

Appunti universitari
Tesi di laurea
Cartoleria e cancelleria
Stampa file e fotocopie
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Rilegature

NUMERO: 224 DATA: 05/03/2012

APPUNTI

STUDENTE: Sannipoli

MATERIA: Scienza delle Costruzioni Esercizi

Prof. Chiaia - Surace

Il presente lavoro nasce dall'impegno dell'autore ed è distribuito in accordo con il Centro Appunti. Tutti i diritti sono riservati. È vietata qualsiasi riproduzione, copia totale o parziale, dei contenuti inseriti nel presente volume, ivi inclusa la memorizzazione, rielaborazione, diffusione o distribuzione dei contenuti stessi mediante qualunque supporto magnetico o cartaceo, piattaforma tecnologica o rete telematica, senza previa autorizzazione scritta dell'autore.

CASI PARTICOLARI 1) le ho SIMMETRIA POLARE > 6= centro geometrico > parto neletto de un s. d. r. centrato in 6 = salto gli step 4),5) e parto direttamente dal 2), 3), 6) 1) le ho un ave di rimmetria arriale retto => tale aixe à aià avel centrale d'ineveria. L'altro avel lo porizionero arbitratriamente. Es: re y ave di rimmetria retto => trovero Sx (i) = A(i) y G. => XG = DX e ho trovato gli ani centrali d'inervià. Per trovare i momenti centrali d'increria unes le formule di Huyagens 1) Se la remisorare circolari o quarti di corone circolari, comiene prendere il s.d.r. centrale avente origine nel centró di curvitara di tali 6) I momenti d'inerria arriali IX; e Iy; (i) sono nulli sel caso di serioni sottili porte rispettisamente lungo l'ane X; e lungo l'ane y; 6) momenta d'inervia centrifughi I (i) sono mulli se il sistema avente origine in G; e anche principale, asse 'gli assi X; e 4, sono di simmetria 6) 5 termini di trasporte (46-46;) 2 sono nulli re 46=46; 6) de ho rimnetria polare può accadere de IX (i) = IXC $\underline{T}_{q_{G}}(i) = \underline{T}_{q_{G}}(j) \quad \text{if } \underline{T}_{x_{G}q_{G}}(i) = \underline{T}_{x_{G}q_{G}}(j)$ Il centro di remi anelli o quarti di anelli mon è il barrento $T_{x_{G}}(x) = T_{x_{i}}(x) + A^{(i)}(y_{G} - y_{0_{i}})^{2} - 2 S_{x_{i}}(y_{G} - y_{0_{i}})$ $T_{x_{G}y_{G}}^{(i)} = T_{x_{i}y_{i}}^{(i)} + A^{(i)}(x_{G}-x_{0_{i}})(y_{G}-y_{0_{i}}) - S_{x_{i}}(x_{G}-x_{0_{i}}) - S_{y_{i}}(y_{G}-y_{0_{i}})$

Showing the rate deliberations a destruction a sea of CENTRO APPANT. Care Lay Extend 5. Tomor Page 7 d 6.3
$$A(A) = \frac{2}{3} \cdot A(A)$$

$$A(A) = \frac{2}{3} \cdot A = A_1 \cdot 5 \text{ cm}^2$$

$$A(A) = \frac{2}{3} \cdot A = A_1 \cdot 5 \text{ cm}^2$$

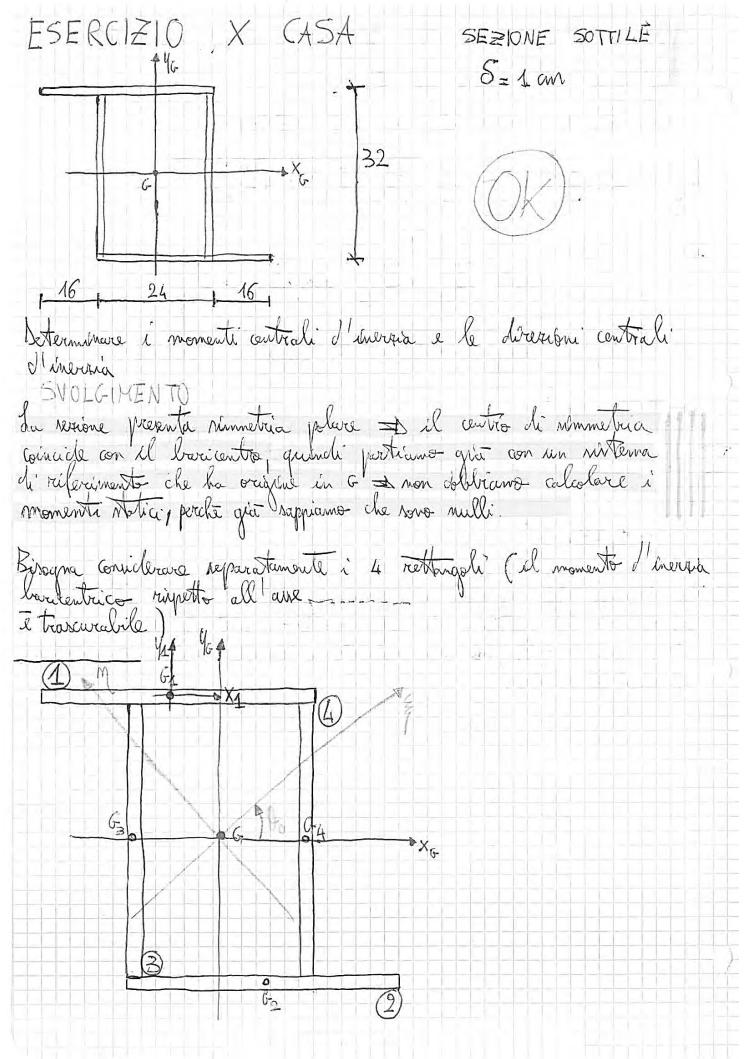
Thus birry a determinance it benefits obtained by the first interest of the property of the birry and the property of the birry and the property of the birry of the bir

 $=\frac{3^2 \cdot 1^2}{42} + 1.5 \left(1.553 - 2\right) \left(1.239 - 2.333\right) = 0.857 \text{ cm}^4$

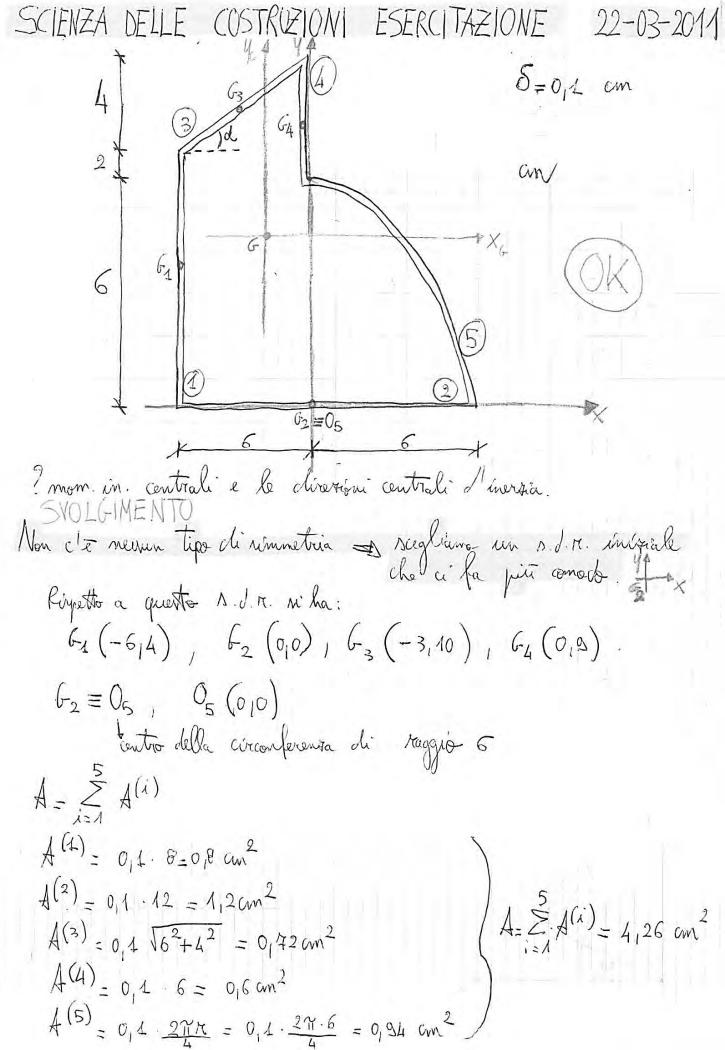
 $I_{x_{6}}^{(3)} = I_{x_{3}}^{(3)} + A_{x_{6}}^{(3)} (x_{6} - x_{63}) (y_{6} - y_{63}) = X_{3}y_{3} = 0$ parche il cerchio ha infiniti am di summetua = 0,485 (1,553-2)(1,239-1,5) = 0,092 cm⁴

o d'argolo di aci lirogna rustare il nistema 6, X6, 1/6
per ottenere i momenti centrali d'inergia è:

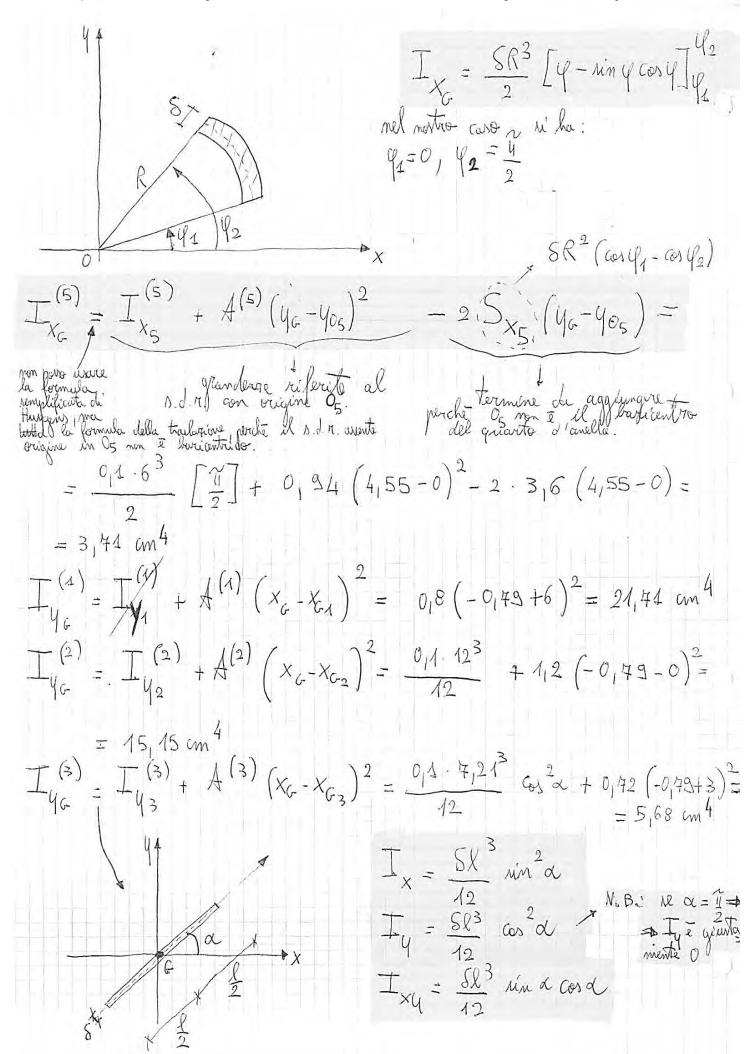
 $Q_0 = \frac{1}{2} \operatorname{arctan} \frac{2 - x_0 y_0}{x_0 - x_0} = \frac{1}{2} \operatorname{arctan} \frac{2 \cdot 0.841}{5.362 - 4.108} = + 26^{\circ} 38^{\circ}$



$$\begin{split} & I_{ij} = \sum_{i=1}^{4} I_{ij} \\ & I_{ij} = \sum_{i=1}^{4} I_{ij} \\ & I_{ij} = I_{ij} + A^{(2)} (x_{0} - x_{0A})^{2} = \frac{4 \cdot 40^{3}}{42} + 40 (0 + 8)^{2} = 7893; 3 \text{ cm}^{4} \\ & I_{ij} = I_{ij} + A^{(3)} (x_{0} - x_{0a})^{2} = 32 (0 + 12)^{2} = 4608 \text{ cm}^{4} = I_{ij} \\ & I_{ij} = I_{ij} = I_{ij} + I_{ij} \\ & I_{ij} = I_{ij} = I_{ij} = I_{ij} \\ & I_{ij} = I_{ij} = I_{ij} = I_{ij} \\ & I_{ij} = I_{ij} = I_{ij} = I_{ij} \\ & I_{ij} = I_{ij}$$



$$S_{4}^{(4)} = \frac{4^{3} \cdot 4}{4_{1} \cdot 26} = 4_{1} \cdot 5_{5} \cdot c_{1} \cdot c_{$$



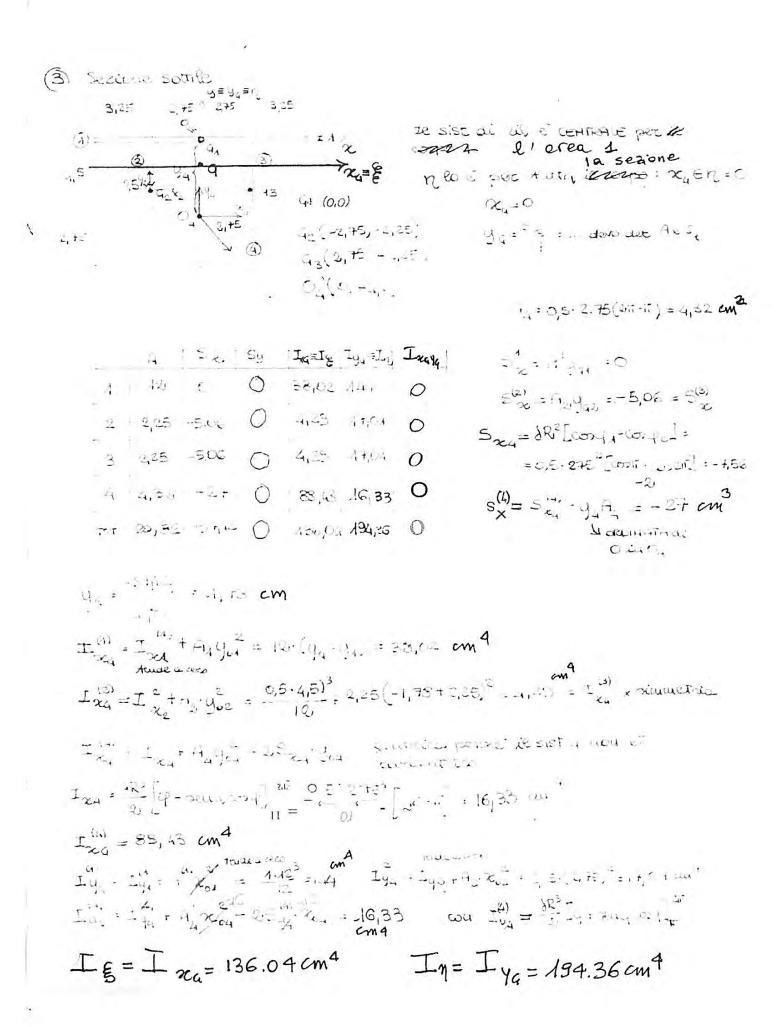
$$T_{XCYG}^{(A)} = T_{XBYB}^{(A)} + A^{(4)} (x_G - x_{CB}) (4_G - 4_{CB}) =$$

$$= c_{16} (-0.149 - 0) (4.155 - 9) = 2.111 \text{ cm}^{4}$$

$$T_{XBYB}^{(5)} = T_{XBYB}^{(6)} + A^{(6)} (x_G - x_{OS}) (4_G - 4_{OS}) - S_{XS}^{(6)} (x_G - x_{OS})$$

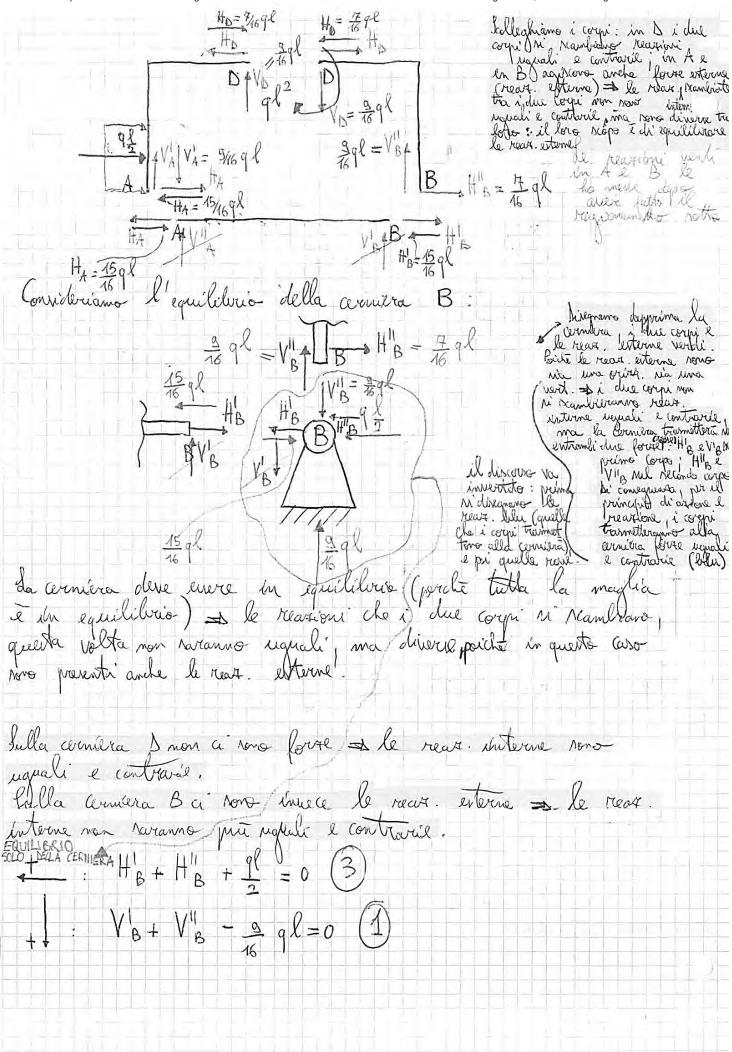
$$- S_{YS}^{(6)} (4_G - 4_{OS}) =$$

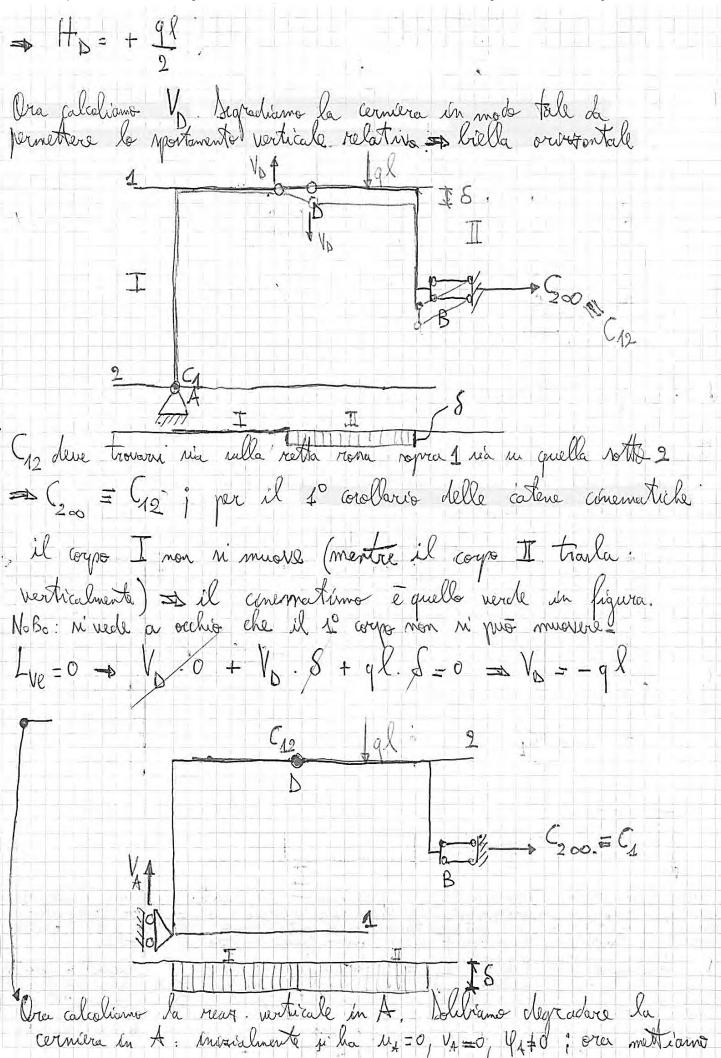
$$= c_{11} c_$$

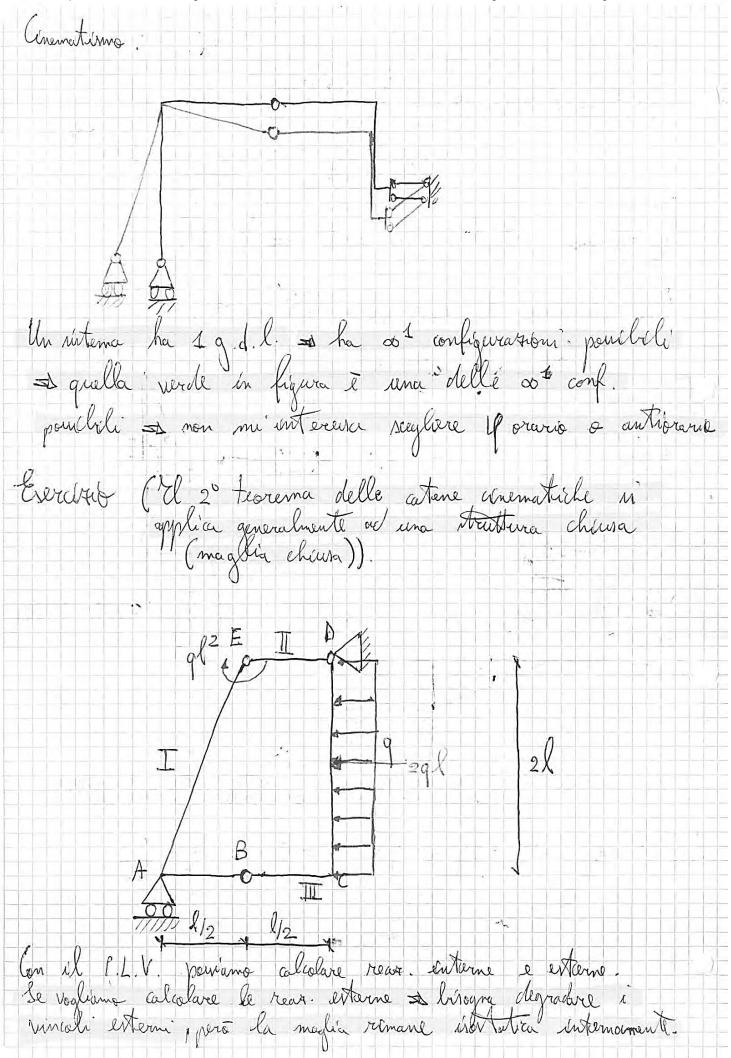


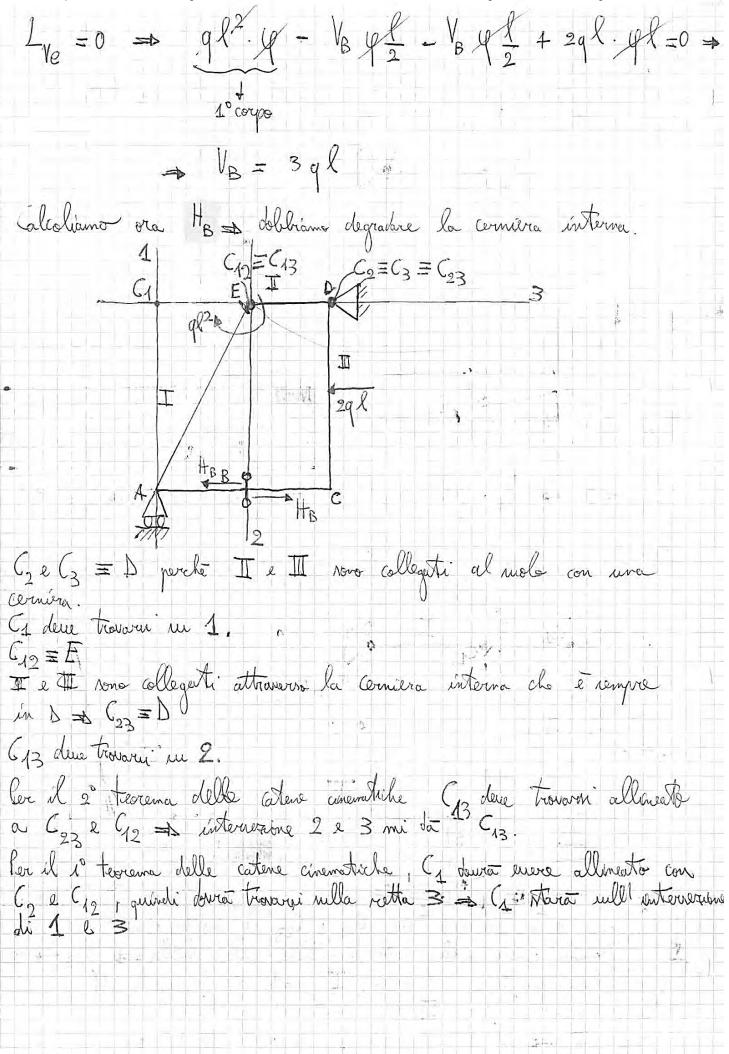
$(+4) M(c)^{T} = -M_{B} + \frac{9l}{2} \cdot \frac{5}{4} l = 0 \Rightarrow M_{B} = \frac{5}{8} q l^{2}$
Ora deviremme recivera l'eq di eq alla retarina alchale in eva pero tronscremme arche l'eq di'eq alla retarine del 1º corpo (recittà repla), quindi ai consiène diretta mente reciver il momento un torno a C di tutto quello che c'è a destra della cerniera:
$(+) M(c) = ql 2l - 2gl l + 5ql l + M_E + 2x V_E$ $+ ql^2 - ql 2l \Rightarrow$
$= M_{E} = \left(-\frac{5}{2} - 1 + 2\right) q \ell^{2} = -\frac{3}{2} q \ell^{2}$
Ora riamo in grado di andere a ricavare le recurioni interne (matrita
Hc = 0 - poule suiverdo l'eq ch' eq alla trarl ouver del 10
$V_{c} = \frac{q l}{2}$ "I unica forra verticale agents \bar{z} $q \frac{l}{2} \Rightarrow V_{c} = \frac{q l}{2}$ Ora considerana l'equil. del 3° corps (ultimo corps)
Dra convidence l'equil. del 3° corpo (ultimo corpo)
Pall'eq. d'eq. alla trail. orves. > H= ql. Per calcolare Mp reriviano l'eq. di eq. alla roterione intorno ad F dell'ultimo Taryo.
$\left(+g + M(F)^{\text{T}} = -H_F + q\ell^2 - q\ell 2\ell = 0 \Rightarrow H_F = -q\ell^2$

