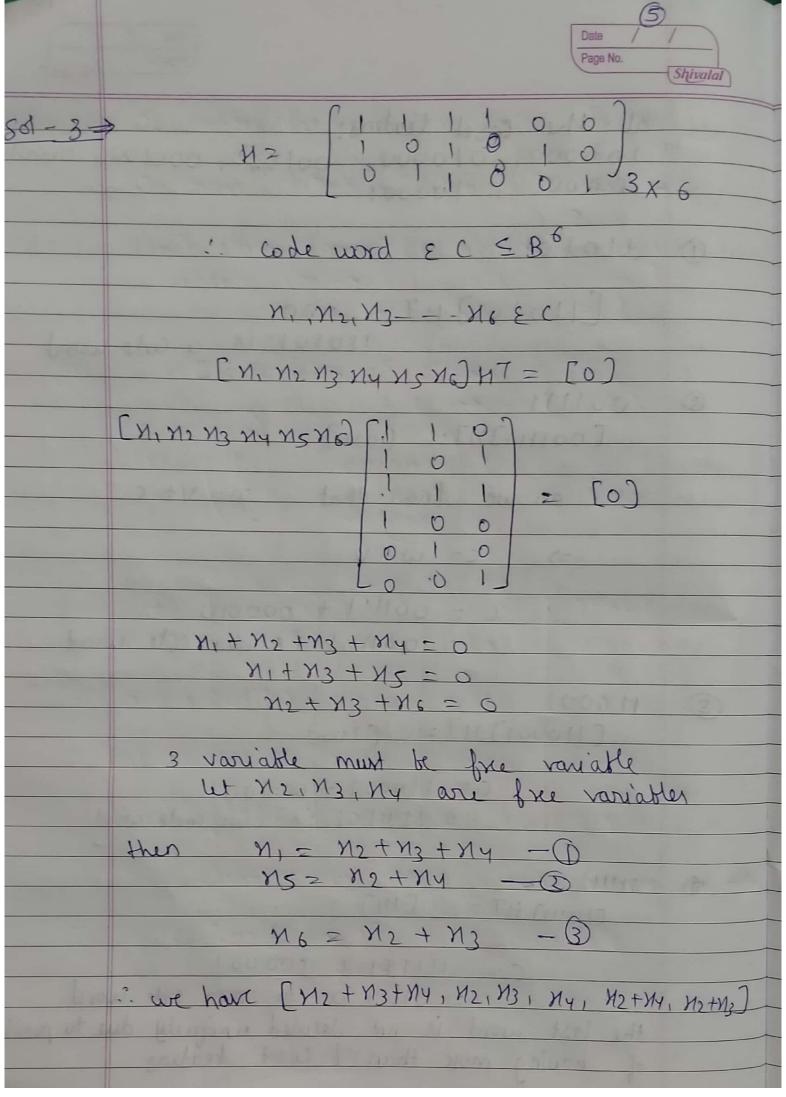
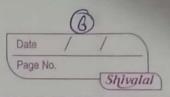


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(vi)	Parity check matrix: - W MEB" when B" is own word group, then 3 'H' such, MHT = 0 if ME ( and MHT = 0
10011 4011	where 'c' is our code word group i.e. $c \leq B^n$ then 'H' is known as parity there matrix.
	Codewards:- images of a corresponding messages mapped through an encoding function are known as code words
iiiv)	Code: - The set of all the codewords is code
(îx)	Group code: - If the set of all the code words is a group then it is called as group code
(X)	Encoding function  An 1-1 function mapping all the message to their corresponding code words is known as an encoding function.
(x)	Message! - all the elements of our message grp are known as message
(xii)	Undetectable error :- errors which are beyond the error detect" capacity.

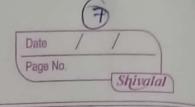


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	all the wed leders; 100000, 010000, 001000, 000100, 000010
0	110101
<b>②</b>	6000 - TH (101011]
	[001111] - [010] - [010] : as we know that w= v+ c
	=> C= W+V -!. C = 001111 + 000010 = 001101 i 8 our code word
3	110001 (110001) = TH (100011)
13	= 110101 + 000100 = 110101 is our wde word
<b>®</b>	CIII) = TN CIIII)
AT 81	c= 111111 + 100001  = 01111 0 is our cade word  the last word is not decaded uniquely due to possible of having more than I west leaders





```
N2-0, N3-0, My=0
   [0,0,0,0,0,0] > 000000
=> M2-0, M3-0, M4=1
    [10,0,1,1,0)=> 100110
    M2 - 0, M3 = 1, M4=0
    [1,0,1,0,0,1] => lobob
    M2-0 M3=1, My=1
     [0,0,11,1,1]
  M2 = 1, M3=0, My=0
                       110011
    [1,1,0,0,1,1)
    M2=1, M3=0 My=1
     [0,1,0,1,0,1) 010101-
M2=1, M3=1, My=0
                    011010
     [0,1,1,0,1,0]
  M2=1, M3=1, My=1
     60,0,1,1,1,17
                      111100
 : ( = } 000000, 100110, 101001, 001111, 1100111
           0 10101, 01010, 111100
                      w(010101)=3
 also W(100 110) = 3
      W(101001)=3 W(011010)=3
       w (00/111) = 4
                      W ( 1111 00 ) = 4
       W ( 110011) = 4
```