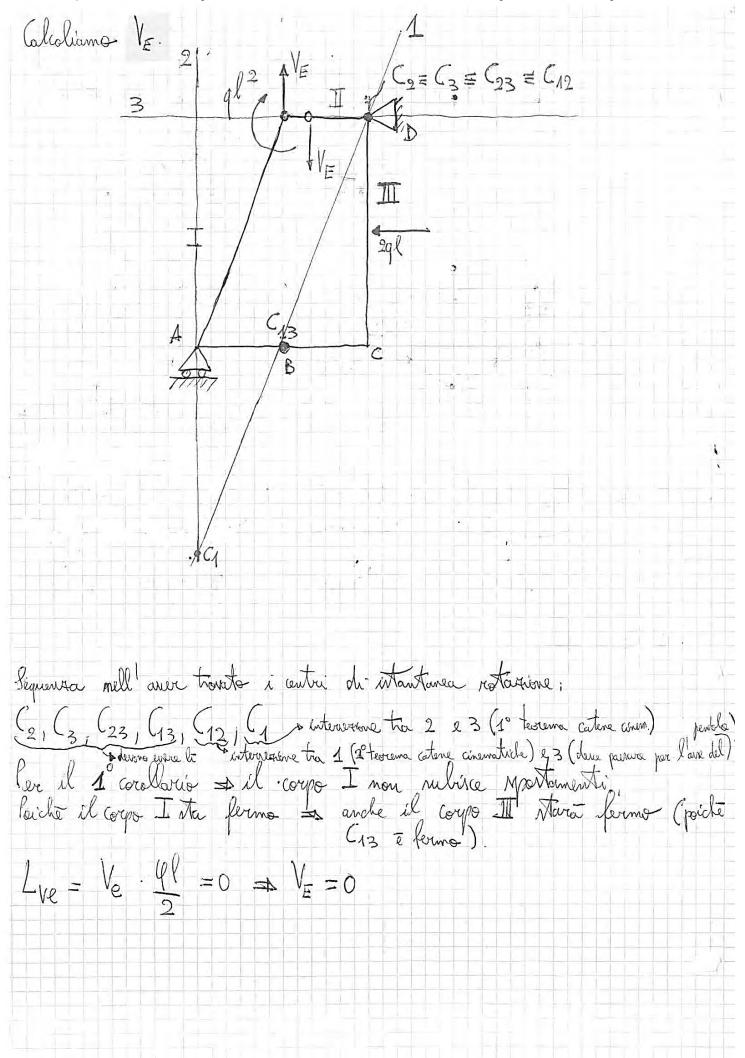
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(+ M(b))						10=
			1+2+37=			
Dra reicariano bleg di la	la rear.	Vulucolare 4	uterna in 1	i andando	a Conni	Servie
HD = 29 R	ou ac y law a	, , , , , , , , , , , , , , , , , , , ,		V V V V V V V V V V V V V V V V V V V		
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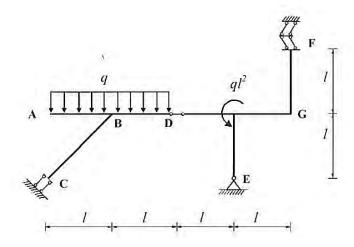




3 Marzo 2011 COMPITO I

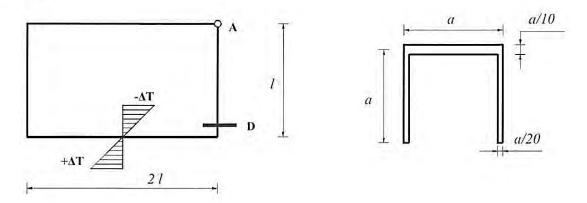
COGNOME :	CORSO DI LAUREA :		
NOME:	MATRICOLA:		

Esercizio 1

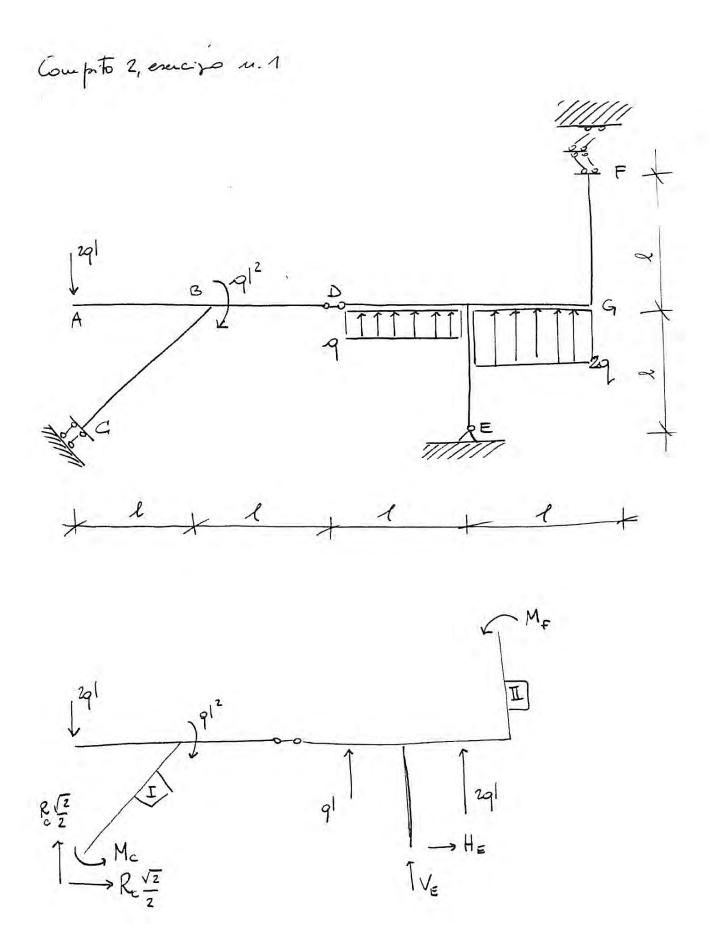


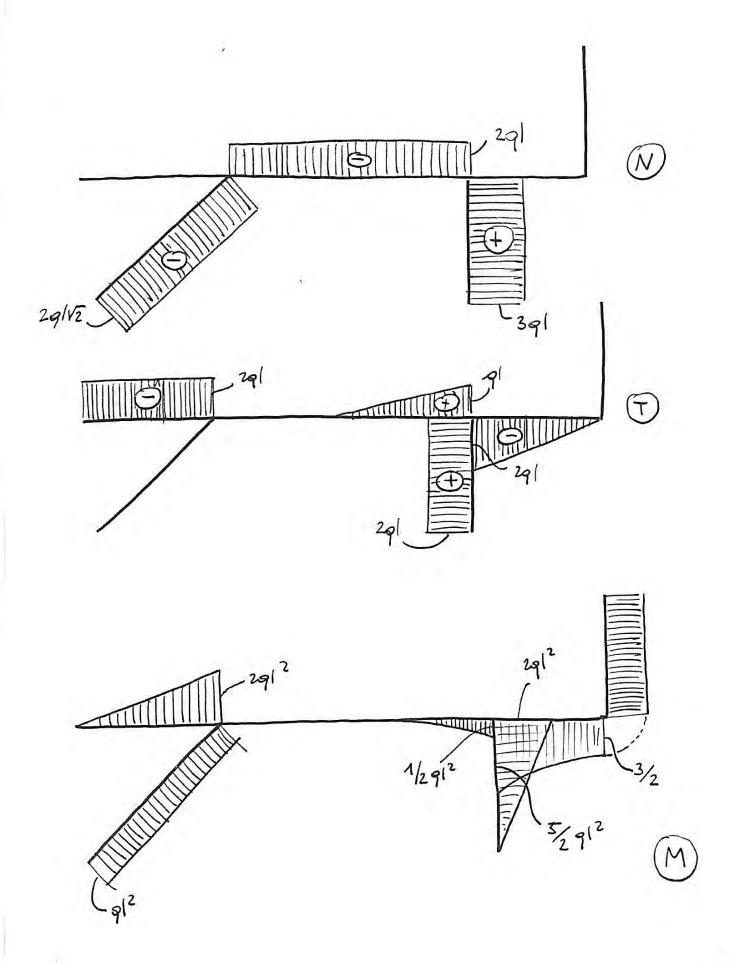
- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni.
- 3. Calcolare con il PLV le reazioni in E.

Esercizio 2

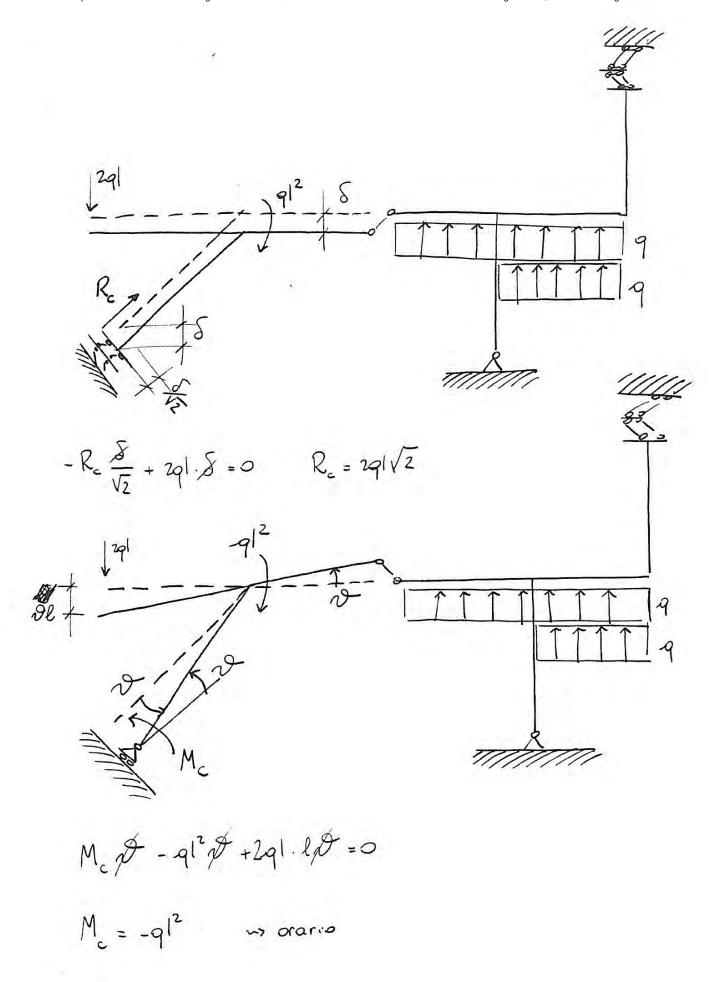


- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni e la deformata qualitativa.
- 3. Calcolare la rotazione relativa in A.
- Calcolare la massima tensione equivalente agente nella sezione D con il criterio di Tresca sapendo che le caratteristiche geometriche della sezione in acciaio sono quelle indicate in figura.









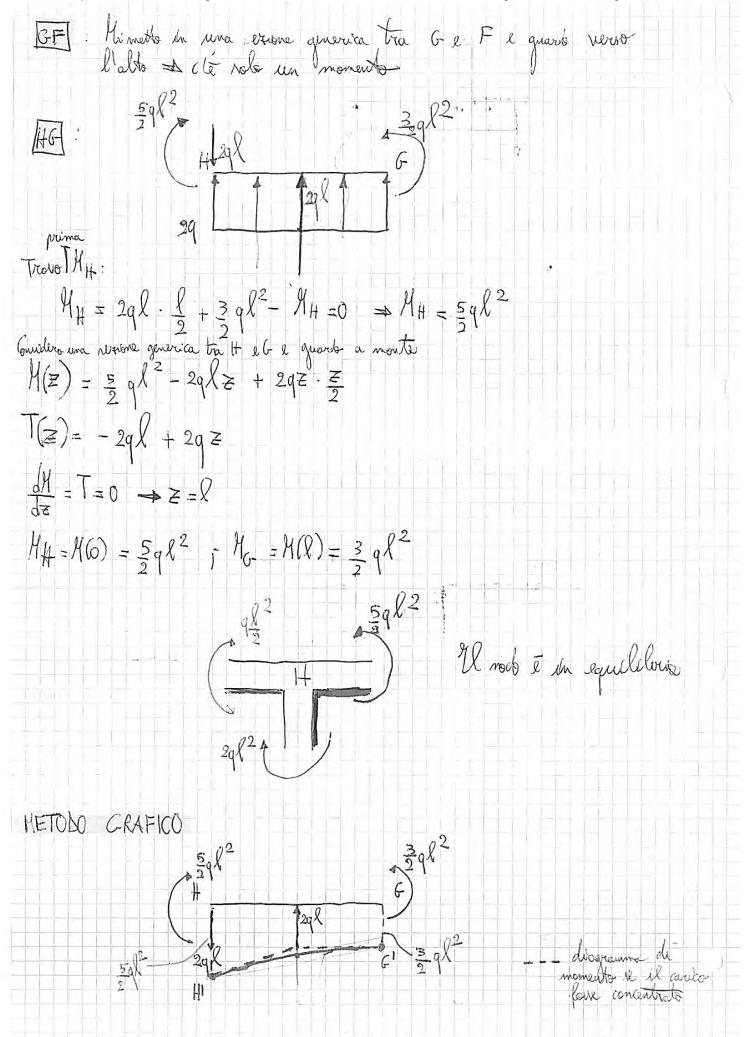
0 n : 1	. 00		1,11
Porche Vb=0 =	=> della (1)	=77	V D= 39/

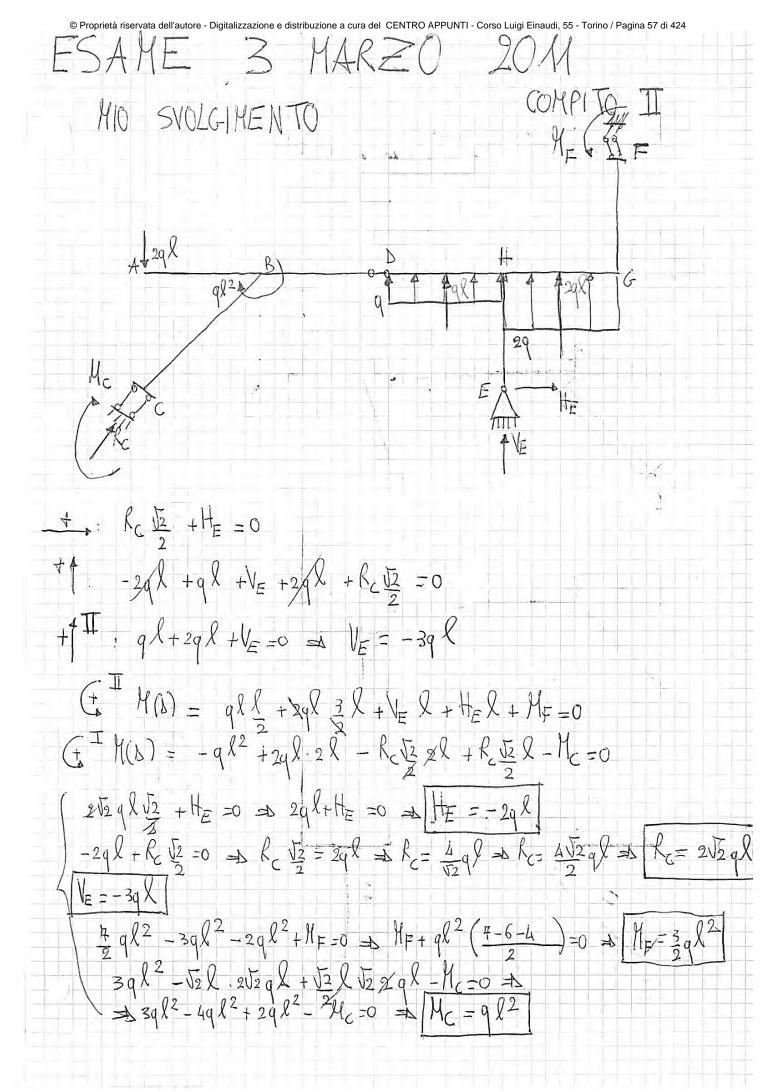
Calcoliums HE:

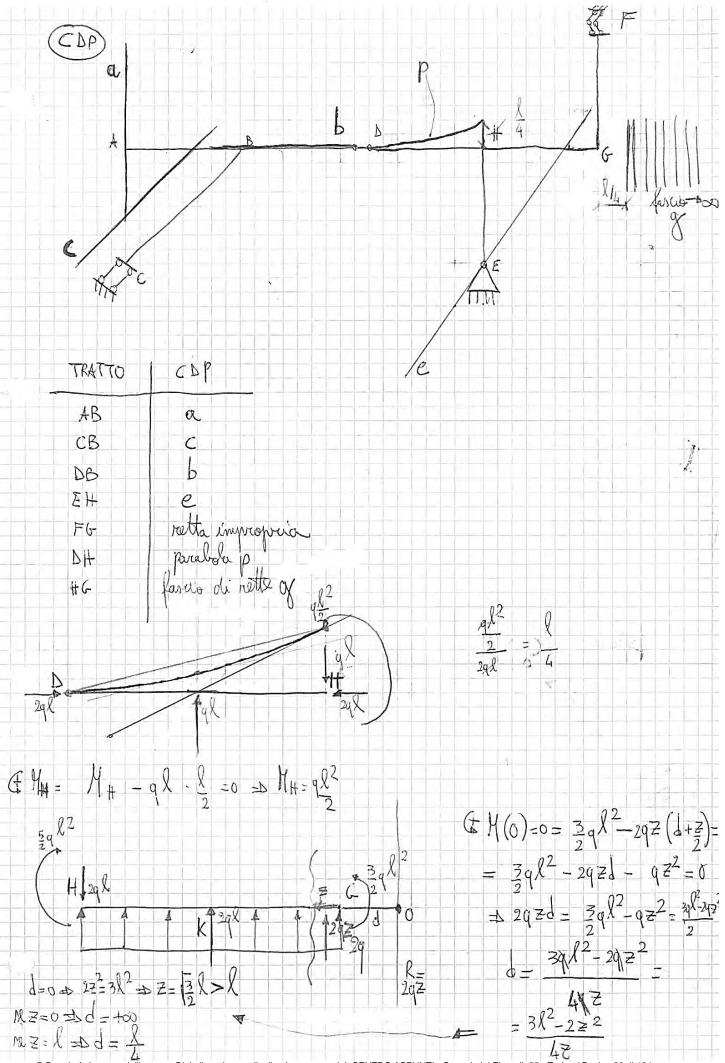
$$(+_{A} \text{ H } \begin{pmatrix} B^{-A-E} \\ B \end{pmatrix}) = 3ql \cdot \frac{1}{2} - ql^{2} - HE \cdot 2l = 0 \implies H_{E} = \frac{1}{2} \left[\frac{3}{2} - 1 \right] ql$$

$$= ql$$

Ora considerians H11 B = 17 9 l	l'eq. di eq. alle	a trail. e	rivis, de	(orpo	<i>PB</i> :	1
Dalla 3 ni ha	$H'_{B} = -\frac{9l}{2}$	H"B = -	$\frac{90}{2} - \frac{7}{16}$. q l = -	- 15 q l	
Exercitio 22/0	6/2009	4 VD	39 L			
	ql ² (E)		t > HD = 29 l			
		921	2			
Va=39 & 1	$A \downarrow B$ $A \downarrow l_2 \downarrow l_{12}$			Il Carrel relamente 1 i I come re Perto i la Perto i 2 anti a 39	le in A e there, cise is une there is une there is a sure in the contract of t	
: V _A + V _D ;						
(+) M(D) = -		· V _A & = 0	= VA =	-3ql]		
at dalla 2°: VD		(valou re	m:).			
					<u> </u>	





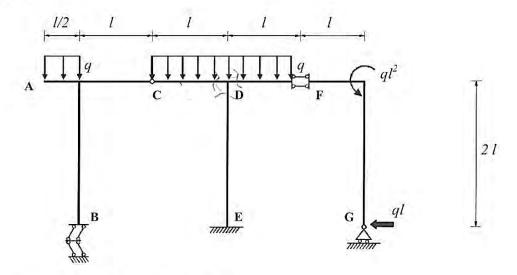


7 Gennaio 2011

COMPITO I

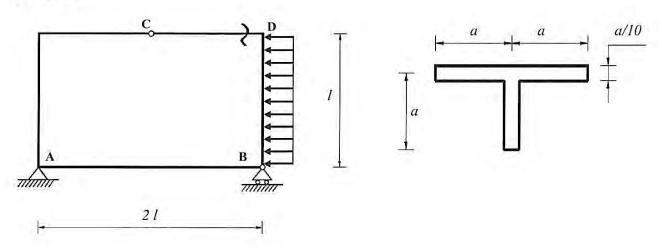
COGNOME:	CORSO DI LAUREA :		
NOME:	MATRICOLA:		

Esercizio 1

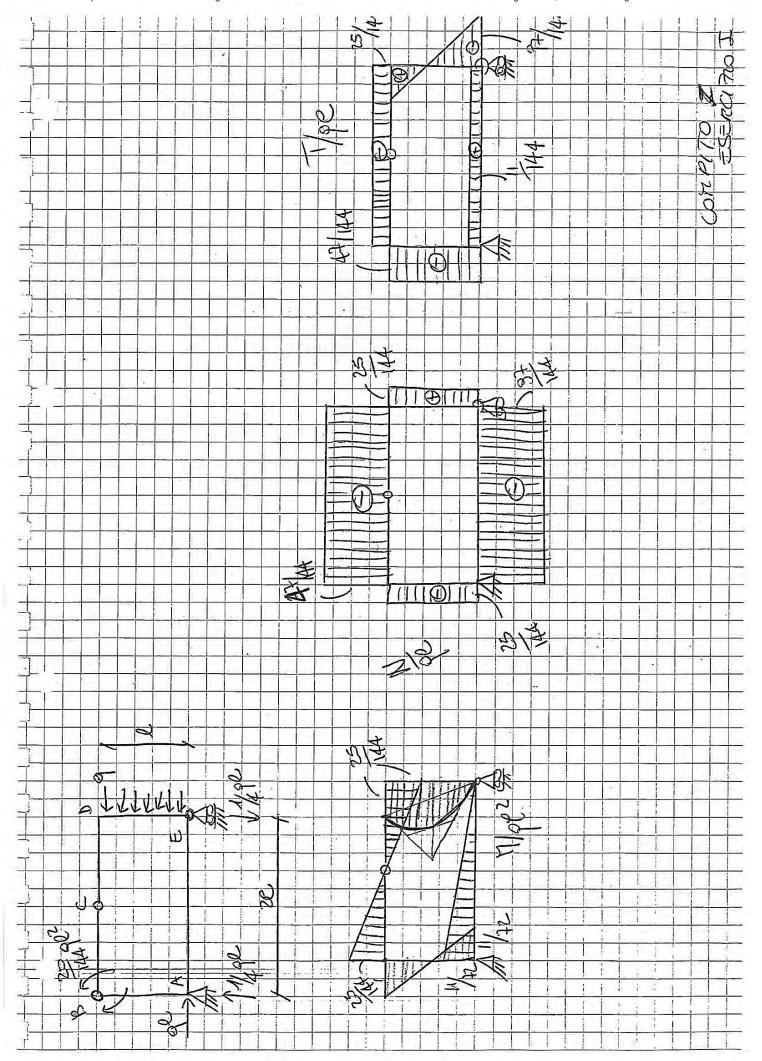


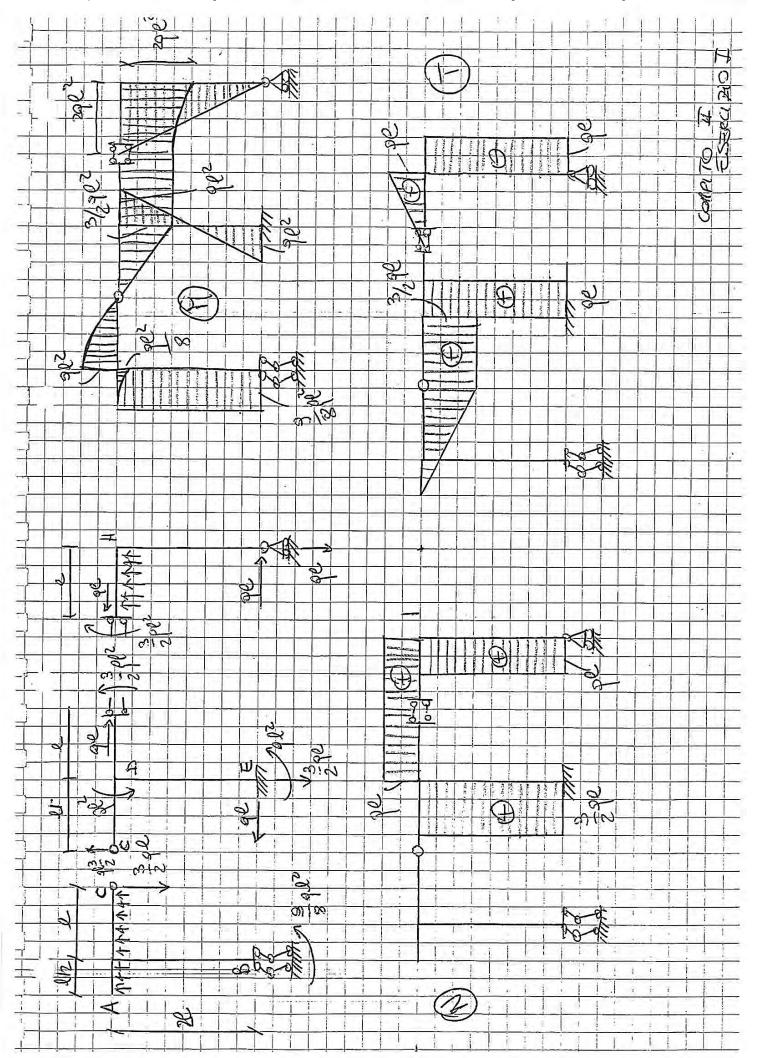
- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni.
- 3. Calcolare con il PLV le reazioni interne in e F.