					1		
0	10	distance	in	sinch	code	18	131
	MILI	as jail	111	acces	-		

in error detecting capacity = dmin = 1

= |

 $e: B^2 \longrightarrow B^5$ 

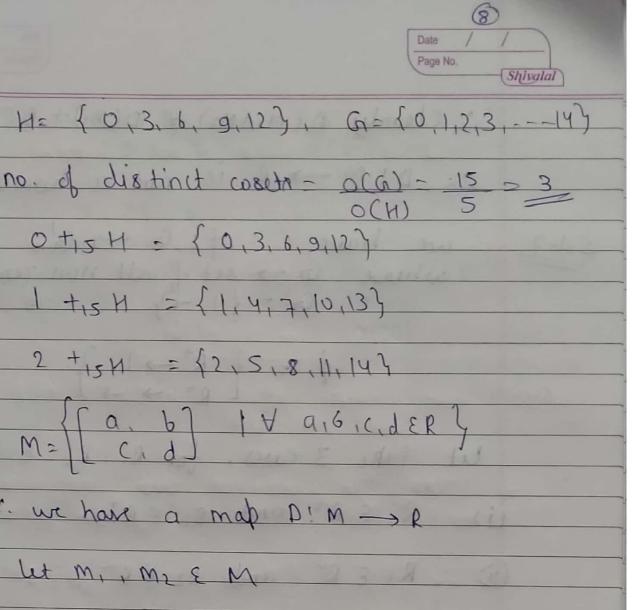
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ı			THE STATE OF THE S		2011 6
	Ð	00000	01110	10101	11011
1	00000	00000	01110	10/0/	11011
			01000		- 51X - 6
	01110	01110	00000	11011	10101
	10101	10101	11011	00000	0 111 0
	Q1	HALL	100	Sold IT	
	11011	11011	10101	01110	00000
ı					

clearly our code follows closure property

:e: B<sup>2</sup> > B<sup>5</sup> i 8 a group code.



i we have a map D! M -> R

let M, M2 E M

Sd- 5

$$M_1 = \begin{bmatrix} q_1 & b_1 \\ c_1 & d_1 \end{bmatrix}$$
 and  $M_2 = \begin{bmatrix} q_2 & b_2 \\ c_2 & d_2 \end{bmatrix}$ 

=> D(M) = (a,d, -b, ()) and D(M2)= (a2d2-b2(2)

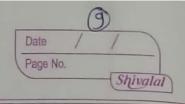
also, ur know that 'm' is got under addition

· MI + M2 = [91 + 92, bit bz] EM

: D (MI+ M2) = [(a1+92)(d1+d2) - ((1+62)(b1+62)]

= [ (a,d, +a,d2 + a2 d, +a2d2) - ((1b) + (1b) + (2b) + (6)

> D(M1+ M2) = D(M1) + D(M2) + (a,d2+ a2d1-C162-C261)



- : Clearly D (M,+M2) & D(M) + D (M2)
- :. D! M -> R is not a homomorphism

Sol-7 we have  $\phi: G \to G'$ where  $G \to 884$  of all non-zero real no.  $G' = \{1, -1\}$ 

Let take 3 cases, for R, Rz E IR- foy

- (i) R, ER+ and R2 ER+
- (D) RIER and RZER
- B R ERT and RZEET or vice versa

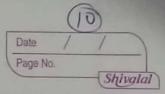
(i) \$ (R) -1 and \$ (R)=1

OCR also RIXRERT

- : \$ (RIXR2)=1 = \$(RI) X \$ (RE)
- for this case of is a homomosphism

(ii)  $\phi(R_1) = -1$  and  $\phi(R_2) = -1$ also  $R_1 \times R_2 \in \mathbb{R}^+$ 

> p(R1 XR2) = +1= p (R1) x p(B) for this care p is a homomorphism



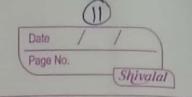
(iii) let RIERT and RZERT \$ (R1)= 1 and \$ (R2)= 7 RIXRIERfor above can of is homomosphism, Hence for all case of is a Homomorphism proved Sol- & We have  $\phi: G \longrightarrow G'$ Im (0) = { 0(n) | n & G } C G 1 > Let 9, 6 & Co : as 'd' is a Homomorphism  $\phi(a + b) = \phi(a) + \phi(b) - 0$ where \$ (a), \$(b), \$ (ax, b) & Im(\$) i. due to egn -O, Im(\$) is closed under 'tz'

It follows closure property => also, a, a-1 EG such that ax, a-1 = e

where e is identity of G

 $\left[\phi(\alpha)\right]^{-1} = \phi(\alpha^{-1}) - \emptyset$ 

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in due to eqn- @ for all elements of Im (\$), there exist inverse member for it.

property under \$2, it is a subgroup of Gr.

· Im(d) < G'

we have  $H = \{ (n, 3n) \mid n \in \mathbb{R} \}$ 

Mere 'G' represent our Cartesian cood. and 'N' represent y-3n line on it

: M = { cn, y) | n ER, y = 3n }

.. the coset (3,7)+n=((n+3,4+7)) NER y=3n+7)

here X= N+3

F-Y=B (= F+P = Y

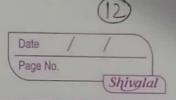
· (3,7)+H=((X,Y) | XER Y=3X)

y = 3 X

y+7=3(n+3)

19 2 3n+2

:. the Coset (3,7) + 11 superent y=3m+2 line



· as	we	Can	See	that	the	810kg	of line
- Si	equa	J					30

=) 423n is parallel to 423nt2

Sol-10 We have

C= {0000000, 1110100, 0111010, 001101,

property, it is a group code.

also,  $\omega$  (11000) =  $\Psi$   $\omega (0011101) = \Psi$   $\omega (00111001) = <math>\Psi$   $\omega (0100111) = \Psi$   $\omega (1000101) = \Psi$ 

- : min distance = 4
- : error detecting capacity of (= 4-1=3

and the error - correcting capacity of C= 7 = 2