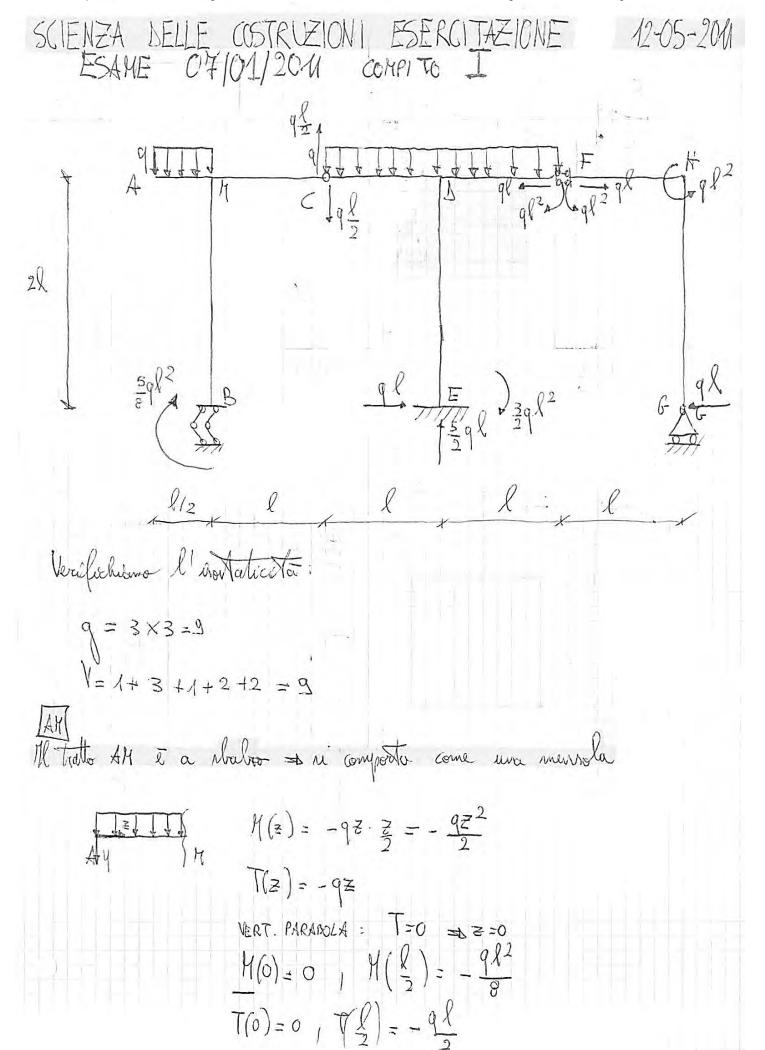
Esercizio 2

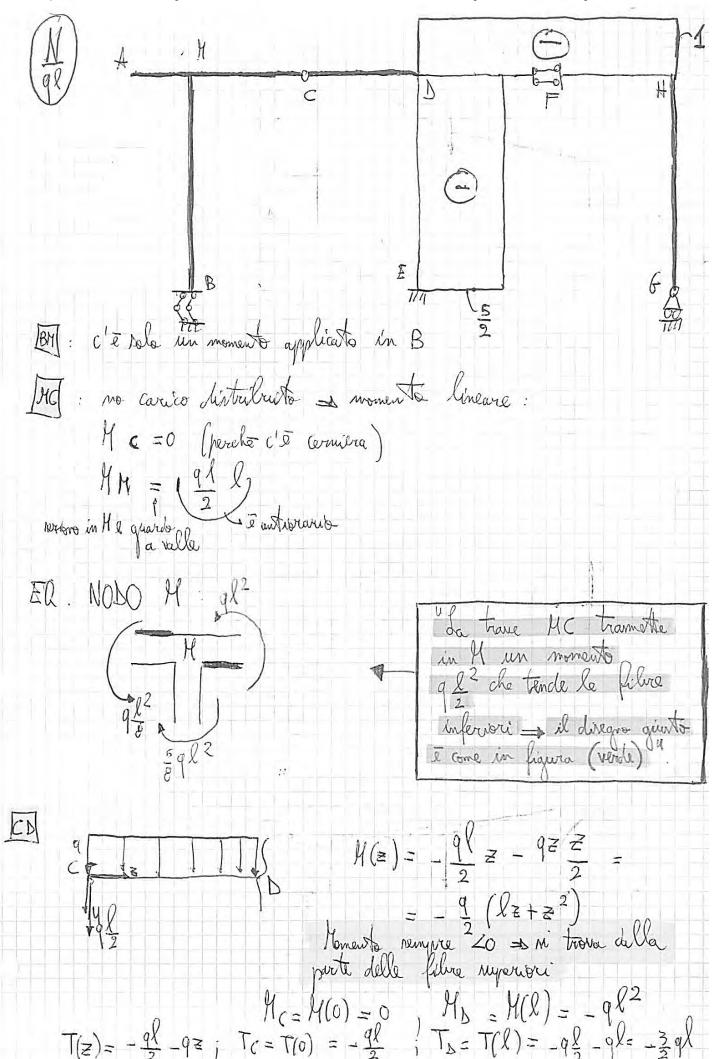


- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni e la deformata qualitativa.
- 3. Calcolare la rotazione relativa in C.
- 4. Calcolare la massima tensione equivalente agente nella sezione D con il criterio di Tresca sapendo che le caratteristiche geometriche della sezione in acciaio sono quelle indicate in figura.



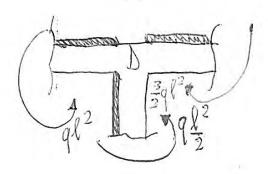






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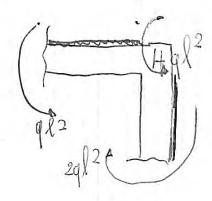


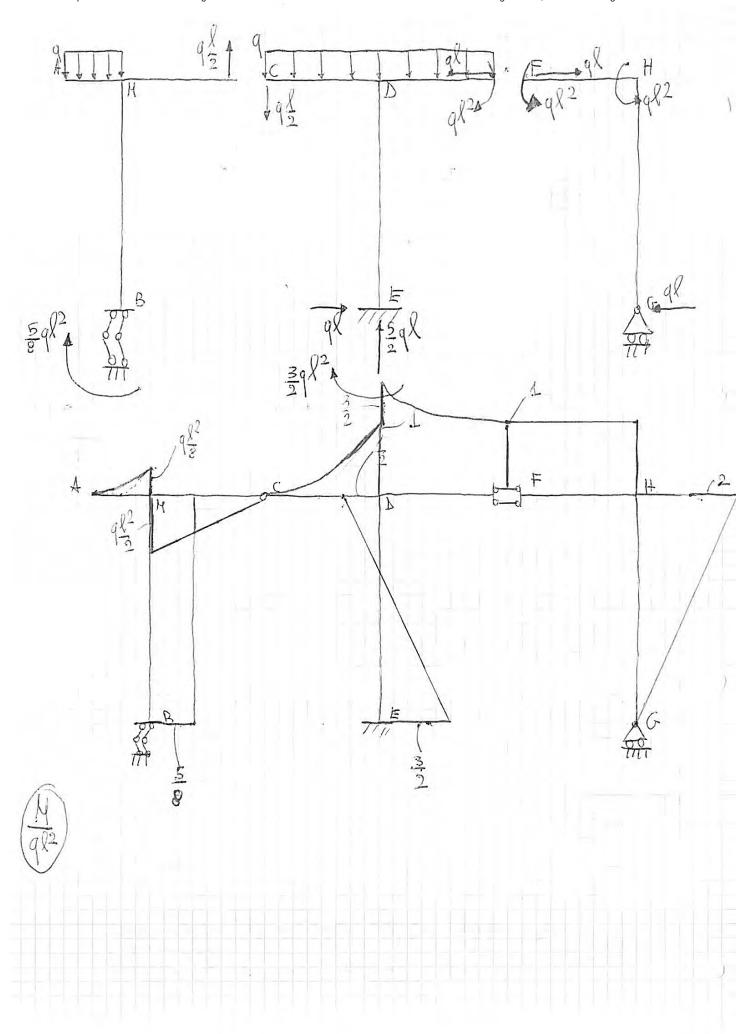
FHI: mel mole H à applicate un momente concentrate as

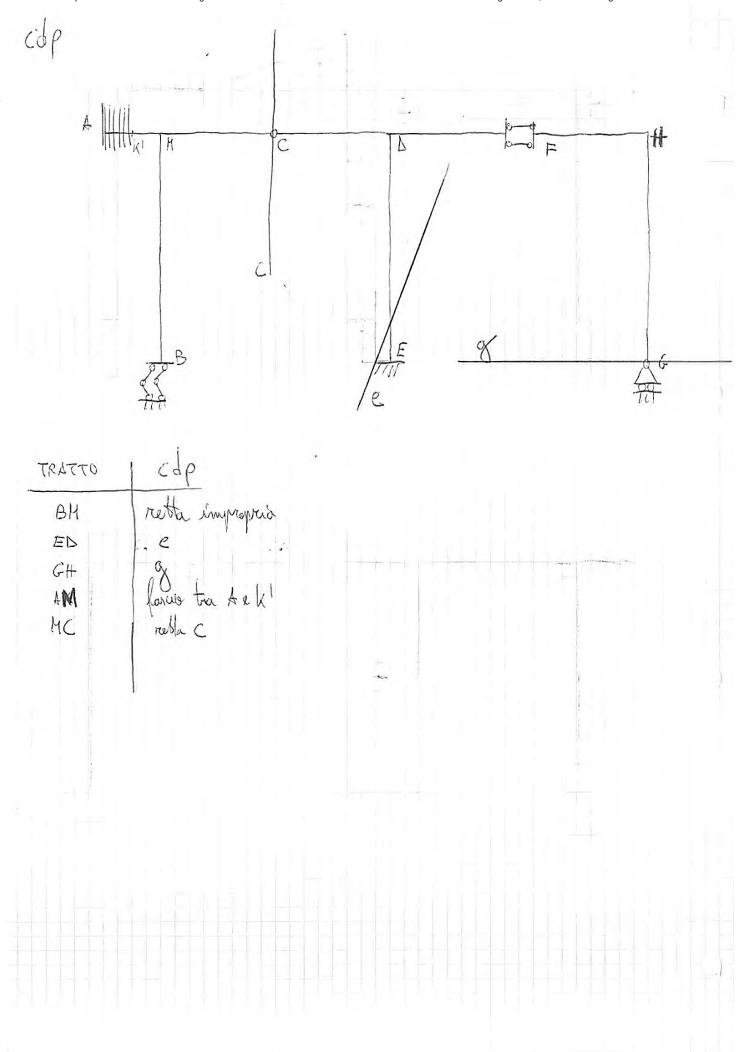
$$M(z) = qlz$$

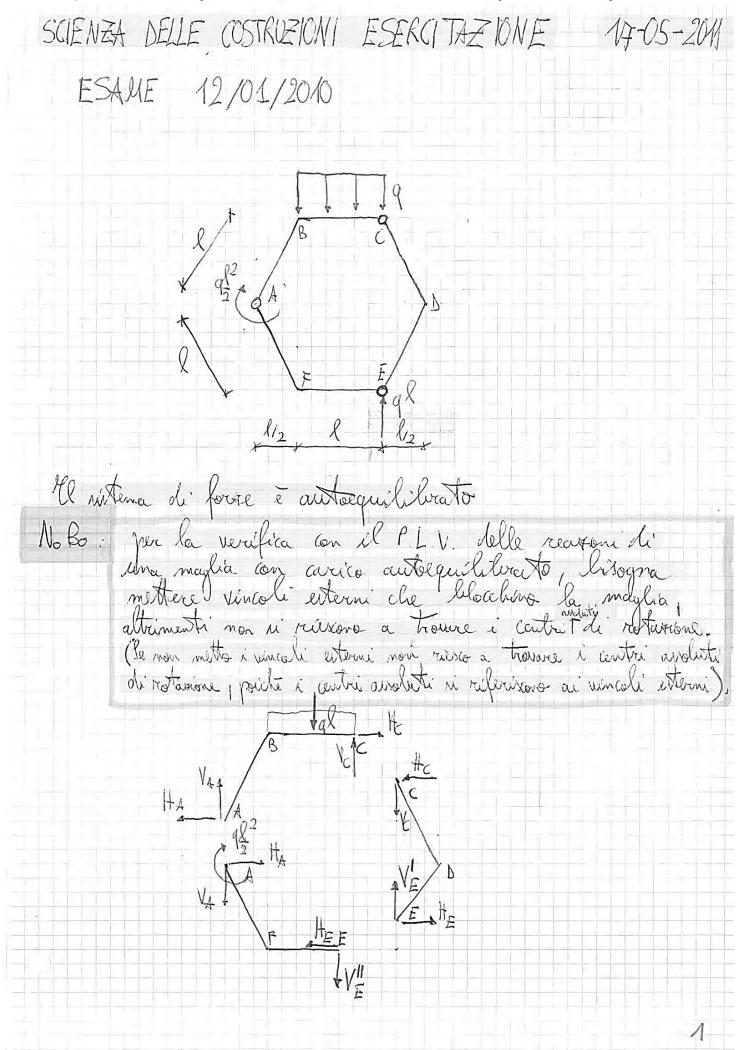
 $M(o) : Mc = 0$

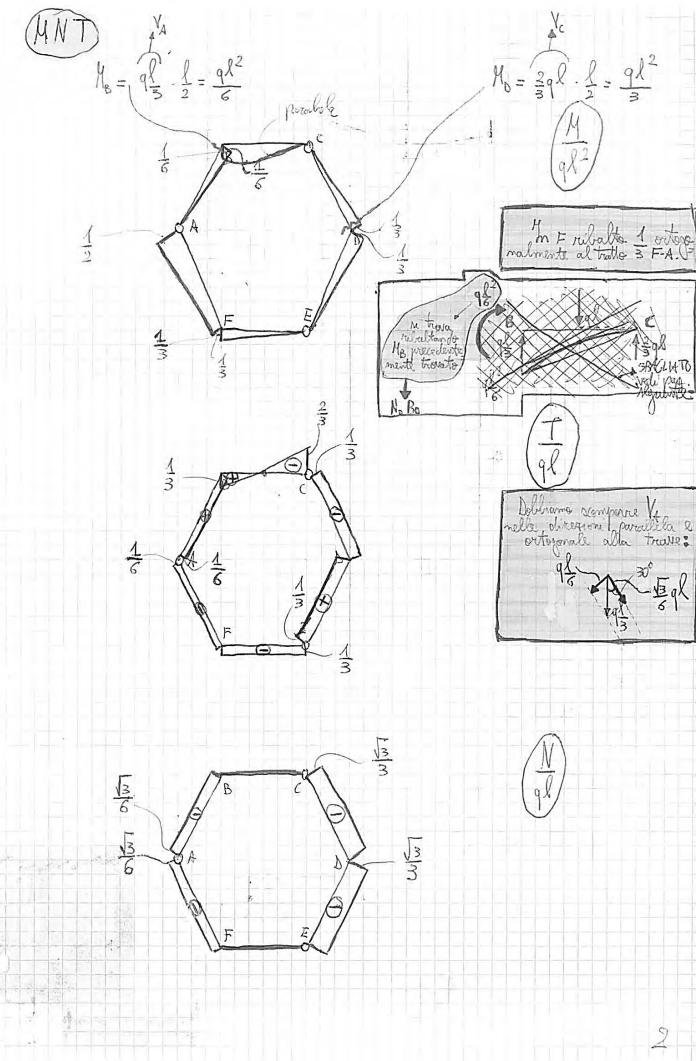
$$M(0) = M_{C} = 0$$
 $M(2l) = M_{H} = 2ql^{2}$









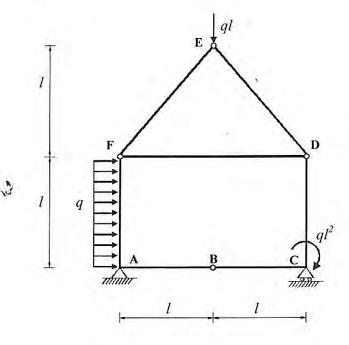


31 Agosto 2010

COMPITO I

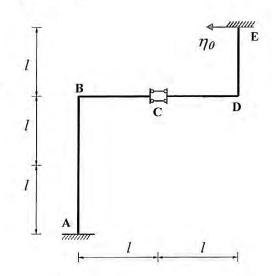
CORSO DI LAUREA :		
MATRICOLA:		

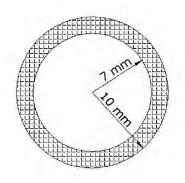
Esercizio 1



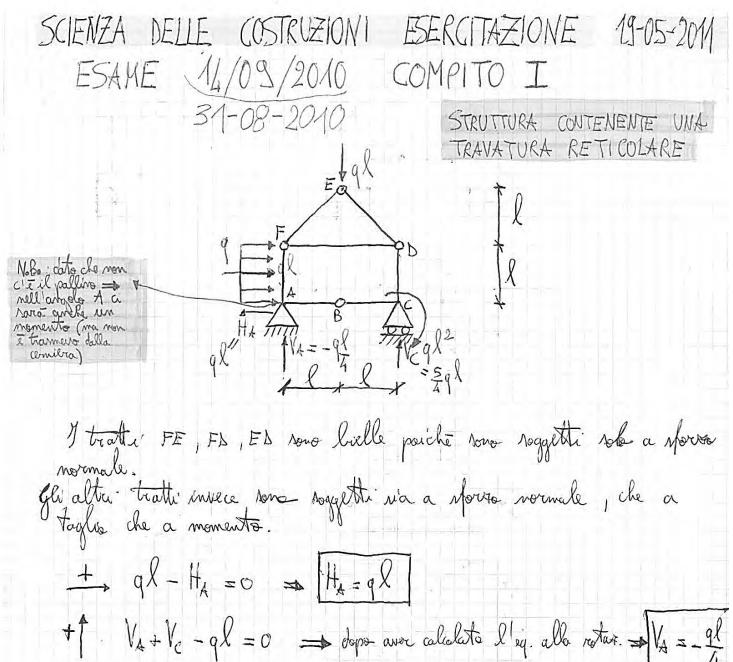
- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni.
- 3. Calcolare le reazioni nell'asta FD con il
 PLV. Chianto lo un'avo
 tobre l'arta l
 metto lo norra
 mi centra relativa
 denta dui centra relativa
 comi connigno lo rieno

Esercizio 2





- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni e la deformata qualitativa.
- 3. Calcolare lo spostamento veriticale relativo nel punto C.
- 4. Verificare la sezione in acciaio maggiormente sollecitata sapendo che le sue caratteristiche geometriche sono quelle indicate in figura e che E=210 GPa, $\eta_0=20$ mm, l=1 m e $\sigma_{amm}=255$ MPa.



(+ H(A) = - 9/2 - 9/2 + Vc. 2/ =0 =

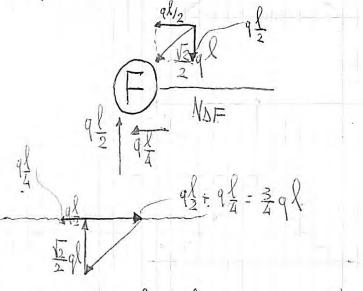
→ 2/c = ql (1/3+1+1) → Vc = 5/4 l

$$\frac{1}{4} DCB, H_{D} = q \frac{1}{4}$$

$$\frac{1}{4} DCB, V_{D} = q \frac{1}{2}$$

$$\frac{1}{4} FAB, V_{F} = -q \frac{1}{2}$$

Consideriano l'equilibrio del noto F:

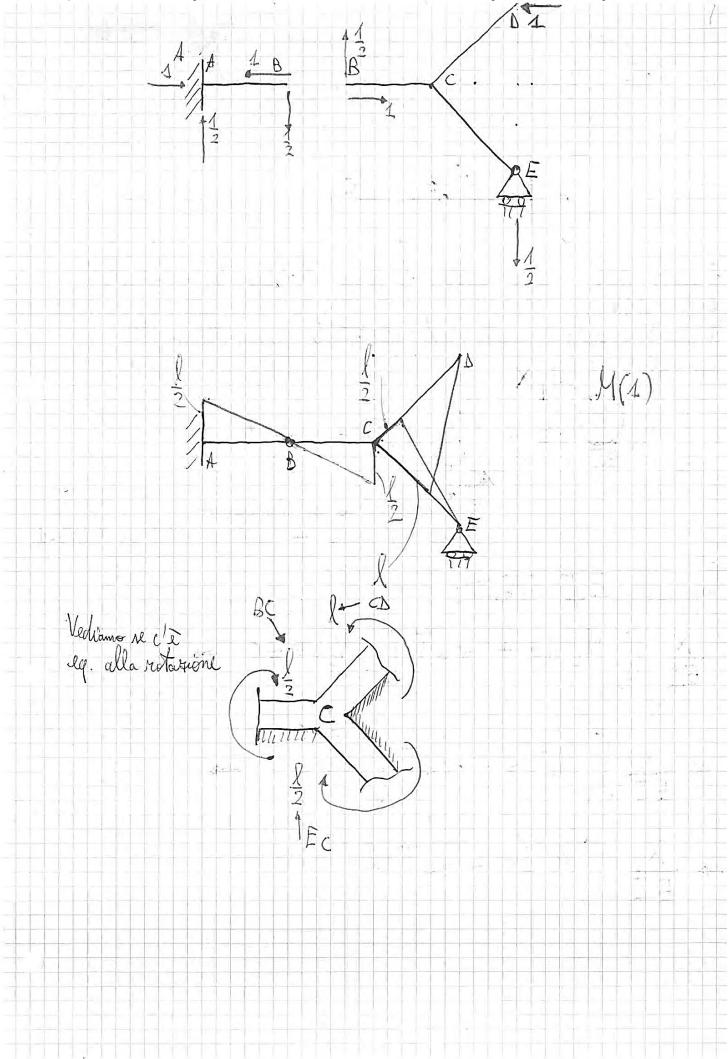


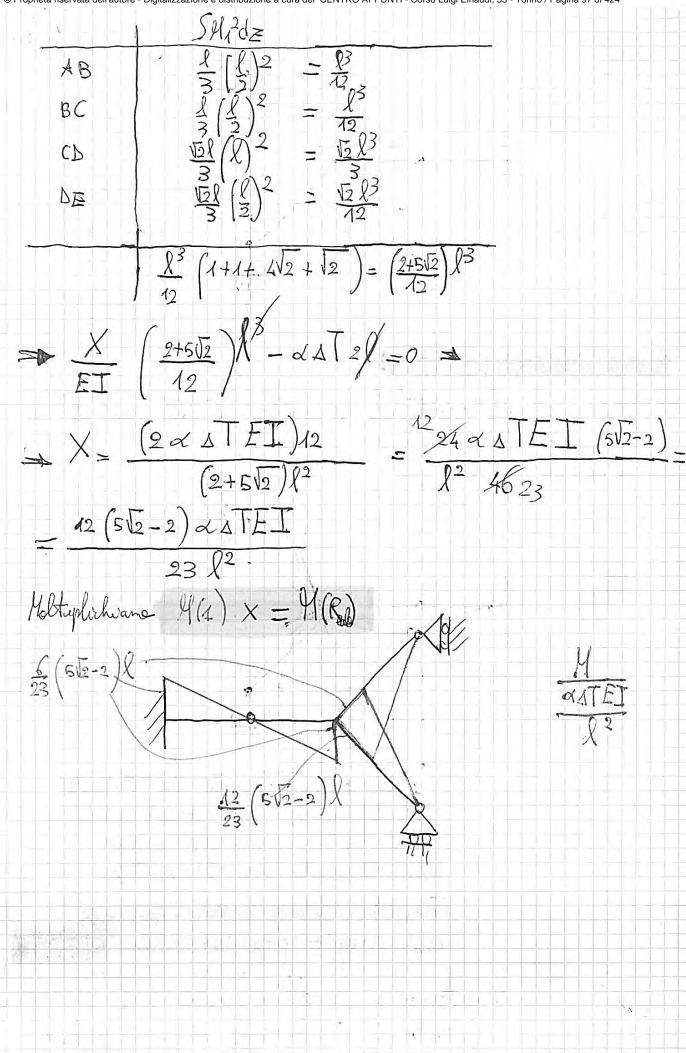
Methodo analítico:
$$+1$$
 $q_{\frac{1}{2}}^{2} - q_{\frac{1}{2}}^{2} = 0$

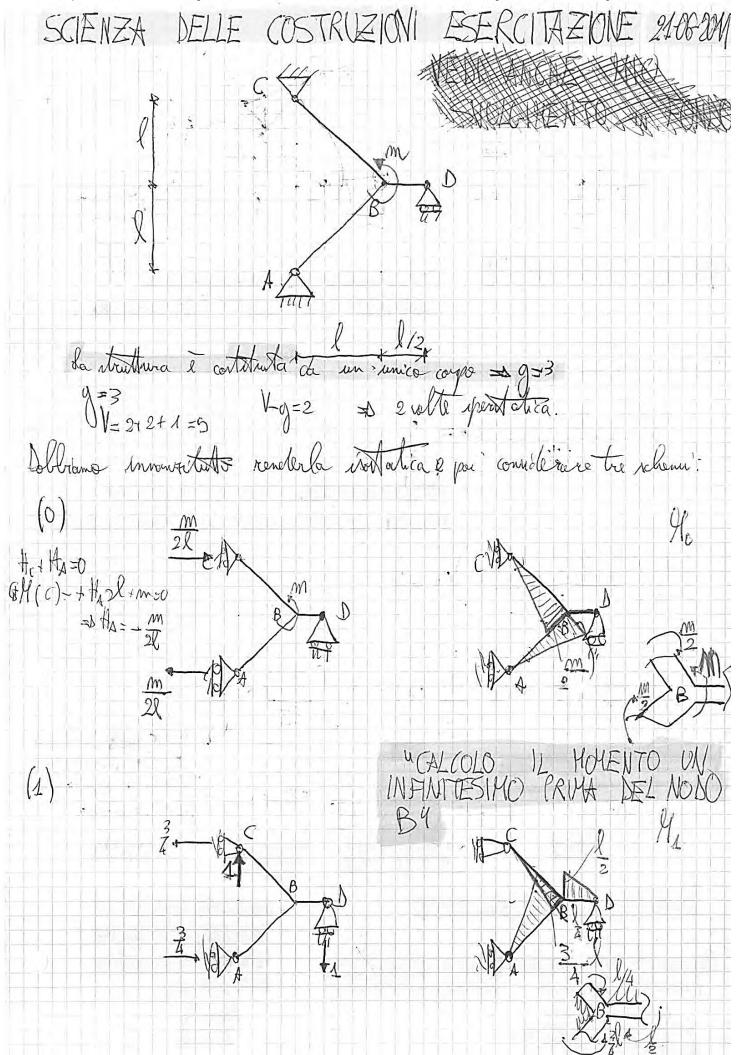
$$+ - q_{\frac{1}{4}}^{2} - N_{SF} - q_{\frac{1}{2}}^{2} = 0 \Rightarrow N_{SF}^{2} - \frac{3}{4}ql$$
initialmenta

initialheura

COSTRUZIONI ESERCITAZIONE 16-06-2011 SCIENZA DELLE ESAME 02/02/2009 g=3, V=2+2=4 => V-g=1 1 grad di sperstaticata Ora consideriamo l'isostatica principale e due schemi: M(0) (0) CS W Comps 4(1) Rholinamo i due rchemi iroxtatia (fetto qui ropra)



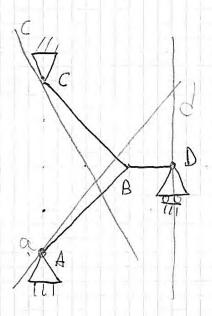




licholi	tota l'egu	artione e ju	r lequerabre	di COI	VG-RUENEA;
(Ameha lei	20 è un le	quartre di 6	nywra)		VG-RUENEA,
Micordane	che le 19	· carelmali	della Mal	Ta a con	mo per questa
Mativa & 2 role che robbiefa	la conquer	wa]			
				(TEORRYH	
Scritte nell M10 +XM11 Lapponiano che	+ ×2M12=0	n'Alfanixo	no EQUAZ	PIONI DI M	WLER-BRESLAN
Lapponiano che	E = Co	corcula P	3	National Market	2 med du monter of
	1. 1/1/1/2	J. Mz dZ	J M1M2dz) MaModz) M2M0 dZ
CB	$\frac{\sqrt{2}}{3} \lambda (\frac{1}{4})^2$	$\frac{\sqrt{2}}{3} \left(\frac{3}{4}\right)^2$	$\frac{\sqrt{2}}{3} \left(\frac{2}{2} \right) \left(-\frac{3}{4} \right)$	$\frac{\sqrt{2}}{3}\left(\frac{l}{4}\right)\left(\frac{m_l}{2}\right)$	1.12 (C3) (M) 2
AB	\frac{12}{3}\left(\frac{3}{3}\left)^2	$\frac{\sqrt{2}}{3}\left(\frac{1}{3}\right)^2$	$\frac{3}{\sqrt{2}\sqrt{\frac{3}{3}}\sqrt{3}}$	$\frac{\sqrt{2}}{3}\left(\frac{-3}{4}\right)\left(\frac{m}{2}\right)$	$\frac{1}{3}$ $l(\frac{1}{4})(\frac{m}{2})$
BD	$\frac{2}{6}\left(\frac{1}{2}\right)^{2}$	$\mathcal{L}_{\mathcal{E}}^{\mathcal{L}} \left(\frac{\mathcal{L}}{2}\right)^2$	$\left \frac{\left(\frac{1}{2}\right)^2}{6\left(\frac{1}{2}\right)}\right $	0	
TOTALE	1+5/2 (3	1+5\(\frac{1}{2}\) 24	1-3\(\frac{1}{2}\)\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	$-\frac{\sqrt{2}}{12}$ m λ^2	-V2 ml 2 **

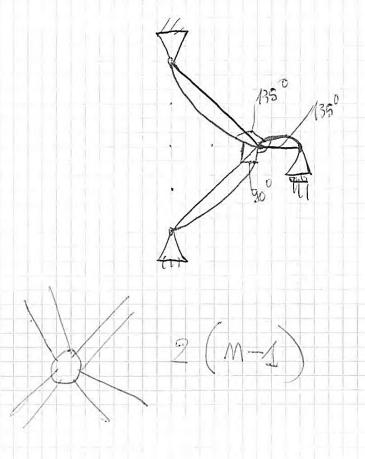


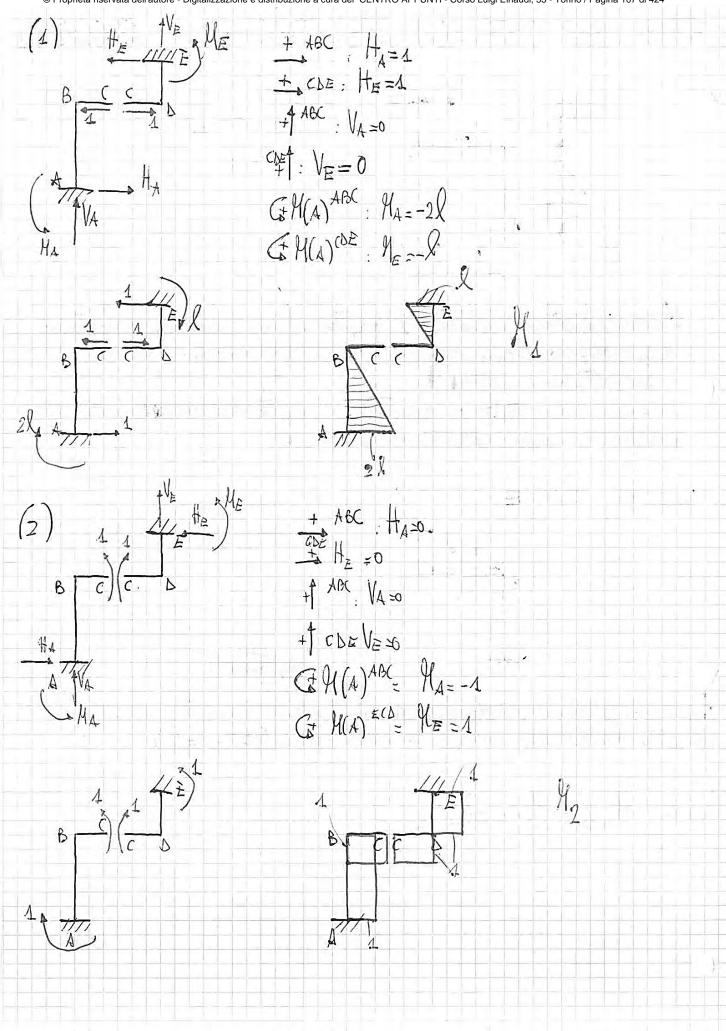
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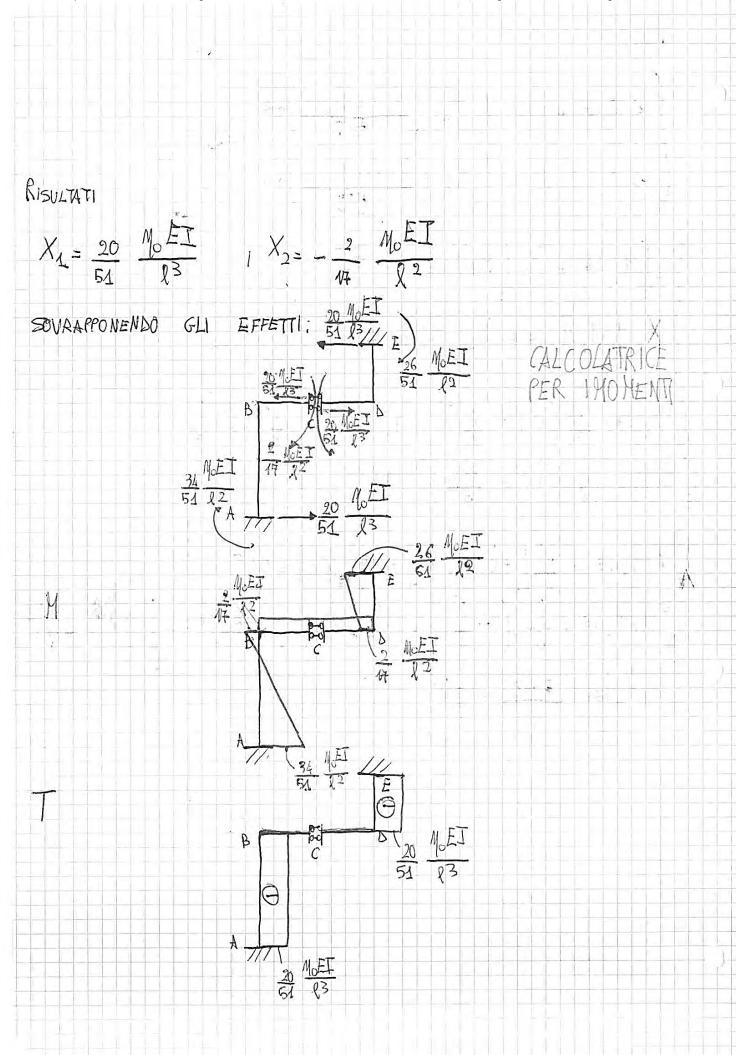


Le tre forte non payaro per uno tem punto, perche c'è una forta applicata
le compositione. Vs con m so la forta rivultante paretre per il punto d'interversione di c'è a.

DEFORMATA ELASTICA : il televo à a modi fimi







The proposed reservation collisioner - Digitalizazione e citationaline e cure cel CENTRO APPUNTI-Coro Luigi Eiracul, 55-Totrio Pegne 115 d 428 holo Vo

$$\int_{S} M_{2} \left(\frac{M_{2} X_{4} + M_{2} X_{2}}{ET} \right) dz + \int_{C} M_{2} \left(\frac{N_{1}}{T} \right) dz = 1. \Delta M_{4}$$

$$\int_{S} M_{2} \left(\frac{M_{4} X_{4} + M_{2} X_{2}}{ET} \right) dz + \int_{C} M_{2} \left(\frac{N_{1}}{T} \right) dz = 1. \Delta M_{4}$$

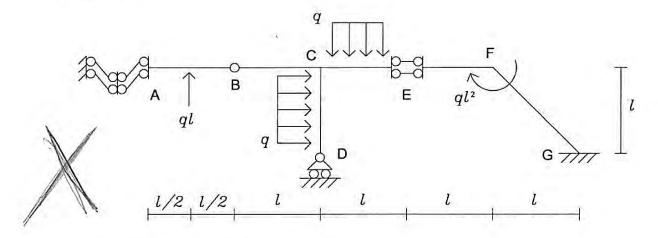
$$\int_{S} M_{2} \left(\frac{M_{4} X_{4} + M_{2} X_{2}}{ET} \right) dz + \int_{C} M_{2} \left(\frac{N_{1}}{T} \right) dz = 1. \Delta M_{4}$$

$$\int_{S} M_{2} \left(\frac{M_{4} X_{4} + M_{2} X_{2}}{ET} \right) dz + \int_{C} M_{4} dz = \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2 \Delta \Delta T}{L} \left[\frac{1}{L} \left(\frac{1}{L} \right) \right] - \frac{2$$

21 Luglio 2009 COMPITO II

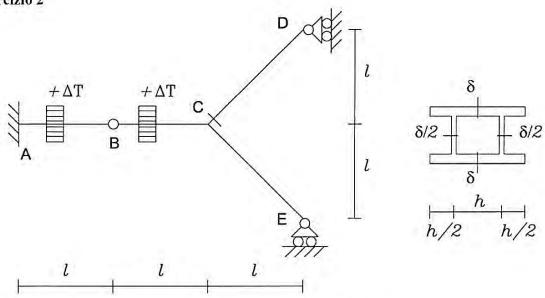
COGNOME:	CORSO DI LAUREA :		
NOME:	MATRICOLA:		

Esercizio 1



- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni.
- 3. Verificare le reazioni interne nel doppio pendolo E con il Principio dei Lavori Virtuali.





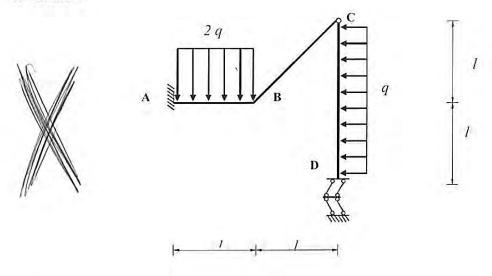
- 1. Tracciare in scala i diagrammi M, N, T e la curva delle pressioni.
- 2. Tracciare la curva delle pressioni e la deformata termo-elastica qualitativa.
- 3. Verificare la sezione C con il criterio di Tresca, sapendo che le caratteristiche geometriche della sezione sono quelle indicate in figura e che $h = 20\delta$.
- 4. Calcolare lo spostamento verticale della cerniera B con il Principio dei Lavori Virtuali.

2 Febbraio 2009

COMPITO I

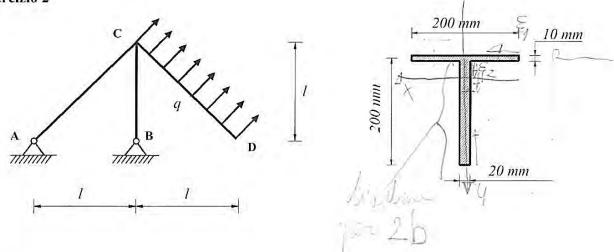
COGNOME :	CORSO DI LAUREA :	
NOME:	MATRICOLA:	

Esercizio 1

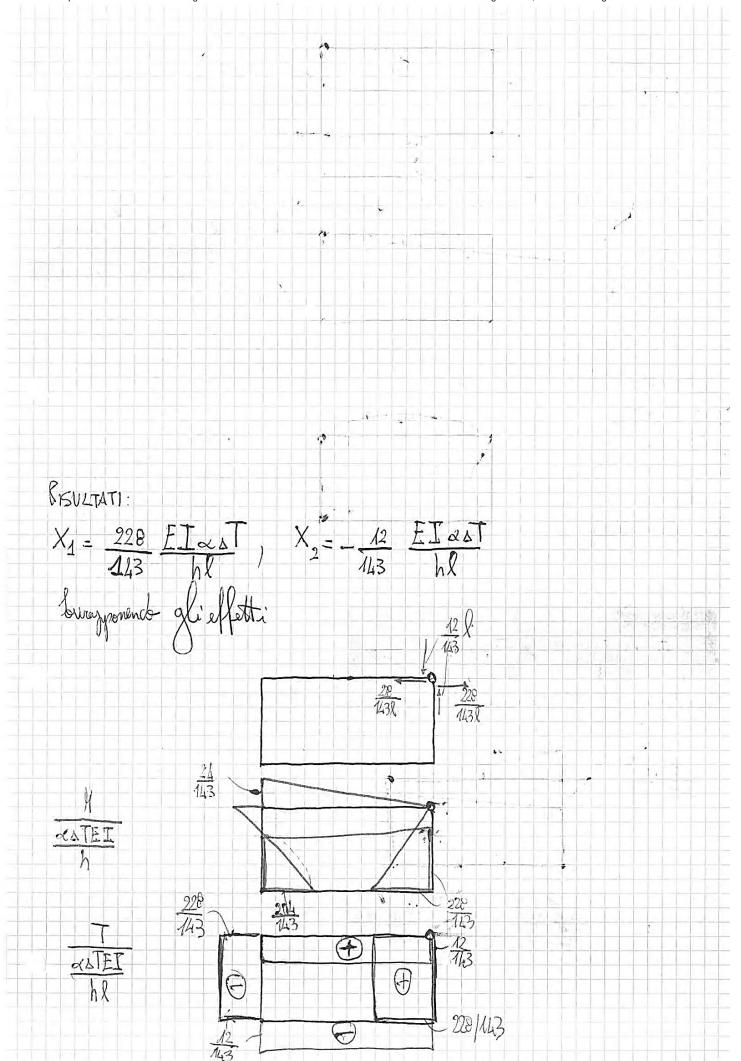


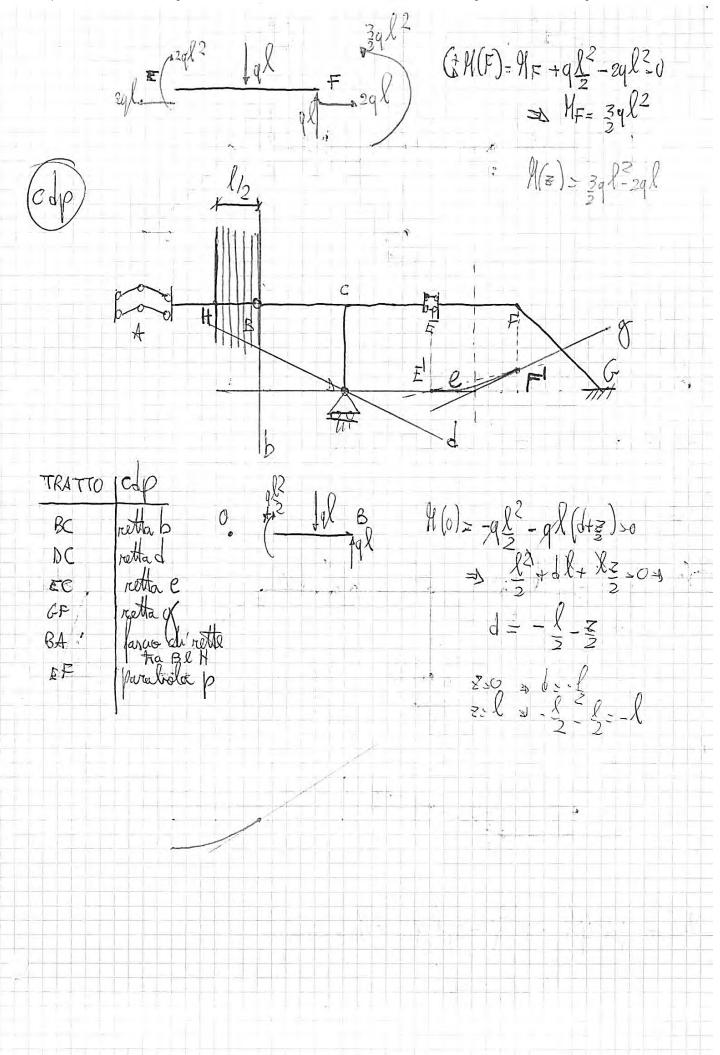
- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni.
- 3. Calcolare le reazioni in C con il Principio dei Lavori Virtuali.

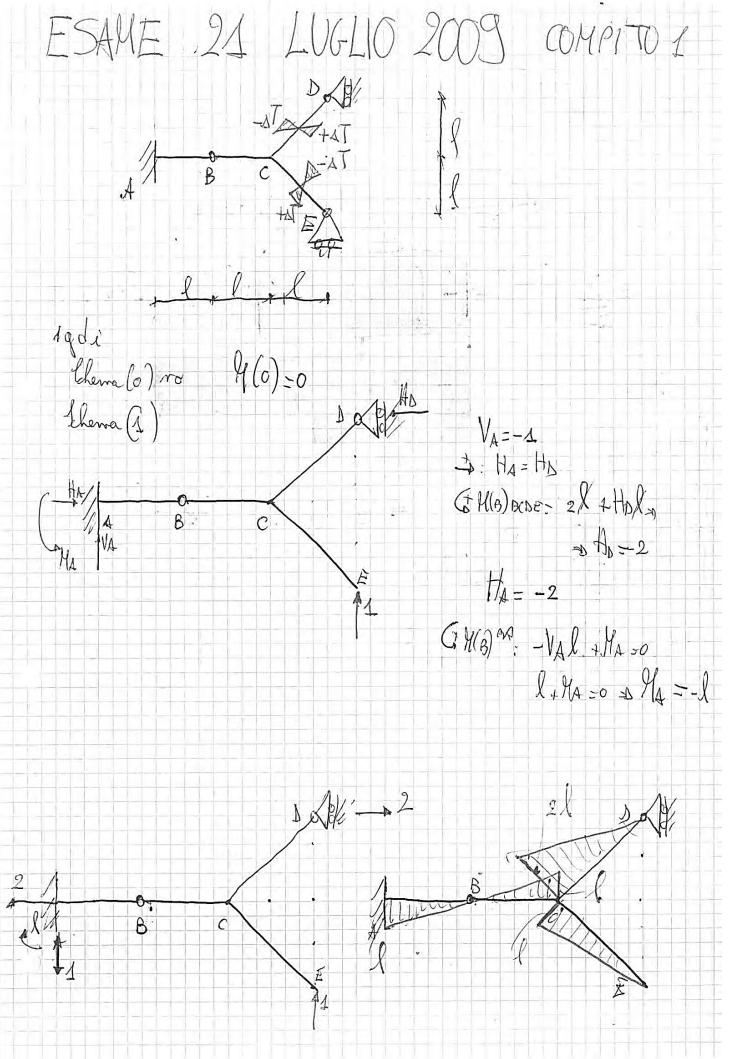
Esercizio 2

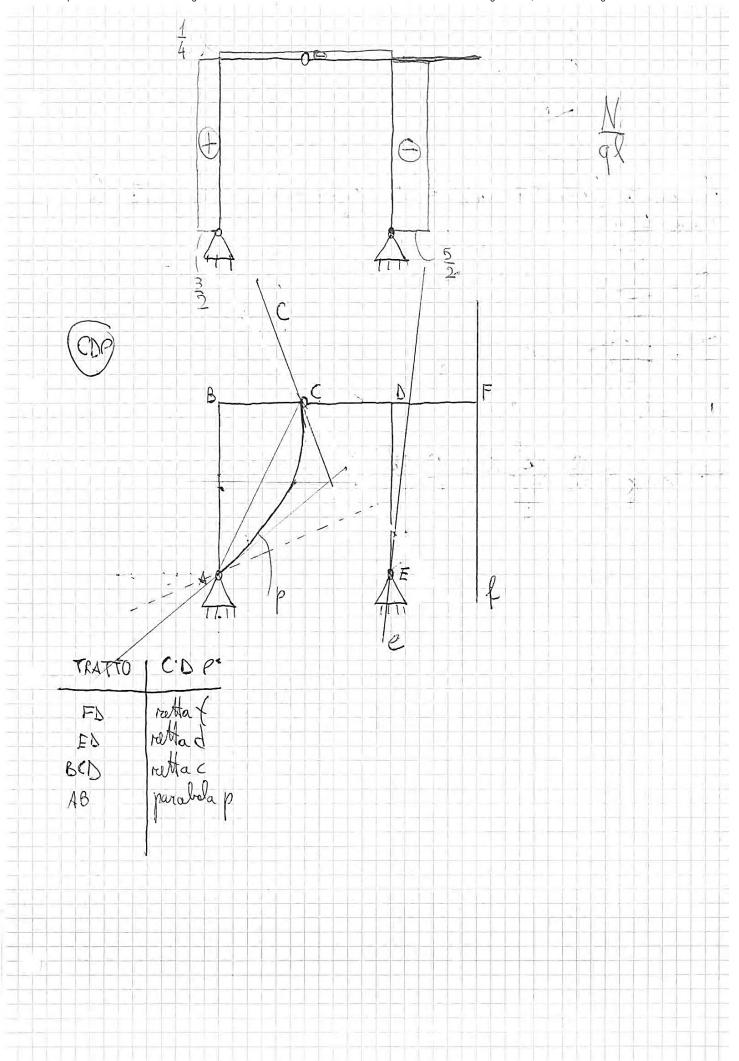


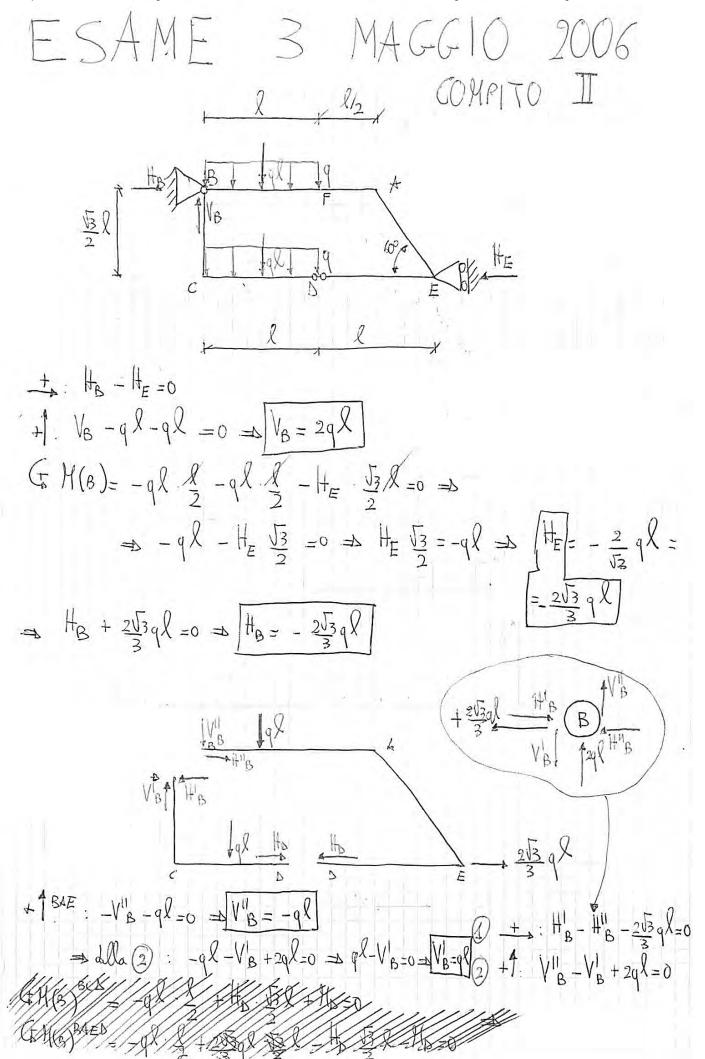
- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni e la deformata qualitativa.
- 3. Sapendo che la sezione riportata in figura è in acciaio con σ_{am} = 255MPa, effettuare la verifica a taglio nella sezione in cui il taglio è massimo sapendo che l = 2 m e q = 25 kN/m.

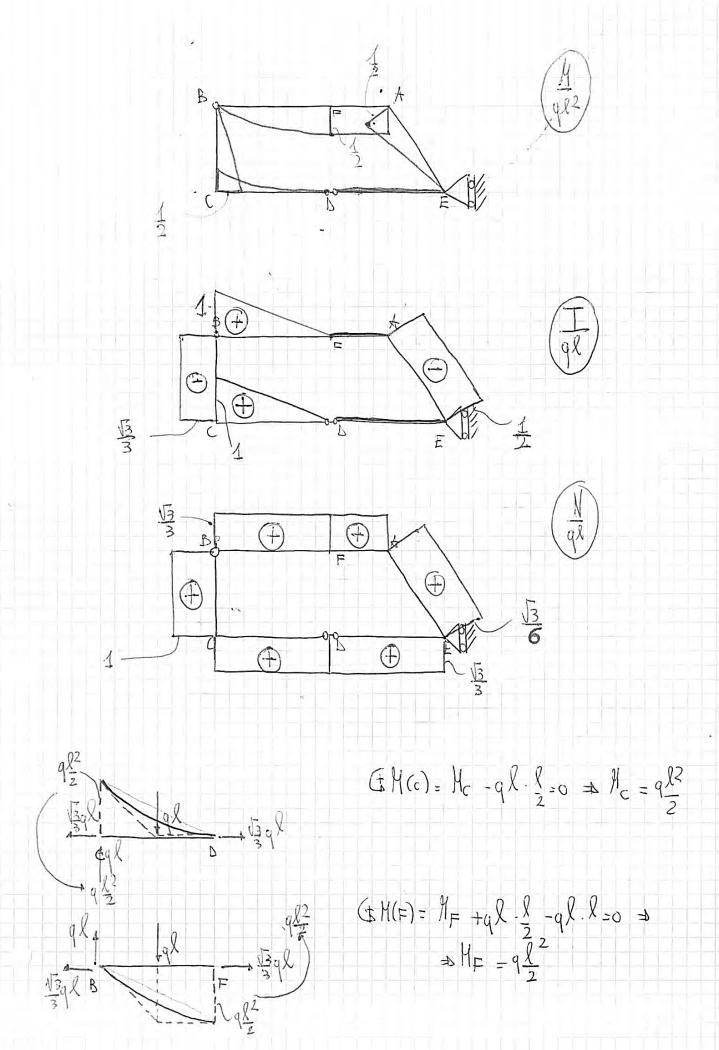


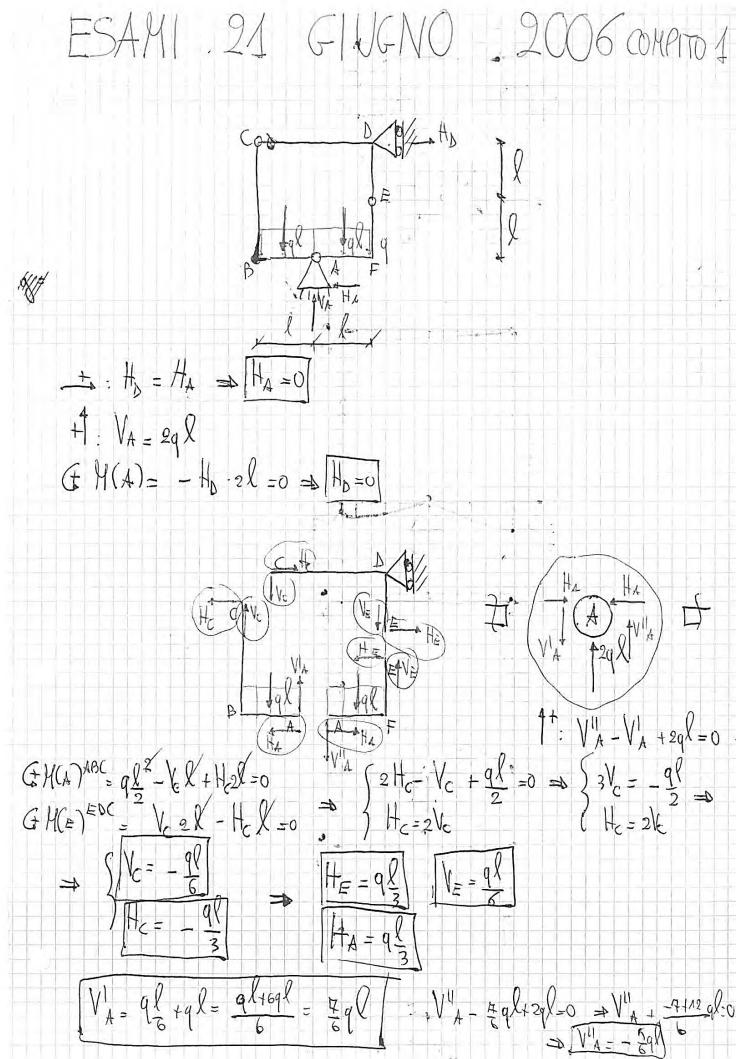


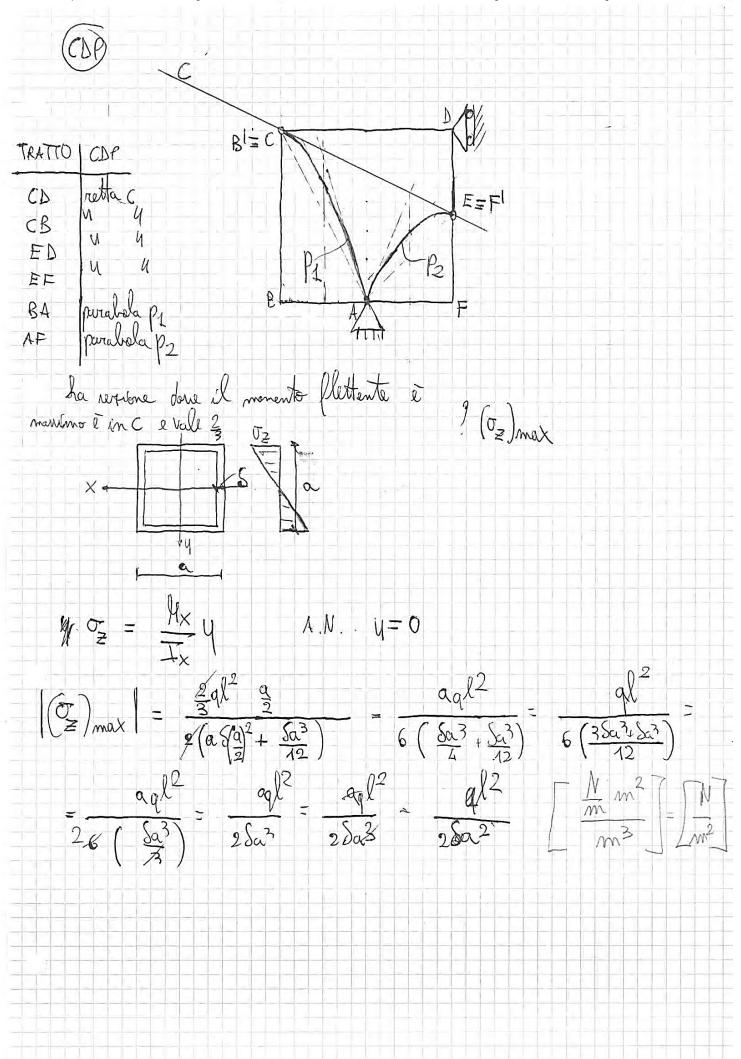


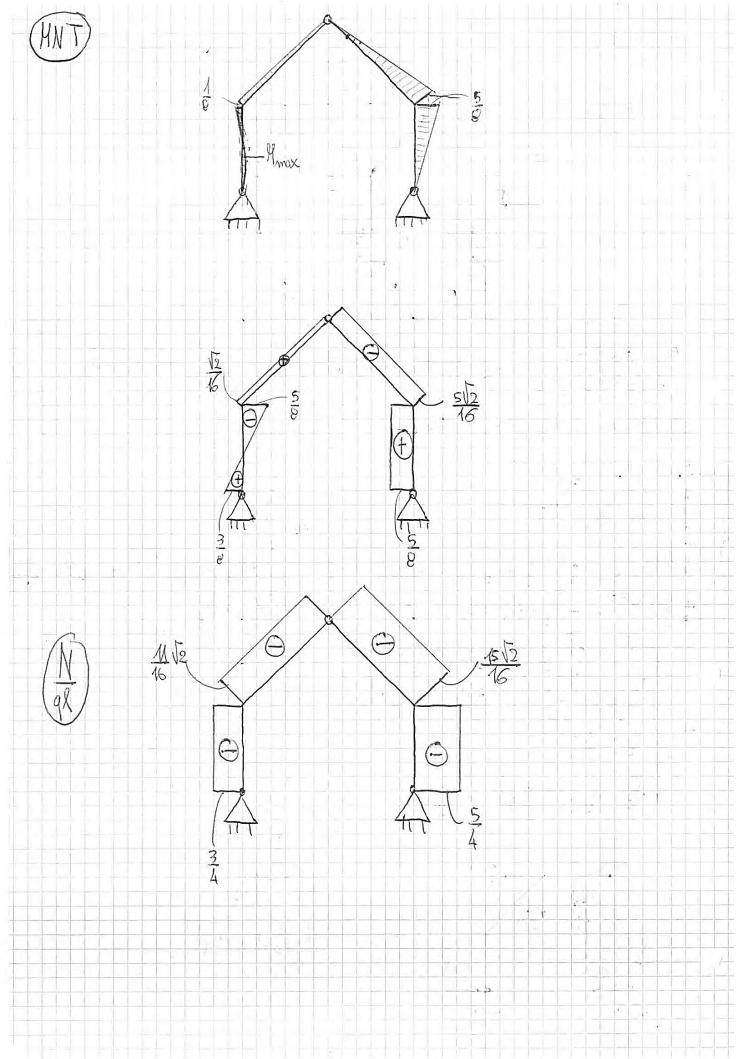


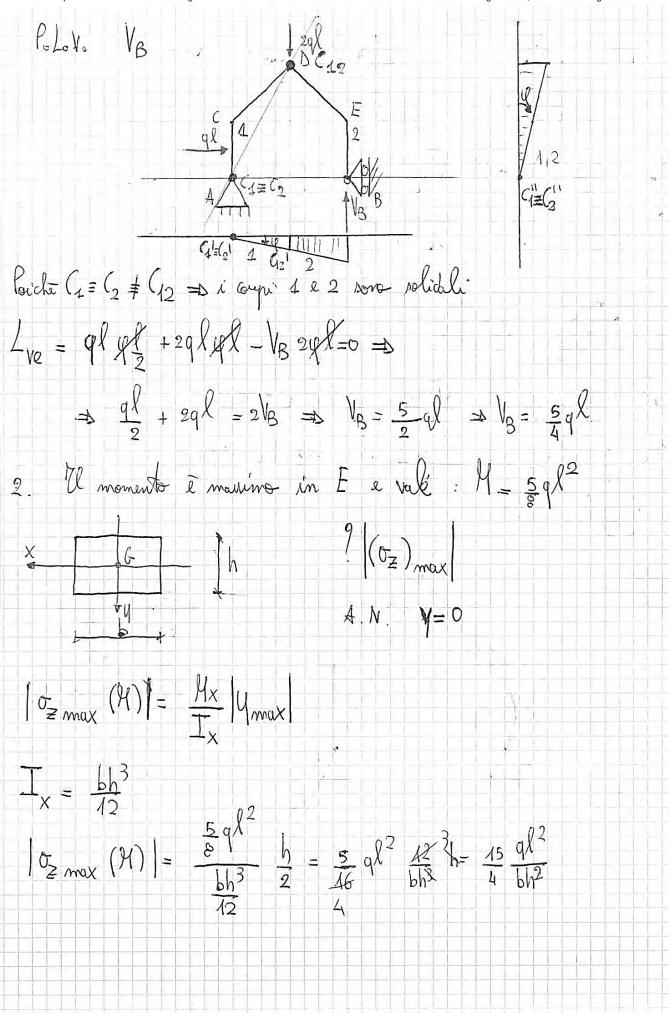


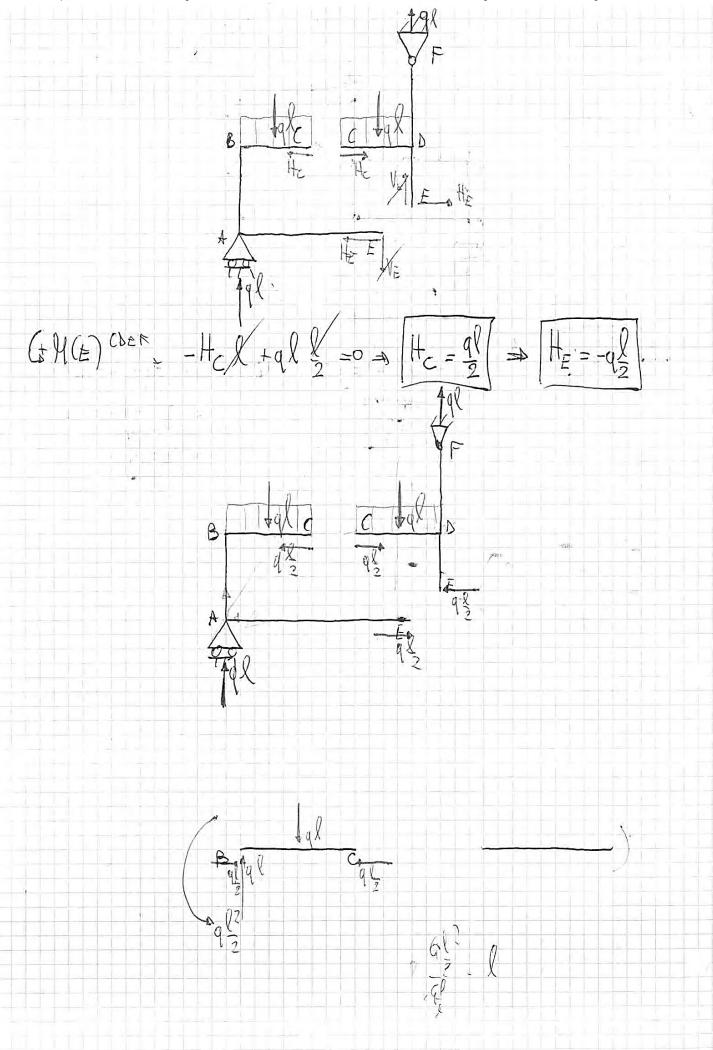


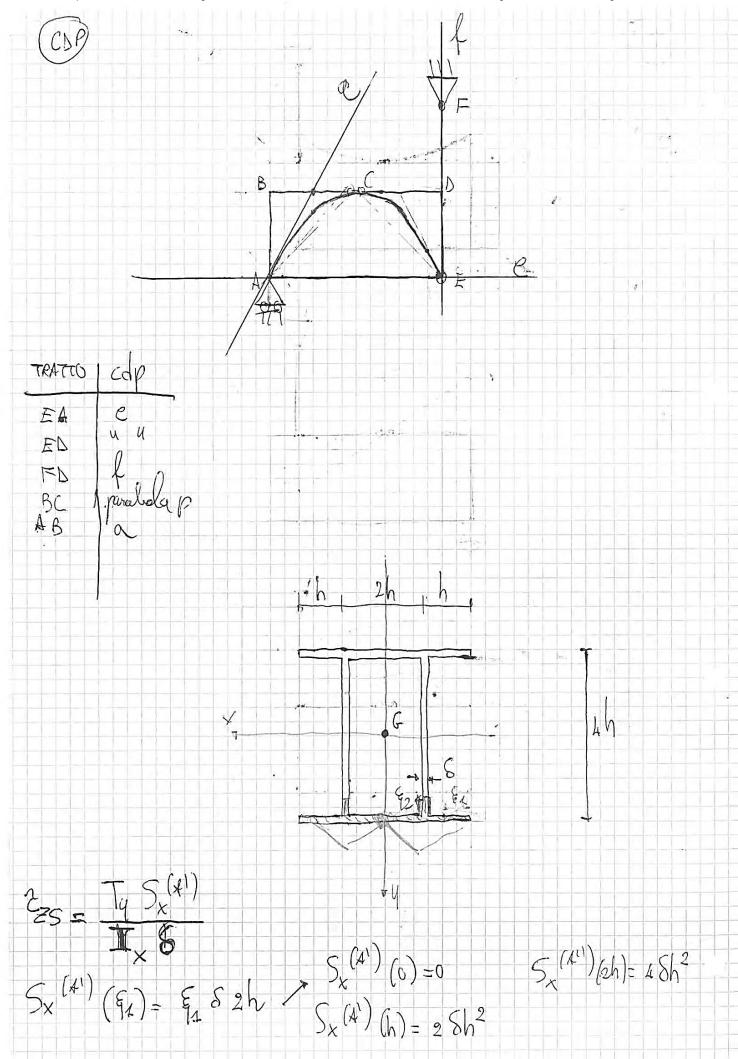




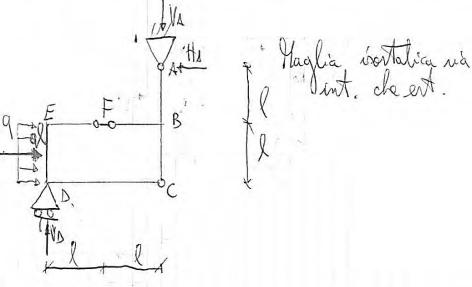








ESAME . OS SETTEMBRE 2006 COMPITO 2

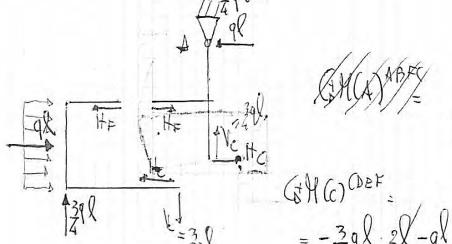


$$\frac{1}{2} : H_A = ql$$

$$\frac{1}{2} : H_A = ql$$

$$\frac{3}{2} : H_A = ql$$

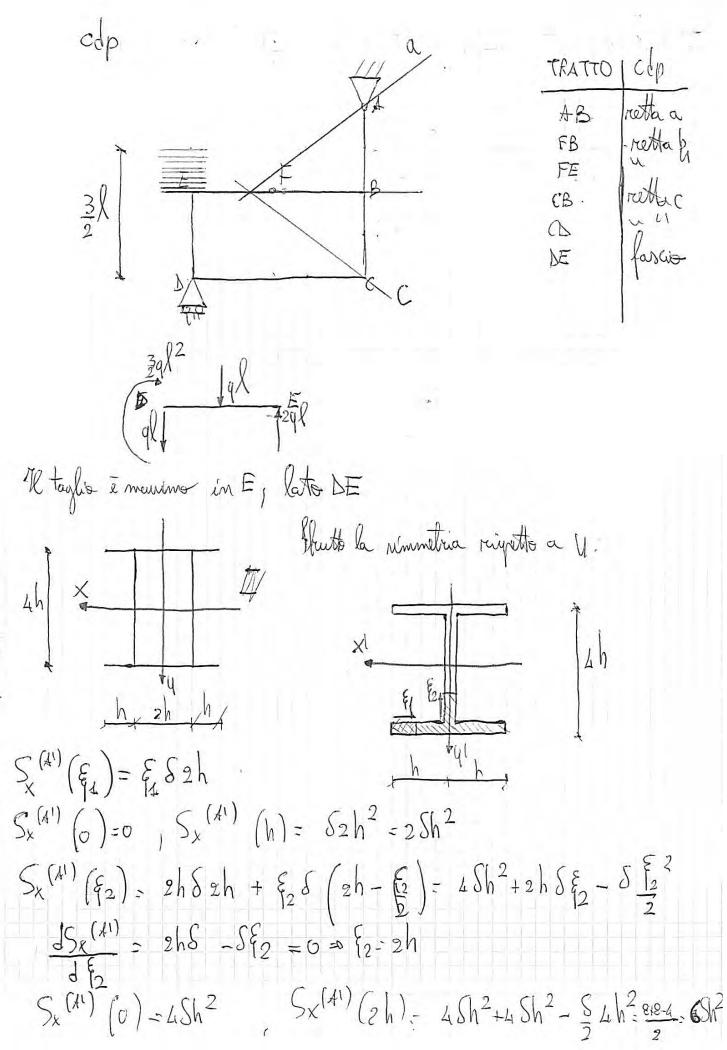
$$\frac{3}{2}$$

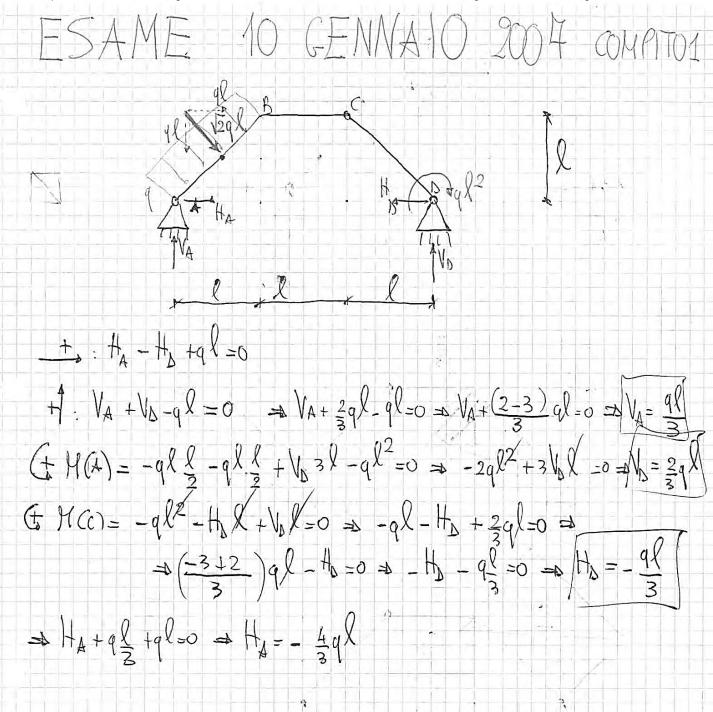


$$= -\frac{3}{4}ql \cdot 2\sqrt{-ql} \frac{1}{2} + H_{F} l = 0$$

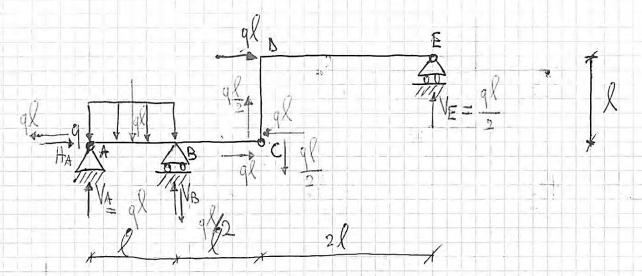
$$\Rightarrow -\frac{3}{2}ql - q\frac{1}{2} + H_{F} = 0$$

$$\Rightarrow -2ql + H_{F} = 0 \Rightarrow H_{F} = 2ql$$





ESAME 06 FEBBRAIO 2007 Exercipción 1 COMPITO 1



$$+\uparrow$$
: $V_A + V_B - q l + V_E = 0 \implies V_A + V_B = + \frac{q l}{2}$

eq. auxiliaria:
$$(+, +)$$
 (c) $(-q)$ $(+$

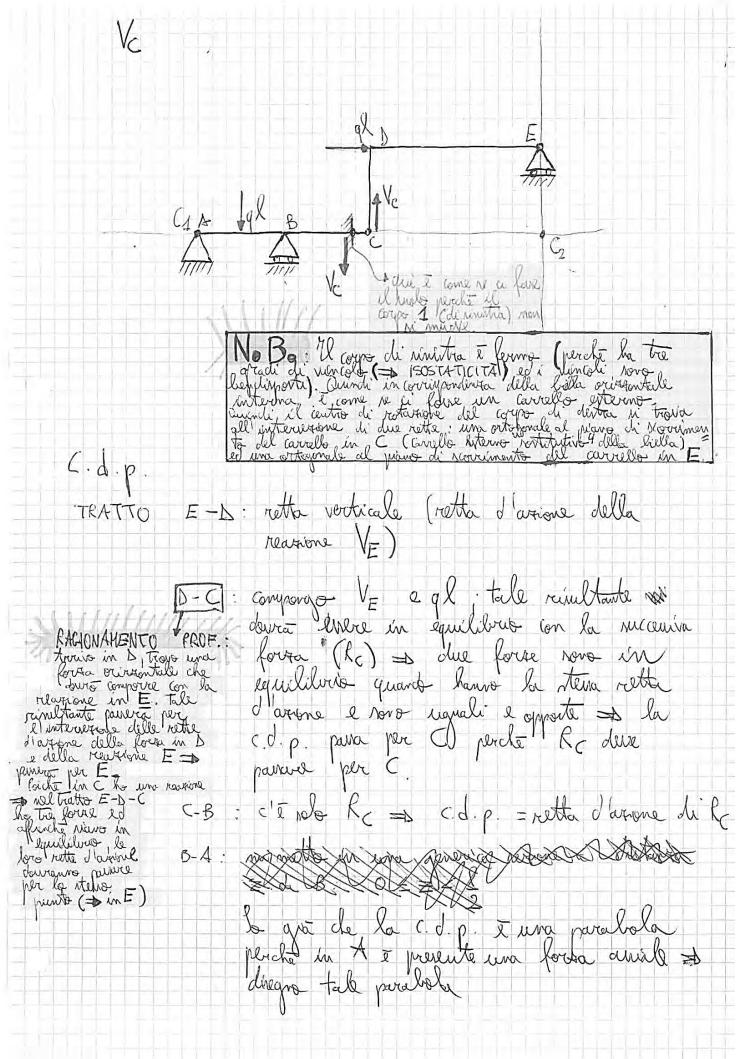
$$(4)^{\pm}: +0^{\pm}: +0^$$

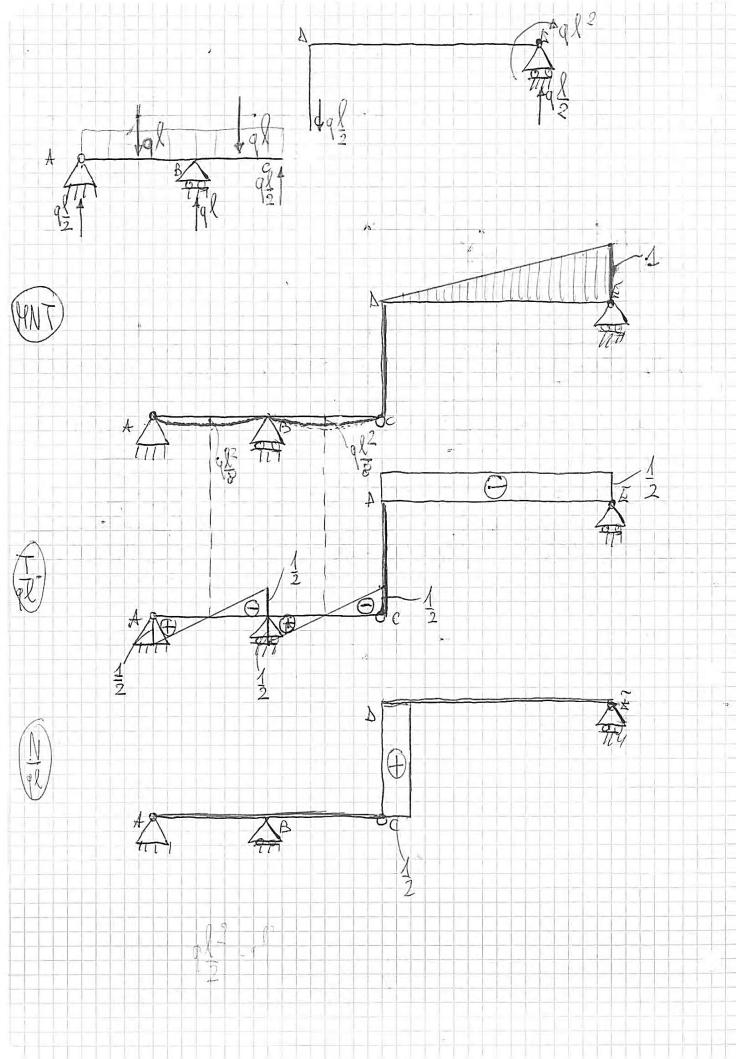
$$\int_{\mathcal{A}} V_{A} = + \frac{9\ell}{2} - V_{B}$$

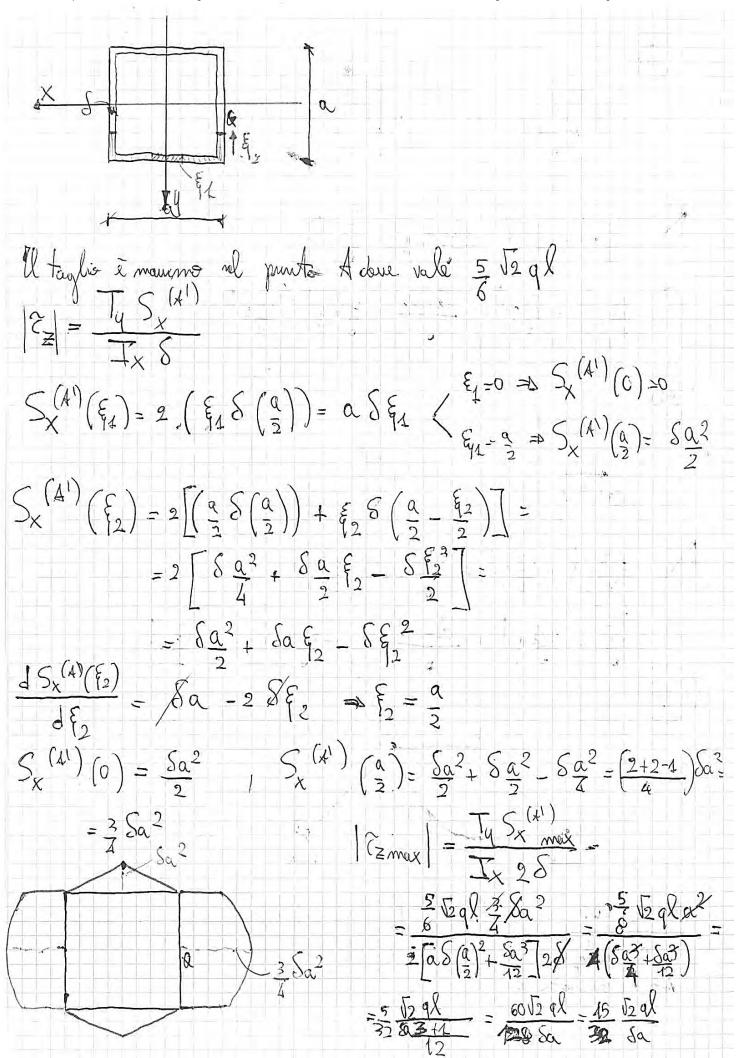
$$\begin{cases} \frac{3}{2}ql - V_{B} - 2(+\frac{ql}{2} - V_{B}) = 0 \\ \Rightarrow \frac{3}{2}ql - V_{B} - ql + 2V_{B} = 0 \Rightarrow \end{cases}$$

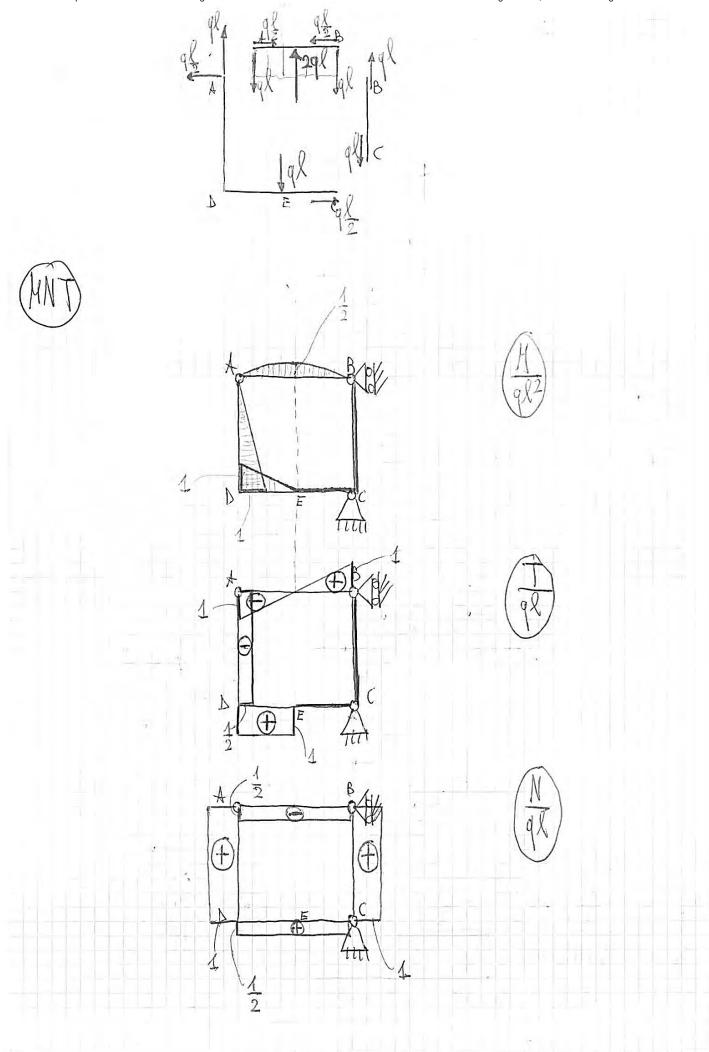
$$=$$
 $V_B = -9\frac{2}{2}$

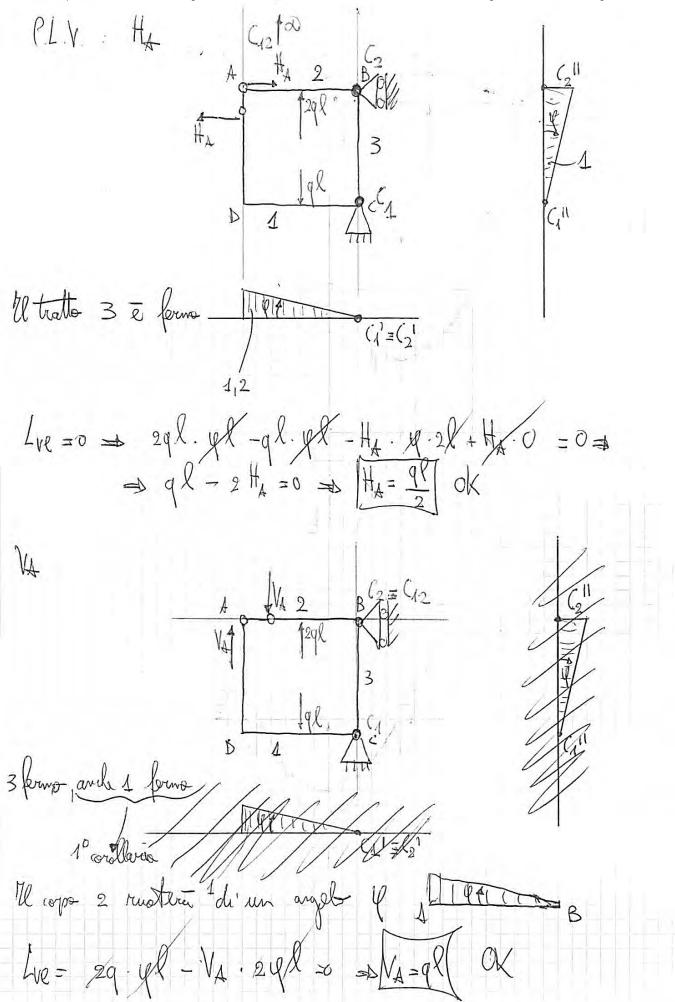
$$\Rightarrow V_A = + \frac{q\ell}{2} + q \frac{\ell}{2} = q\ell$$

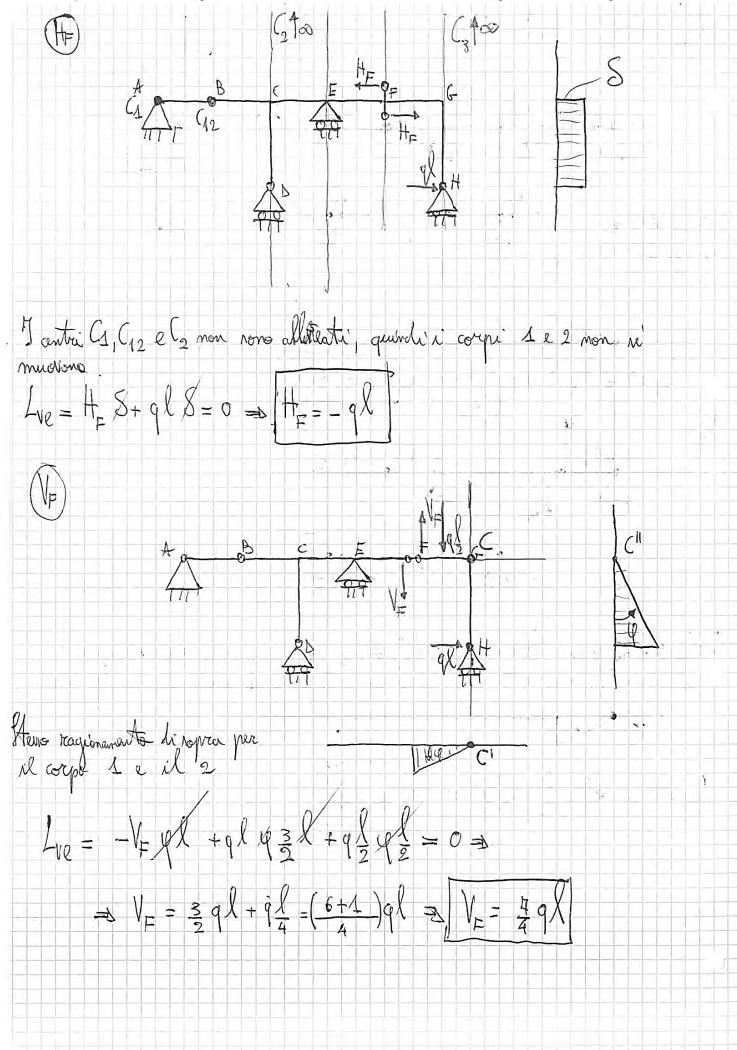


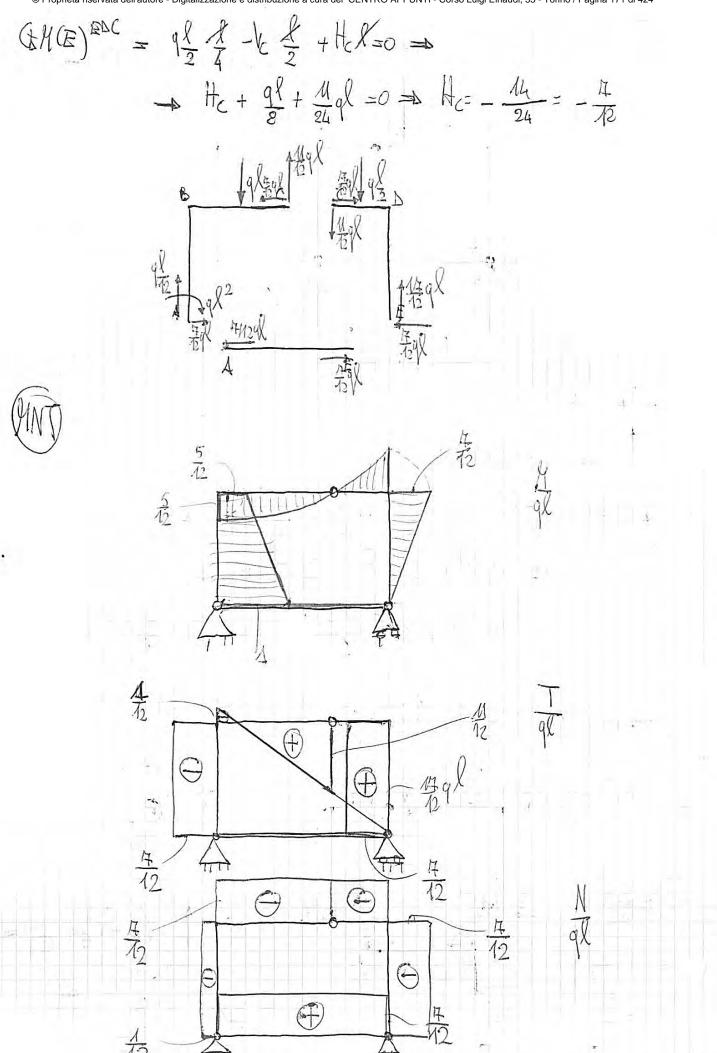


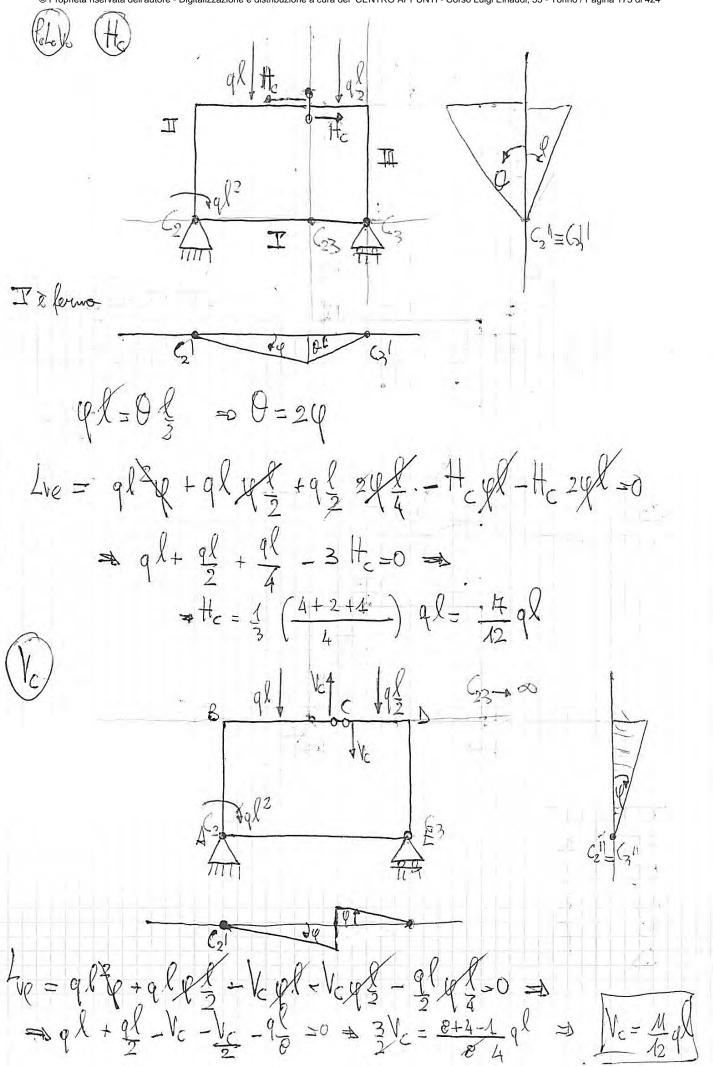


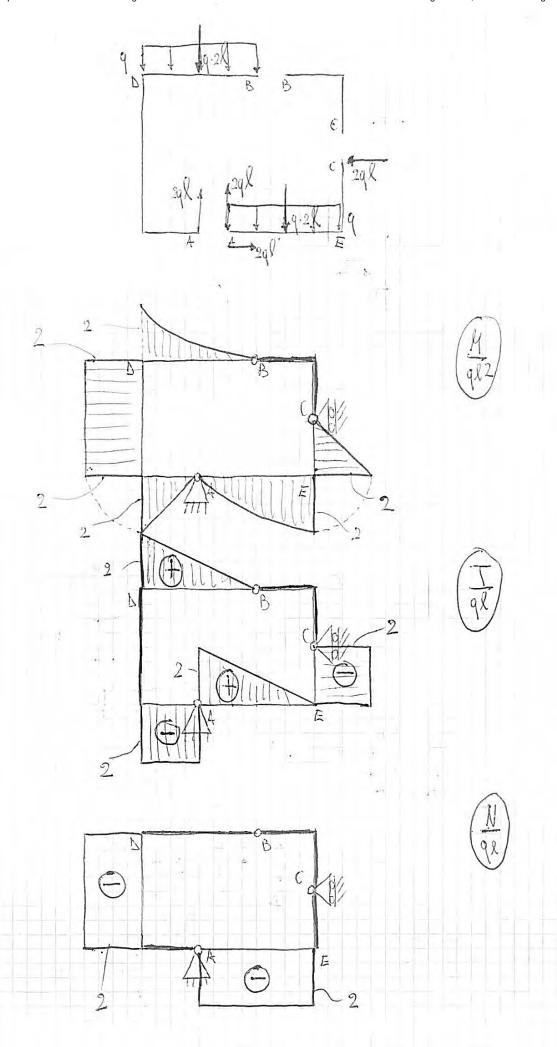


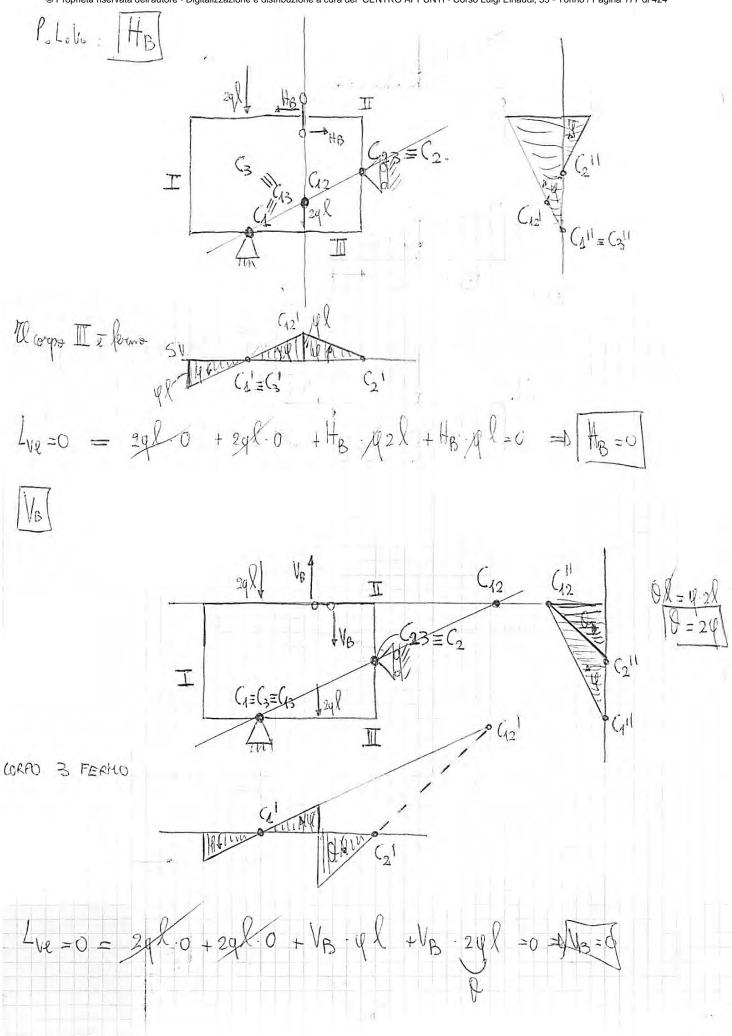


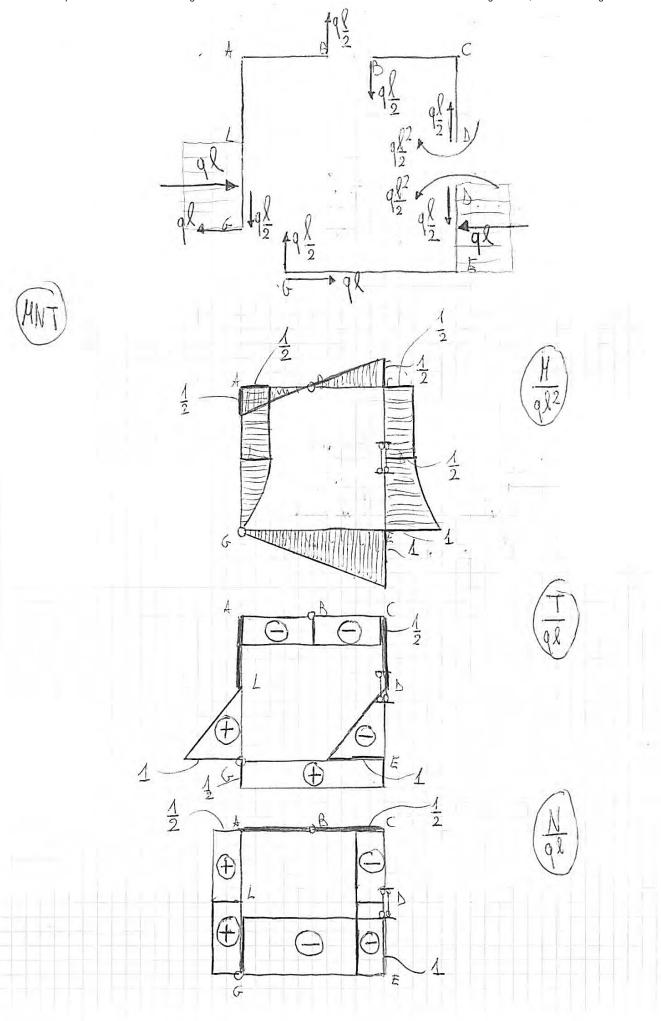




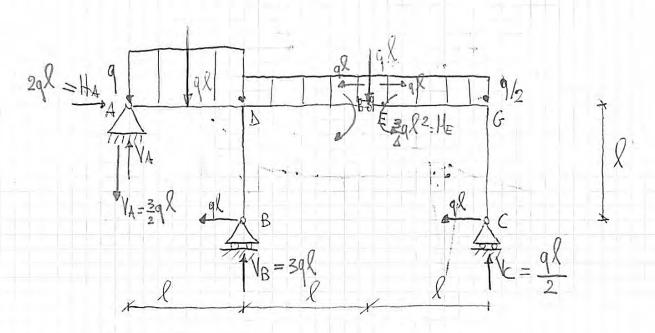


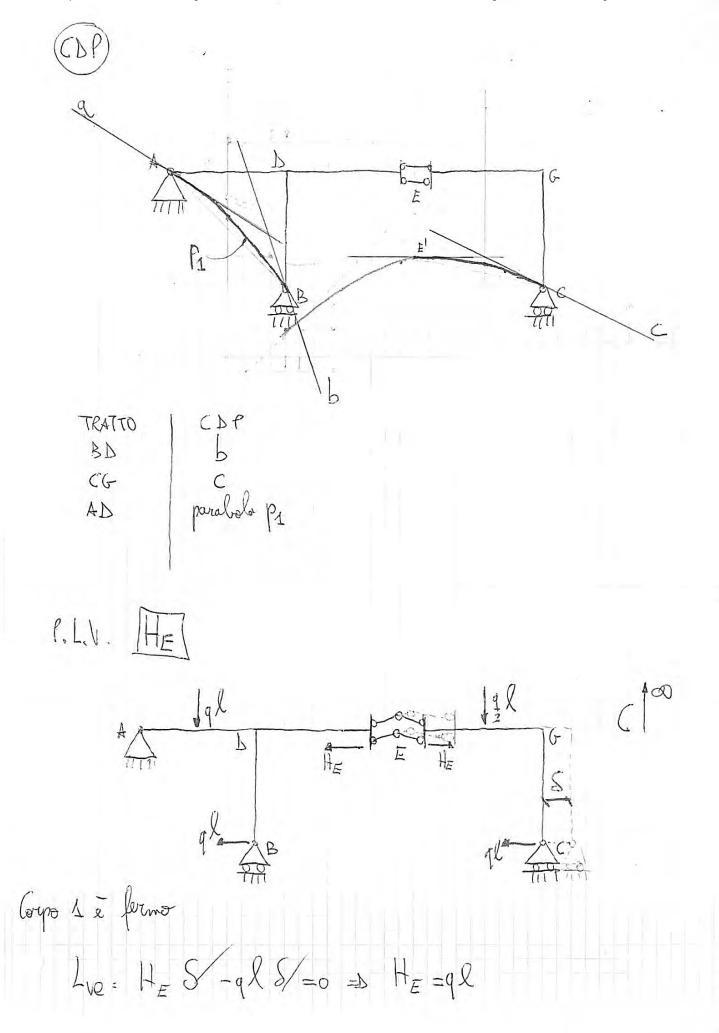






ESAME 12 FEBBRAIO 2002 SCIENZA DELLE COSTRUZIONI A PAG. 90

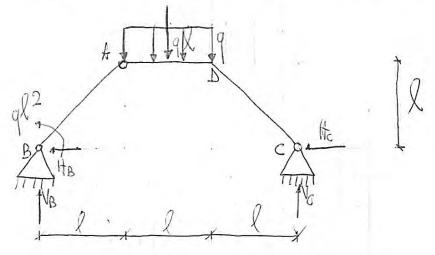












$$(H(A)^{T}: ql^{2}-V_{B}\cdot l-H_{B})l=0$$

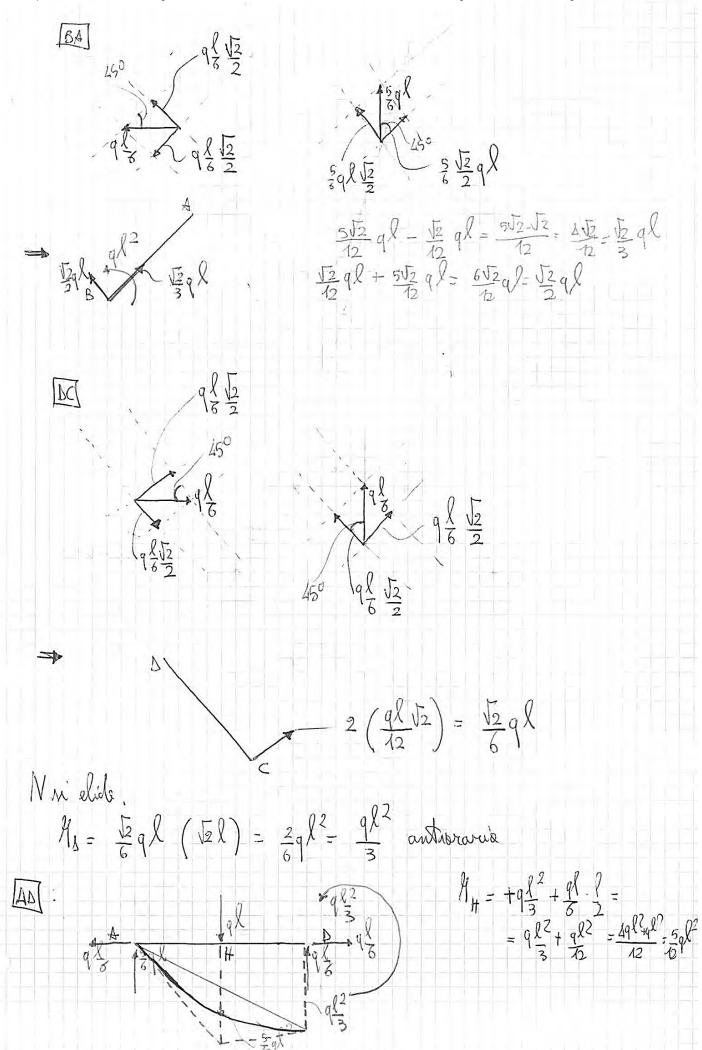
$$(\pm H(\pm)^{II}: -ql \cdot \frac{1}{2} - H_{c} \cdot l + V_{c} \cdot 2l = 0$$

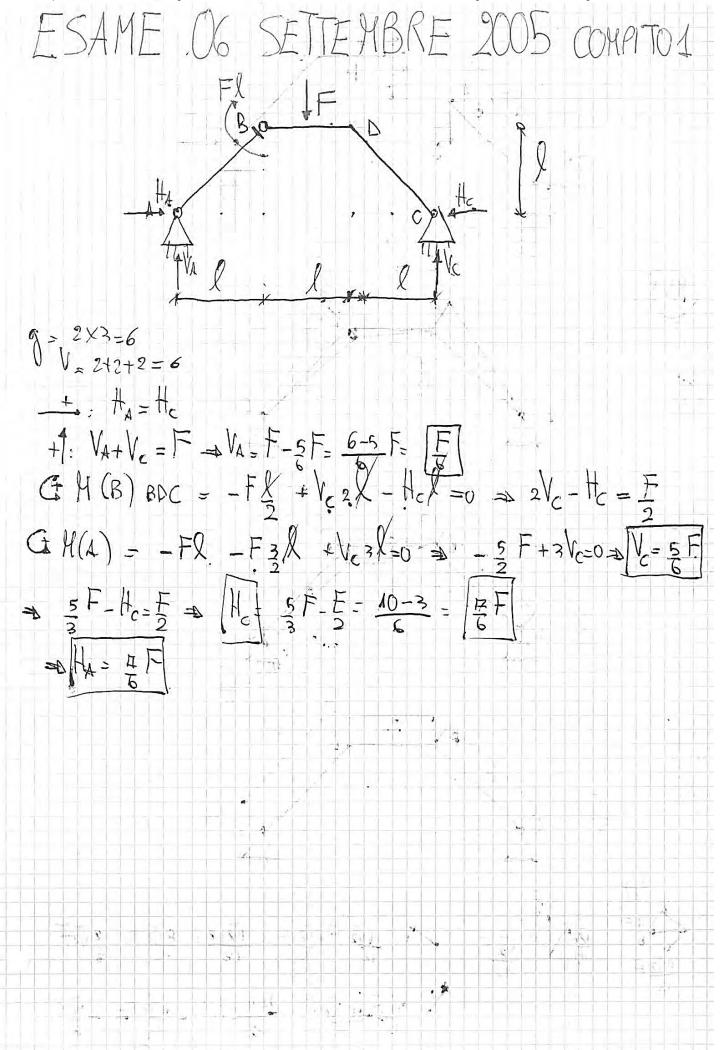
$$\begin{cases} H_{B} = -H_{C} \\ V_{B} + V_{C} = q \\ H_{B} + V_{B} = q \\ -H_{C} + 2V_{C} = q \frac{\ell}{2} \end{cases}$$

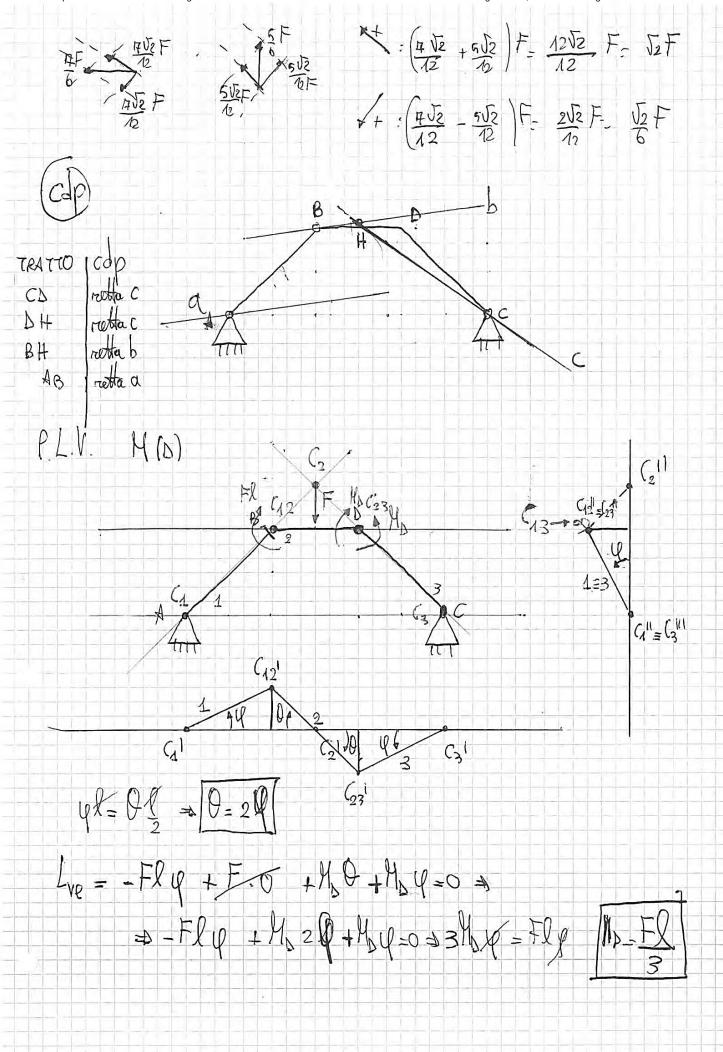
$$\begin{cases} H_{B} = -2V_{C} + 9\frac{1}{2} \\ V_{B} = 9l - V_{C} \\ H_{B} + 9l - V_{C} = 9l \\ H_{C} = 2V_{C} - 9\frac{1}{2} \end{cases}$$

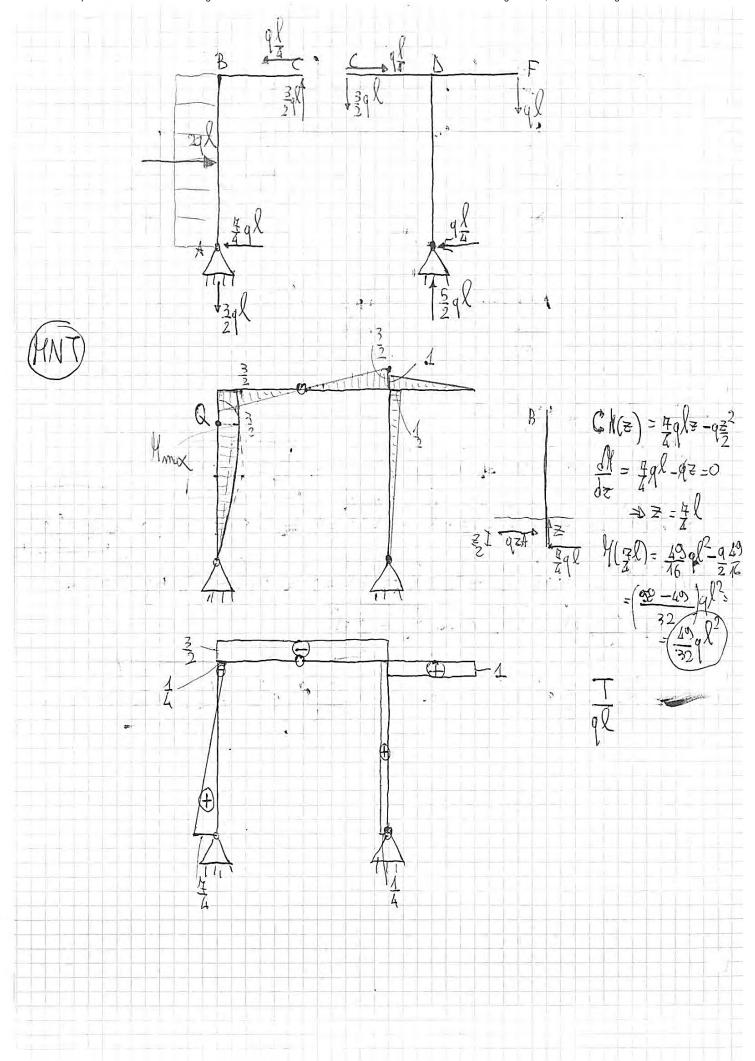
$$\begin{cases} H_{B} = -H_{C} \\ V_{B} + V_{C} = q \\ H_{B} + V_{B} = q \\ -H_{C} + 2V_{C} = q \\ \frac{1}{2} \end{cases}$$

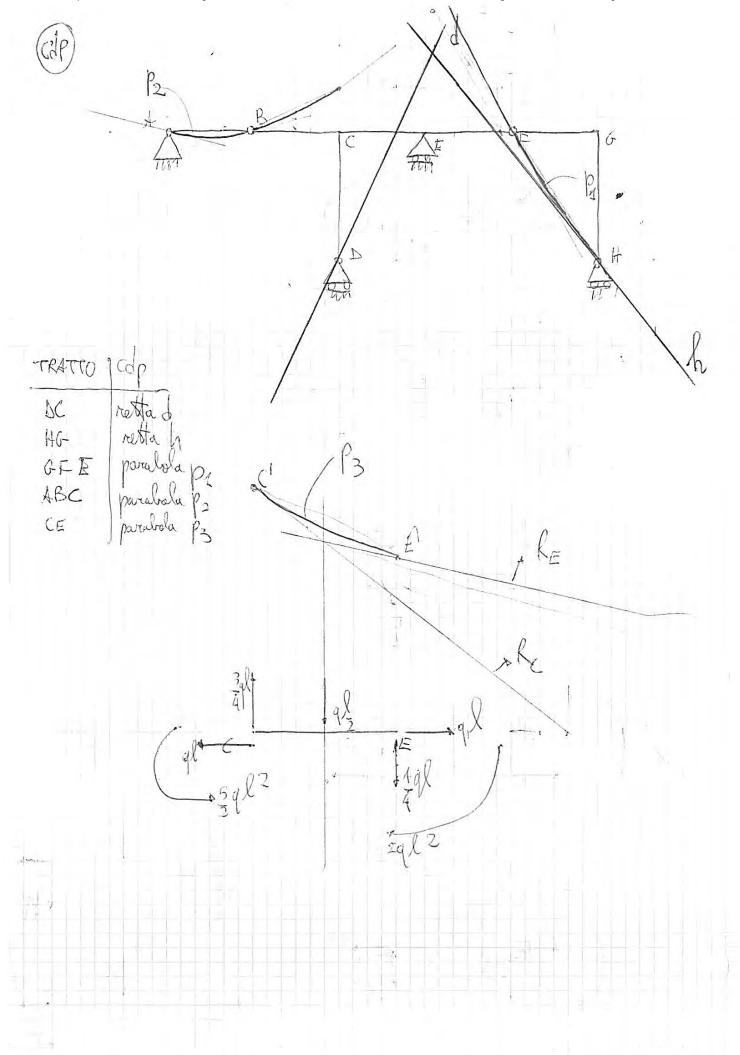
$$\begin{cases} H_{B} = -2V_{C} + q \\ \frac{1}{2} \\ W_{B} = q \\ -V_{C} \end{cases} \Rightarrow V_{C} + 2V_{C} = q \\ \frac{1}{2} \Rightarrow V_{C} = q \\$$







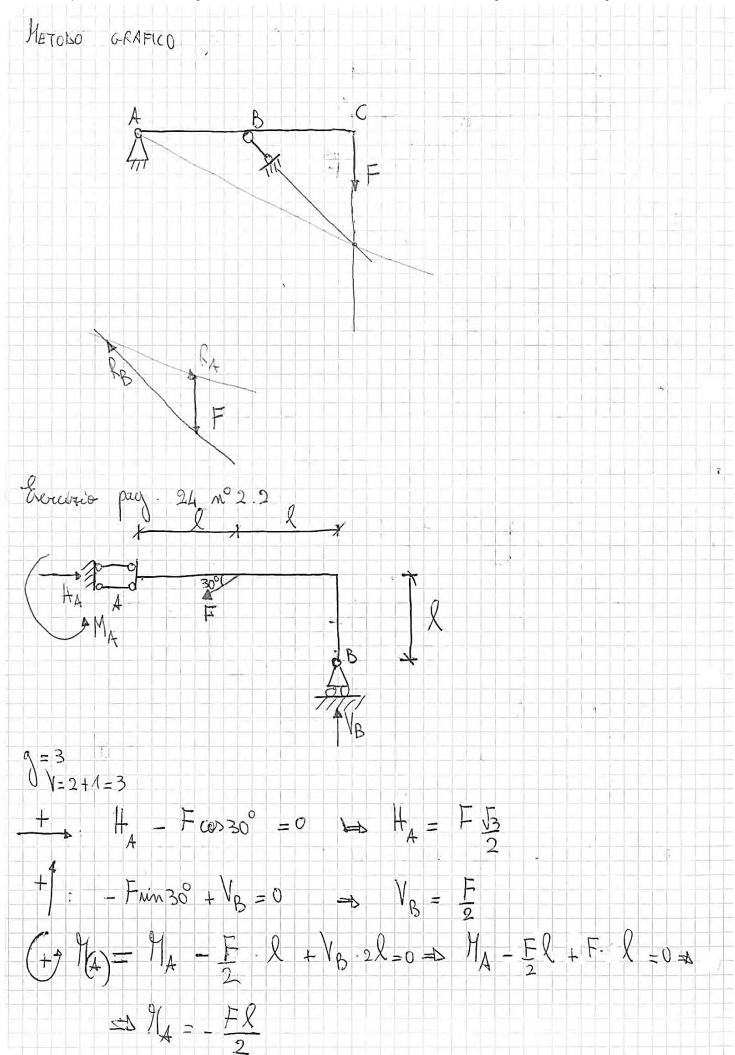


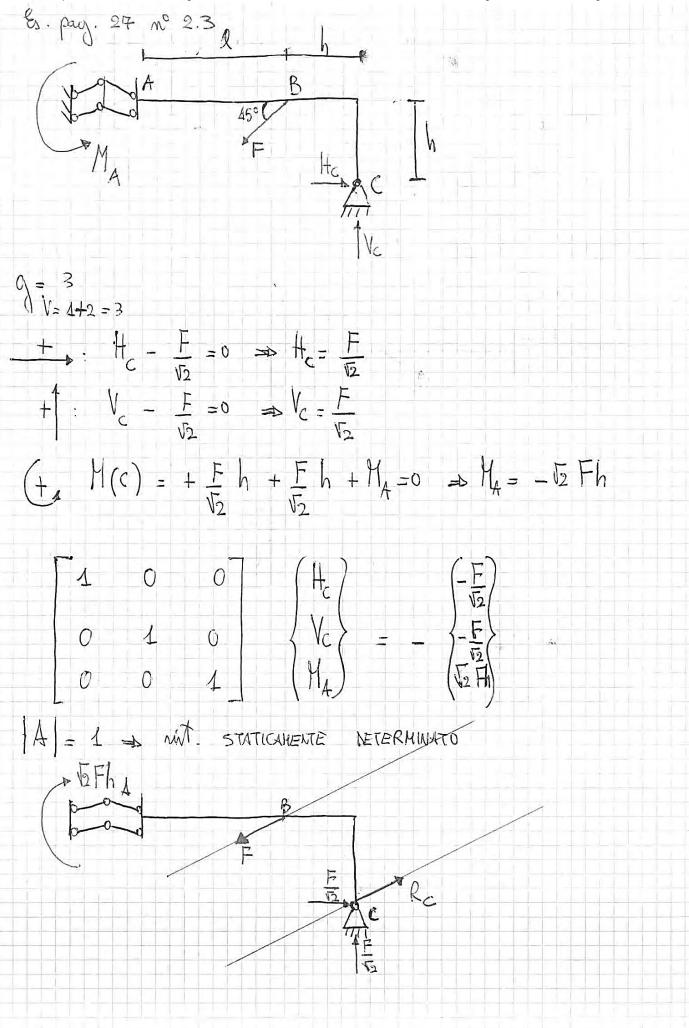


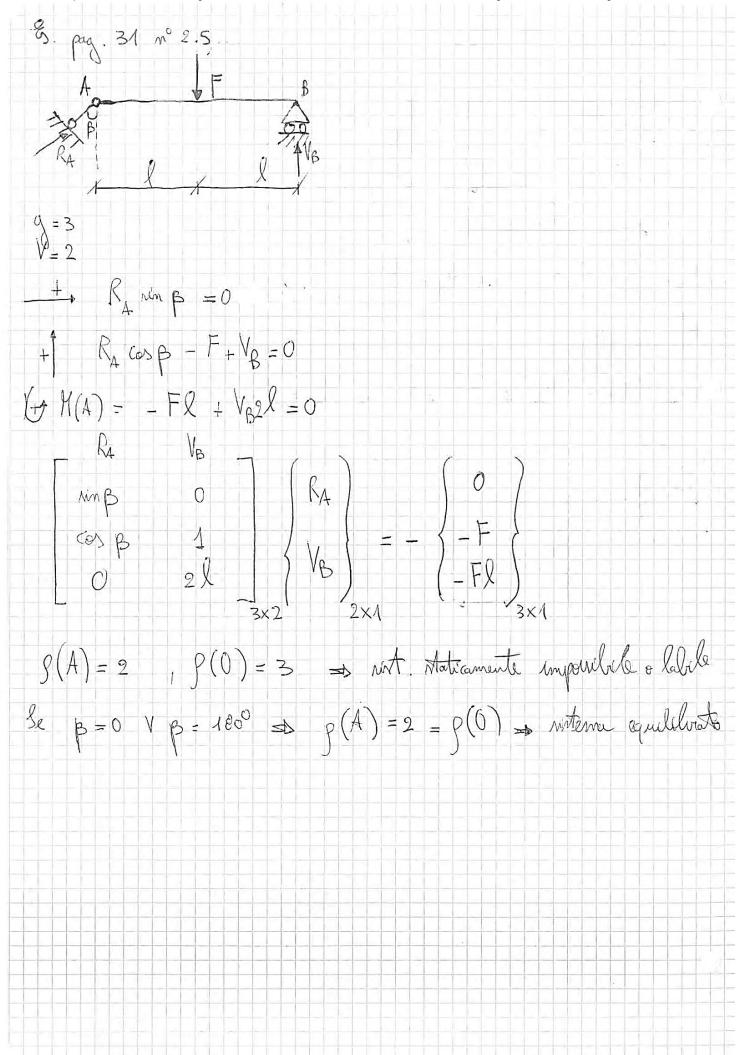
$$\begin{split} & I_{\chi_{G}}^{(A)} = I_{\chi_{A}}^{(A)} + A^{(A)}_{C}(y_{G} - y_{G_{A}})^{2} = \frac{50 \cdot 65^{3}}{12} + 3250 \left(29,24 - 32,5\right)^{2} = 4448040 \text{ 5 mm} \\ & I_{\chi_{G}}^{(2)} = I_{\chi_{G}}^{(2)} + A^{(2)}_{C}(y_{G} - y_{G_{A}})^{2} = \frac{30 \cdot 30^{3}}{42} + 900 \left(29,24 - 50\right)^{2} = 455374 \text{ 8 mm}^{A} \\ & I_{\chi_{G}}^{(3)} = I_{\chi_{3}}^{(3)} + A^{(3)}_{C}(y_{G} - y_{O_{3}})^{2} - 2 \cdot 5\chi \left(y_{G} - y_{O_{3}}\right) = \\ & = \frac{4}{6} \left(77 - 644876577\right) \left(85^{4} - 0^{A}\right) + 353, 4 \left(29,24 - 0\right)^{2} - 2 \cdot 2250 \left(29,24 - 0\right) = \\ & = 450449, 5 \text{ mm}^{A} \\ & I_{\chi_{G}}^{(3)} = I_{\chi_{4}}^{(3)} + A^{(3)}_{C}(\chi_{G} - \chi_{G_{3}})^{2} = \frac{50^{3}}{42} + 3258(0 - 0) = 677083, 3 \text{ mm}^{A} \\ & I_{\chi_{G}}^{(2)} = I_{\chi_{4}}^{(3)} + A^{(2)}_{C}(\chi_{G} - \chi_{G_{3}})^{2} = \frac{30^{3}}{42} + 900(0 - 0) = 677083, 3 \text{ mm}^{A} \\ & I_{\chi_{G}}^{(3)} = I_{\chi_{4}}^{(3)} + A^{(2)}_{C}(\chi_{G} - \chi_{G_{3}})^{2} - 2 \cdot 5\chi \left(\chi_{G} - \chi_{G_{3}}\right)^{2} = \frac{4}{6} \left(77 + 448876577\right) \left(45^{4} - 0^{A}\right) + 43880 + 44800$$

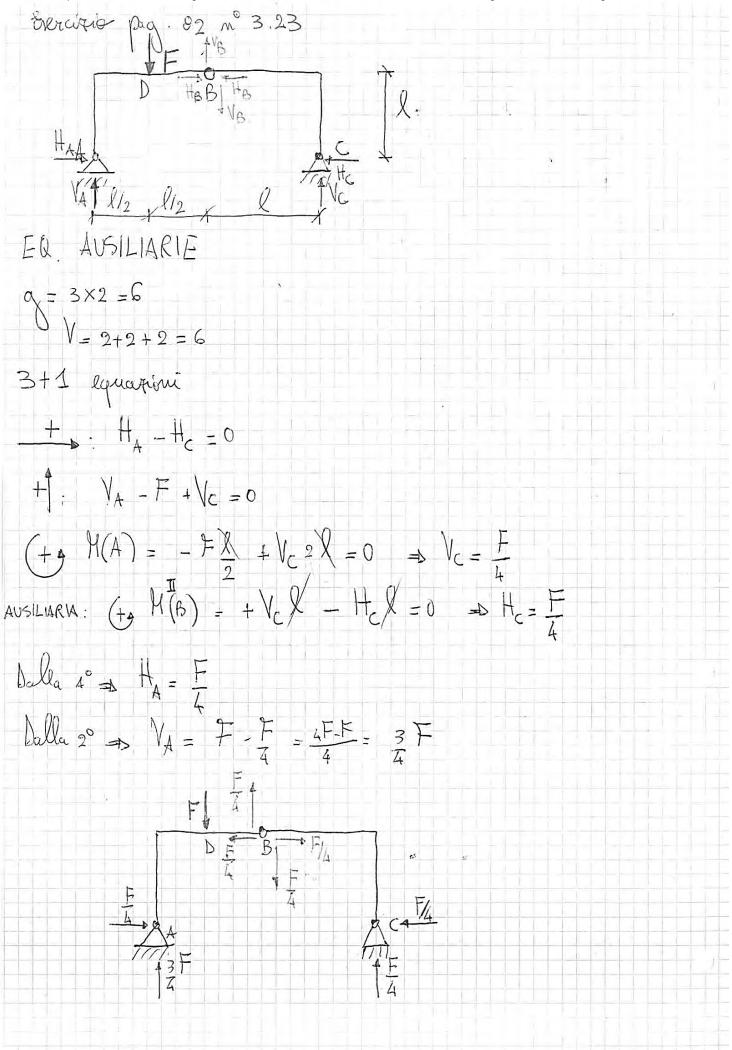
$$\begin{split} & \text{D. Proprieta determina dell'autore - Dignitizatione e distributione a cura del CENTRO APPUNTI - Corso Lugi Errandi, 55 - Totro / Pagina 201 d 424} \\ & I_{X_G} = \frac{A}{1 + A} I_{X_G}^{(A)}, \\ & I_{X_G} = I_{X_A} + A^{(A)} \left(I_{I_G} - I_{G_A}\right)^2 = I_{CO} \left(2I_{I_1}64 - 0\right)^2 = 24 \cdot 226 \cdot \sigma_1 8 \cdot \text{cur}^4, \\ & I_{X_G} = I_{X_A} + A^{(A)} \left(I_{I_G} - I_{G_A}\right)^2 = \frac{5 \cdot 40^3}{42} + 200 \left(2I_{I_1}64 - 20\right)^2 = \\ & = 26687 p \cdot 2 \cdot \text{cur}^4, \quad I_{X_G} = I_{X_G} + A^{(A)} \left(I_{I_G} - I_{G_A}\right)^2 - 2 \cdot \sum_{X_A} \left(I_{I_G} -$$

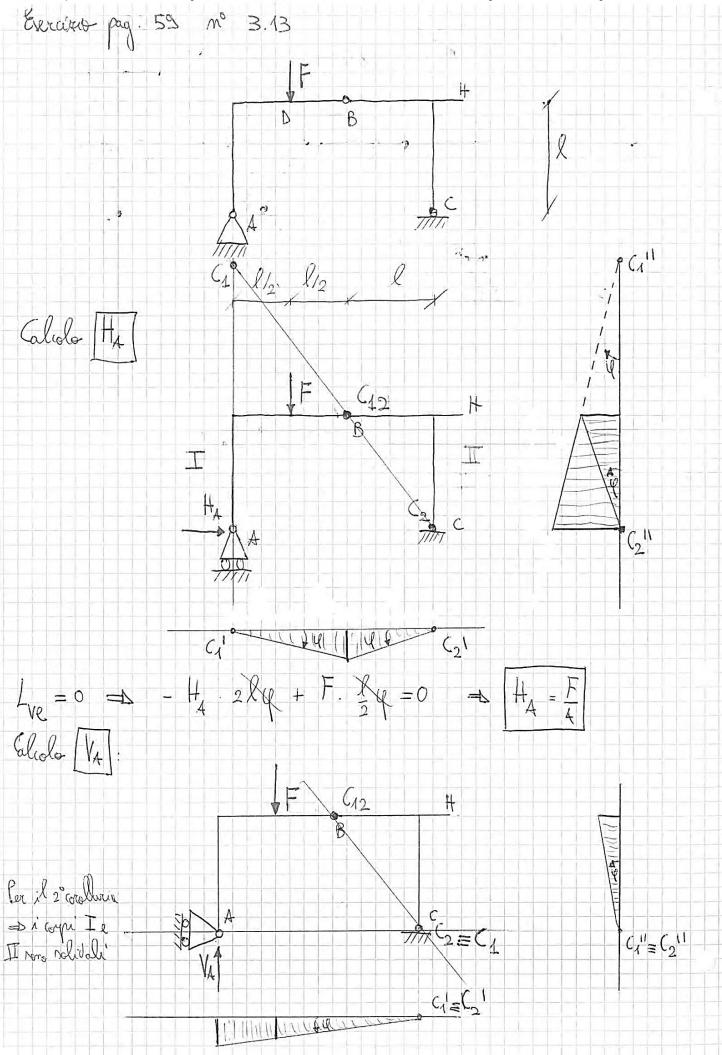
© Proprietà riservata dell'autore - Digitalizzazione e distribuzione a cura del CENTRO APPUNTI - Corso Luigi Einaudi, 55 - Torino / Pagin O = 1													agina	a 203	3 di 4	124																		
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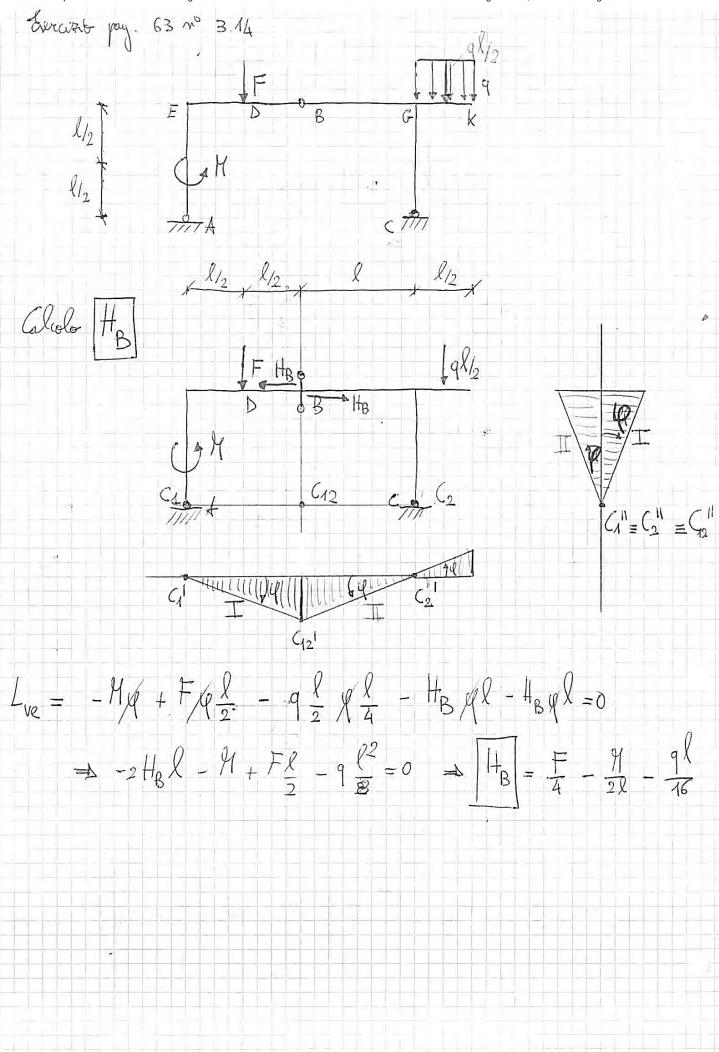


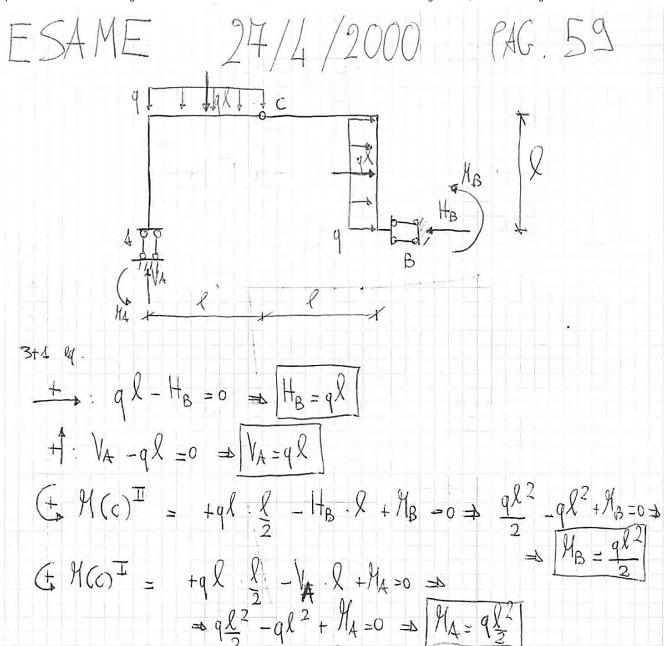


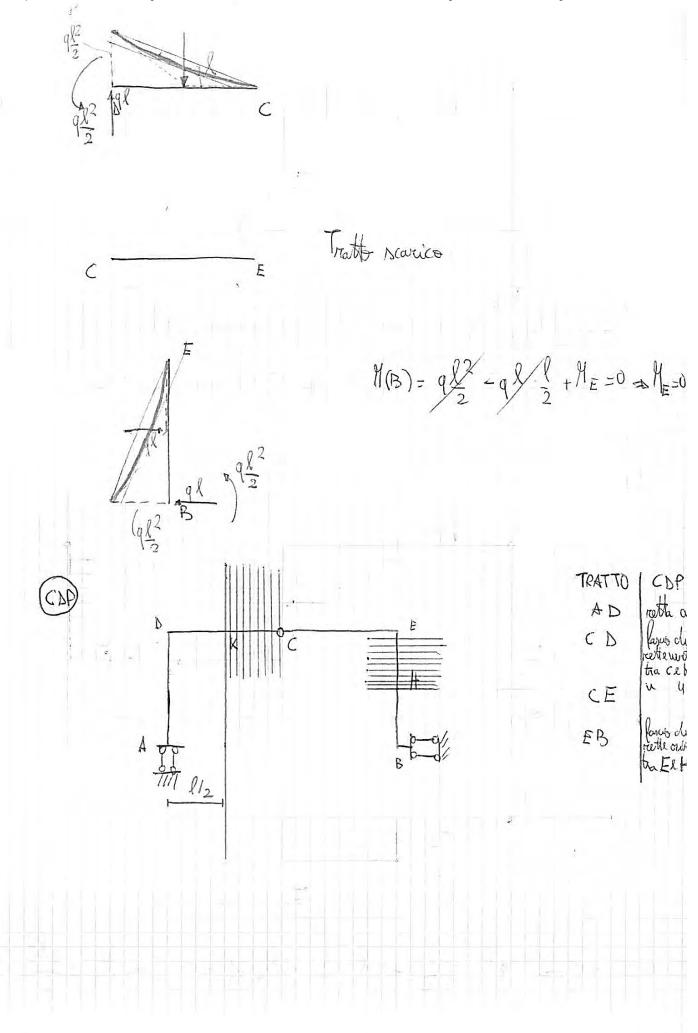


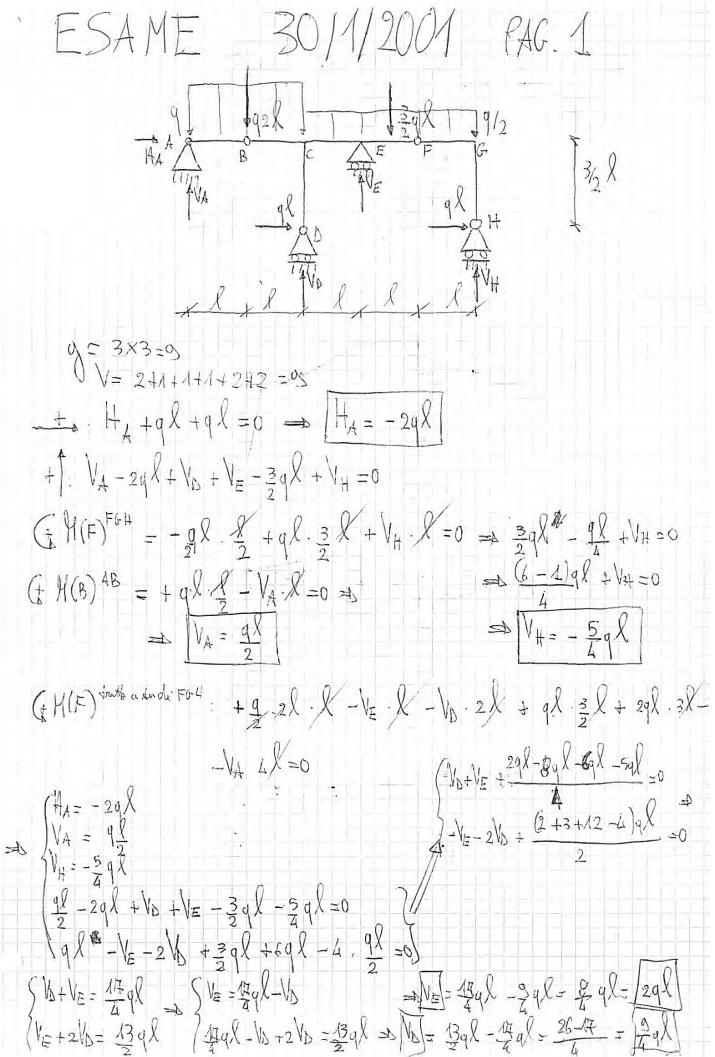












$$T_{X_{0}Y_{0}} = \sum_{i=A}^{3} T_{X_{0}Y_{0}}(i)$$

$$T_{X_{0}Y_{0}} = T_{AY_{A}}(i) + A^{(A)}(x_{0} - x_{A})(y_{0} - y_{A}) = 200 (46_{1}33 - 22_{1}5)(25_{1}99 - 10) = -88752 mm^{4}$$

$$T_{X_{0}Y_{0}} = T_{X_{2}Y_{2}}(i) + A^{(2)}(x_{0} - x_{2})(y_{0} - y_{2}) = -88752 mm^{4}$$

$$T_{X_{0}Y_{0}} = T_{X_{2}Y_{2}}(i) + A^{(2)}(x_{0} - x_{2})(y_{0} - y_{2}) = -88752 mm^{4}$$

$$T_{X_{0}Y_{0}}(i) = T_{X_{2}Y_{2}}(i) + A^{(2)}(x_{0} - x_{2})(y_{0} - y_{2}) = -100 (16_{1}33 - x_{1})(x_{0} - x_{2})(y_{0} - y_{2}) = -1258933, 4 mm^{4}$$

$$T_{X_{0}Y_{0}}(i) = T_{X_{2}Y_{2}}(i) + A^{(2)}(x_{0} - x_{2})(y_{0} - y_{2}) = -1258933, 4 mm^{4}$$

$$T_{X_{0}Y_{0}}(i) = T_{X_{2}Y_{2}}(i) + A^{(2)}(x_{0} - x_{2})(y_{0} - y_{2}) = -1258933, 4 mm^{4}$$

$$T_{X_{0}Y_{0}}(i) = T_{X_{2}Y_{2}}(i) + 200 (16_{1}33 - 21_{1}64) = -1258933, 4 mm^{4}$$

$$T_{X_{0}Y_{0}}(i) = T_{X_{0}Y_{0}}(i) = T_{X_{0}Y_{0}}(i) = T_{X_{0}Y_{0}}(i) = -1258933, 4 mm^{4}$$

$$T_{X_{0}Y_{0}}(i) = T_{X_{0}Y_{0}}(i) = T_{X_{0}Y$$

$$\begin{split} & I_{\chi_{0}}^{(A)} = I_{\chi_{A}}^{(A)} + A^{(A)} (y_{0} - y_{0A})^{2} = 480 \left(8_{1}46 - 0 \right)^{2} = 34273, 2 \text{ om}^{4} \\ & I_{\chi_{0}}^{(2)} = I_{\chi_{2}}^{(2)} + A^{(2)} (y_{0} - y_{0A})^{2} = \frac{6 \cdot 80^{3}}{42} \text{ nim}^{2} 60^{9} + 480 \left(8_{1}46 - 8_{1}64 \right)^{2} + 492098, 9^{\text{tim}^{4}} \\ & I_{\chi_{0}}^{(2)} = I_{\chi_{3}}^{(3)} + A^{(3)} (y_{0} - y_{0A})^{2} = \frac{6 \cdot 80^{3}}{42} \text{ nim}^{2} 200^{9} + 300 \left(8_{1}45 - 24_{1}65 \right)^{2} = 93.444, 25 \text{ om}^{4} \\ & I_{V_{0}}^{(2)} = I_{\chi_{1}}^{(2)} + A^{(1)} (X_{0} - X_{0A})^{2} = \frac{80^{3}}{42} + 480 \left(4.07 - 45 \right)^{2} = 34,9000 \text{ om}^{4} \\ & I_{V_{0}}^{(3)} = I_{\chi_{1}}^{(2)} + A^{(2)} (X_{0} - X_{0A})^{2} = \frac{6 \cdot 80^{3}}{42} \text{ cos}^{2} 60^{9} + 480 \left(4.07 + 42 \right)^{2} = 2.444000 \text{ com}^{4} \\ & I_{V_{0}}^{(3)} = I_{\chi_{1}}^{(3)} + A^{(3)} (X_{0} - X_{0A})^{2} \left(4_{0} - 4_{0A} \right) = 480 \left(4.07 - 45 \right) \left(8_{1}46 \right) = -56500 \text{ com}^{4} \\ & I_{V_{0}}^{(3)} = I_{\chi_{1}}^{(2)} + A^{(2)} (X_{0} - X_{0A}) \left(4_{0} - 4_{0A} \right) = 480 \left(4.07 - 45 \right) \left(8_{1}46 \right) = -56500 \text{ com}^{4} \\ & I_{V_{0}}^{(3)} = I_{\chi_{1}}^{(2)} + A^{(3)} (X_{0} - X_{0A}) \left(4_{0} - 4_{0A} \right) = \frac{6 \cdot 80^{3}}{42} \text{ constant}^{2} \text{ constant}^{2} \left(8_{1}6 - 8_{1}67 \right) \left(4.07 + 42_{1}5 \right) \left(4.07$$

$$S_{ij}(3) = A^{(3)} X_{i3} = 200 \cdot 169 = 4334 \text{ m/m}^{3}$$

$$X_{i5} = \frac{54}{4} = \frac{30209}{1650} = 16_{1}33 \text{ m/m}$$

$$I_{i6} = \frac{5}{4} = \frac{4004}{1850} = 25_{1}98 \text{ m/m}$$

$$I_{i7}(4) = I_{i8}(4) + A^{(1)} (i_{16} - i_{161})^{\frac{1}{2}} = \frac{45 \cdot 20^{3}}{12} + 200 (25_{1}93 - 10)^{\frac{1}{2}}.$$

$$= 260112_{1}1 \text{ m/m}^{\frac{1}{4}}$$

$$I_{i7}(3) = I_{i8}(3) + A^{(2)} (i_{16} - i_{162})^{\frac{1}{2}} = \frac{45 \cdot 50^{3}}{12} + 450 (25_{1}93 - 10)^{\frac{1}{2}}.$$

$$= 424 \cdot 295_{1}1 \text{ m/m}^{\frac{1}{4}}$$

$$I_{i8}(3) = I_{i8}(3) + A^{(2)} (i_{16} - i_{162})^{\frac{1}{2}} = \frac{20 \cdot 20^{3}}{36} + 200 (25_{1}93 - 26_{1}64)^{\frac{1}{2}}.$$

$$= 4536_{1}8 \text{ m/m}^{\frac{1}{4}}$$

$$I_{i9}(3) = I_{i1}(4) + A^{(1)} (x_{16} - x_{162})^{\frac{1}{2}} = \frac{463}{36} \cdot 20 + 450 (16_{1}33 - 22_{1}5)^{\frac{1}{2}}.$$

$$= 496 \cdot 13^{1} \cdot 10^{1} \text{ m/m}^{\frac{1}{4}}$$

$$I_{i9}(3) = I_{i1}(4) + A^{(2)} (x_{16} - x_{162})^{\frac{1}{2}} = \frac{453}{36} \cdot 50 + 450 (16_{1}33 - 21_{1}5)^{\frac{1}{2}}.$$

$$= 4253 \cdot 8_{1} \cdot 2 \text{ m/m}^{\frac{1}{4}}$$

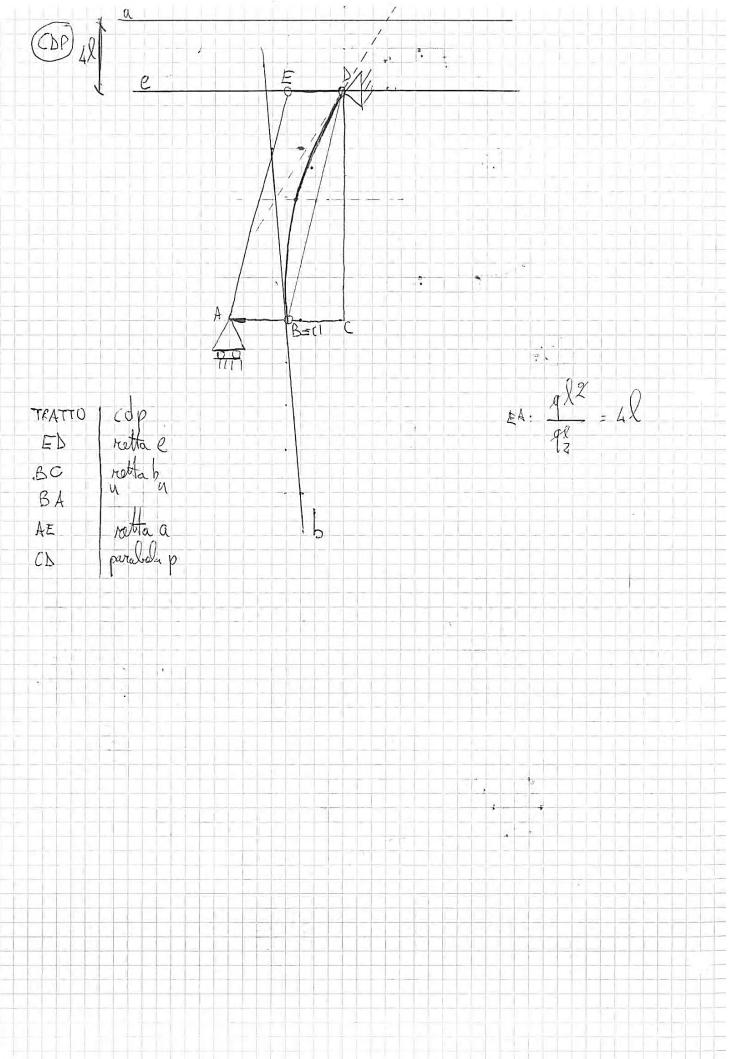
$$I_{i9}(3) = I_{i1}(3) + A^{(3)} (x_{16} - x_{163})^{\frac{1}{2}} = \frac{20 \cdot 20^{3}}{36} + 200 (46_{1}33 - x_{16}7)^{\frac{1}{2}}.$$

$$= 4253 \cdot 8_{1} \cdot 2 \text{ m/m}^{\frac{1}{4}}$$

$$I_{i9}(3) = I_{i1}(3) + A^{(3)} (x_{16} - x_{163})^{\frac{1}{2}} = \frac{20 \cdot 20^{3}}{36} + 200 (46_{1}33 - x_{16}7)^{\frac{1}{2}}.$$

$$= 400 \cdot 147_{1} \cdot 6 \text{ m/m}^{\frac{1}{4}}$$

$$I_{i9}(3) = I_{i1}(3) + A^{(3)} (x_{16} - x_{163})^{\frac{1}{2}} = \frac{20 \cdot 20^{3}}{36} + 200 (46_{1}33 - x_{16}7)^{\frac{1}{2}}.$$

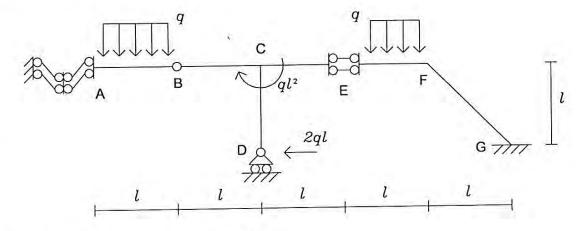


21 Luglio 2009

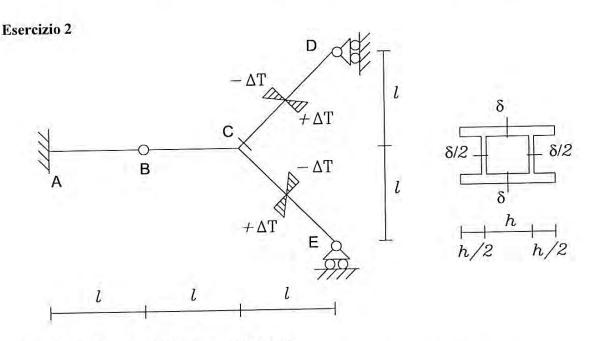
COMPITO I

COGNOME:	CORSO DI LAUREA :
NOME:	MATRICOLA:

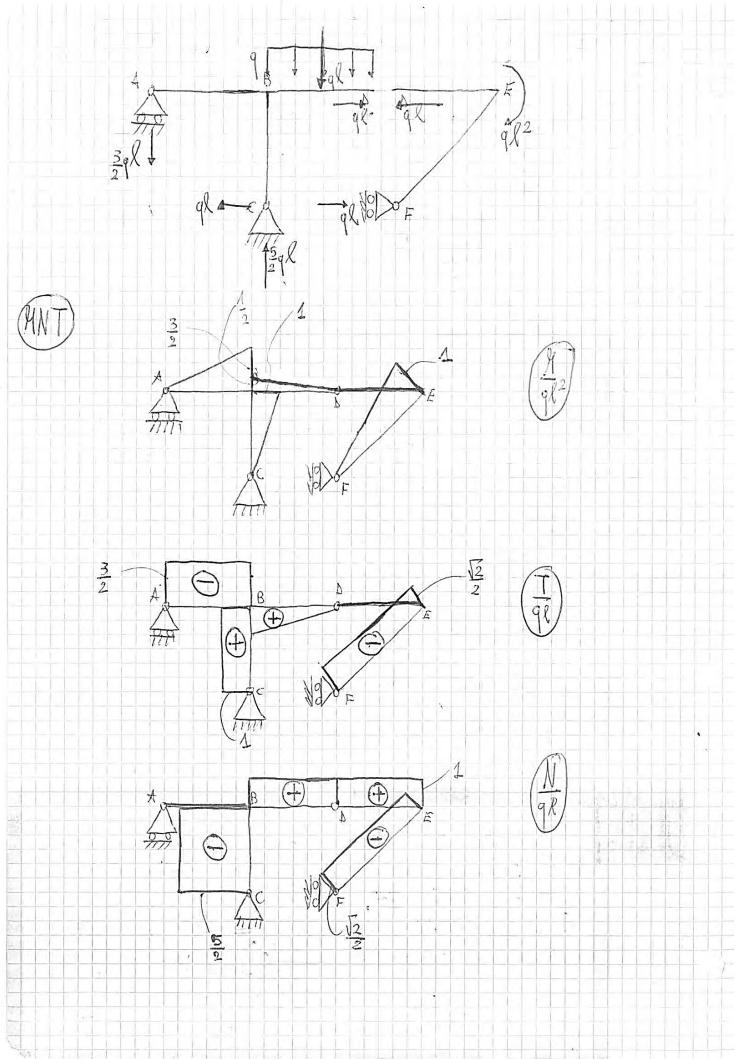
Esercizio 1

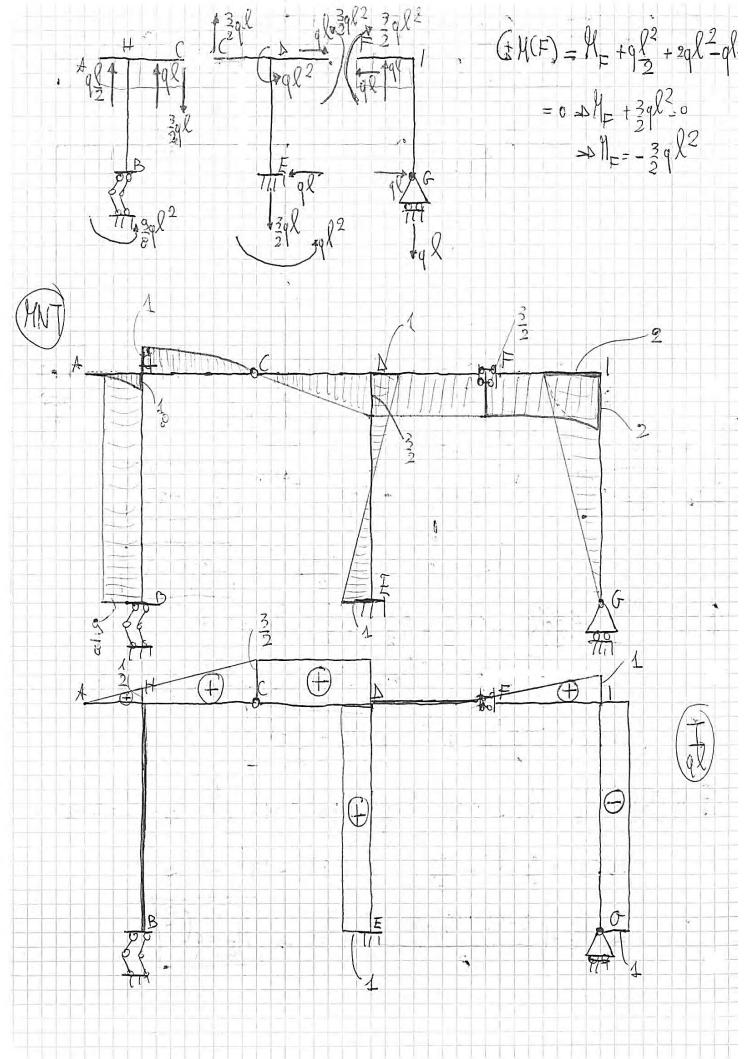


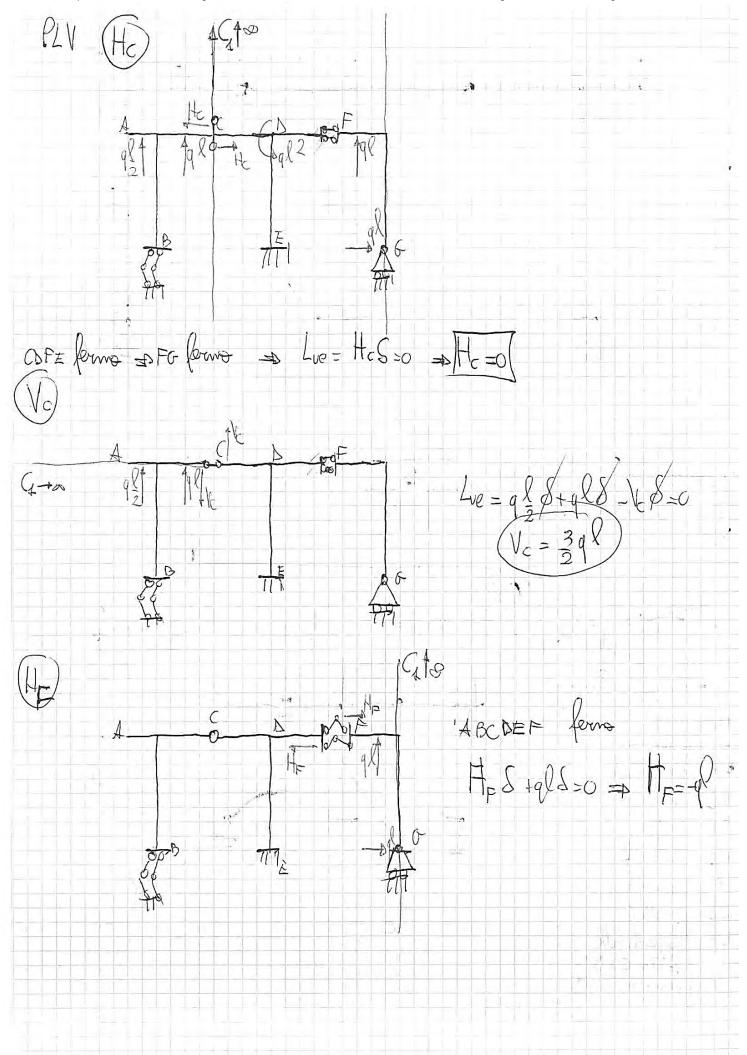
- 1. Tracciare in scala i diagrammi M, N, T.
- Tracciare la curva delle pressioni.
- 3. Verificare le reazioni interne nel doppio pendolo E con il Principio dei Lavori Virtuali.

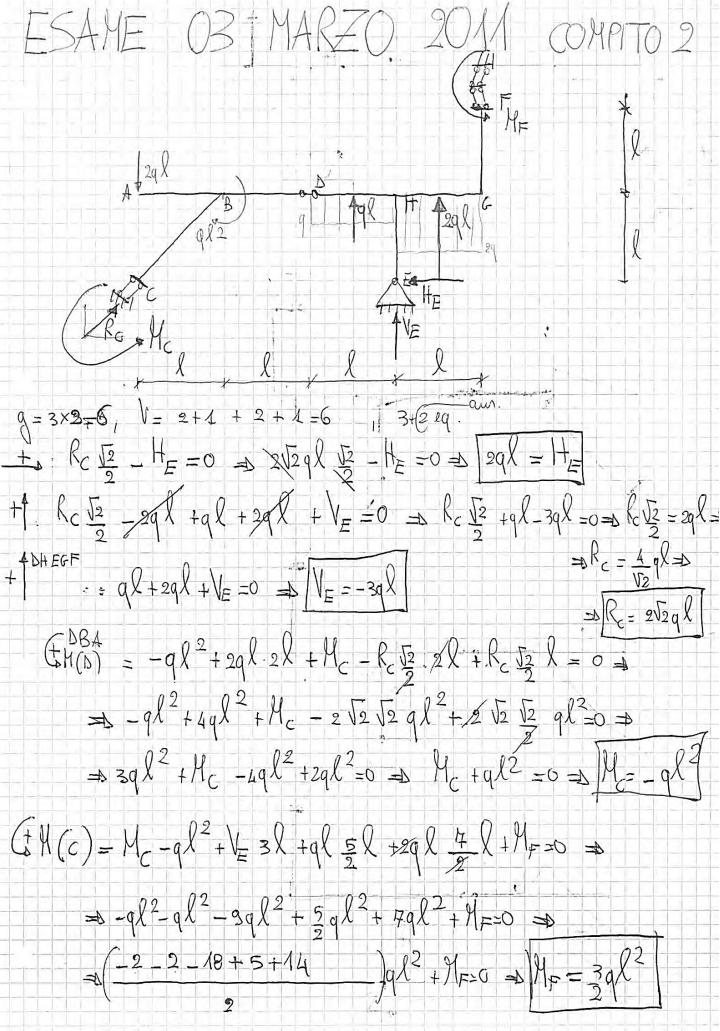


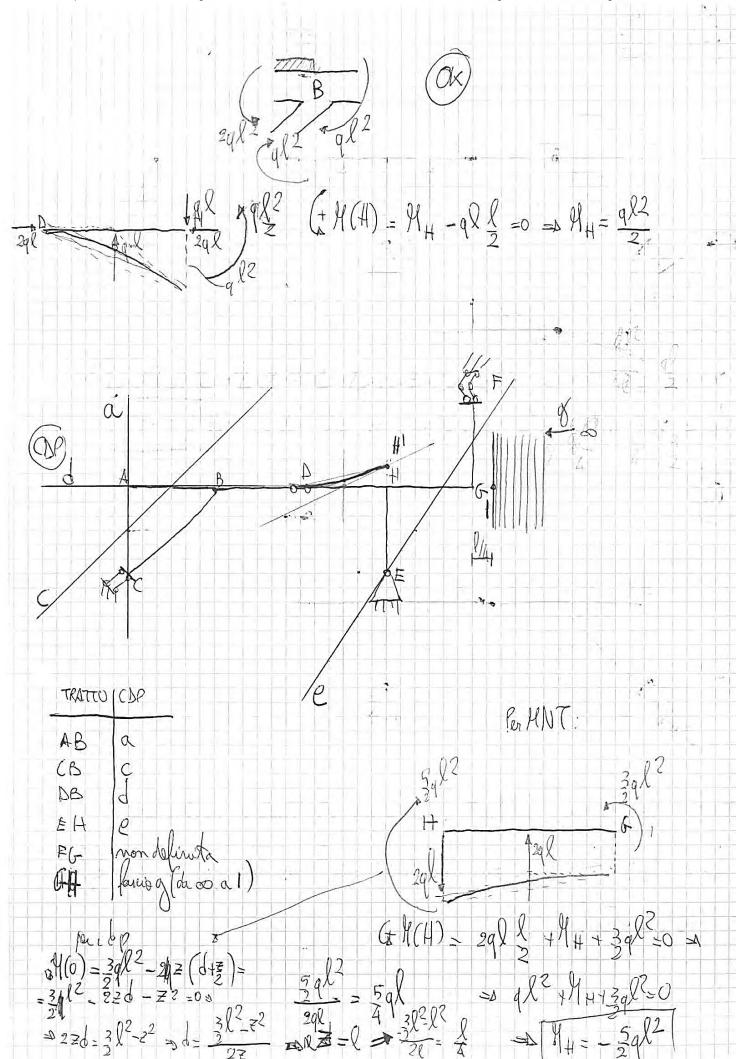
- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni e la deformata termo-elastica qualitativa.
- Verificare la sezione C con il criterio di Tresca, sapendo che le caratteristiche geometriche della sezione sono quelle indicate in figura e che h = 20δ.
- 4. Calcolare lo spostamento verticale della cerniera B con il Principio dei Lavori Virtuali.

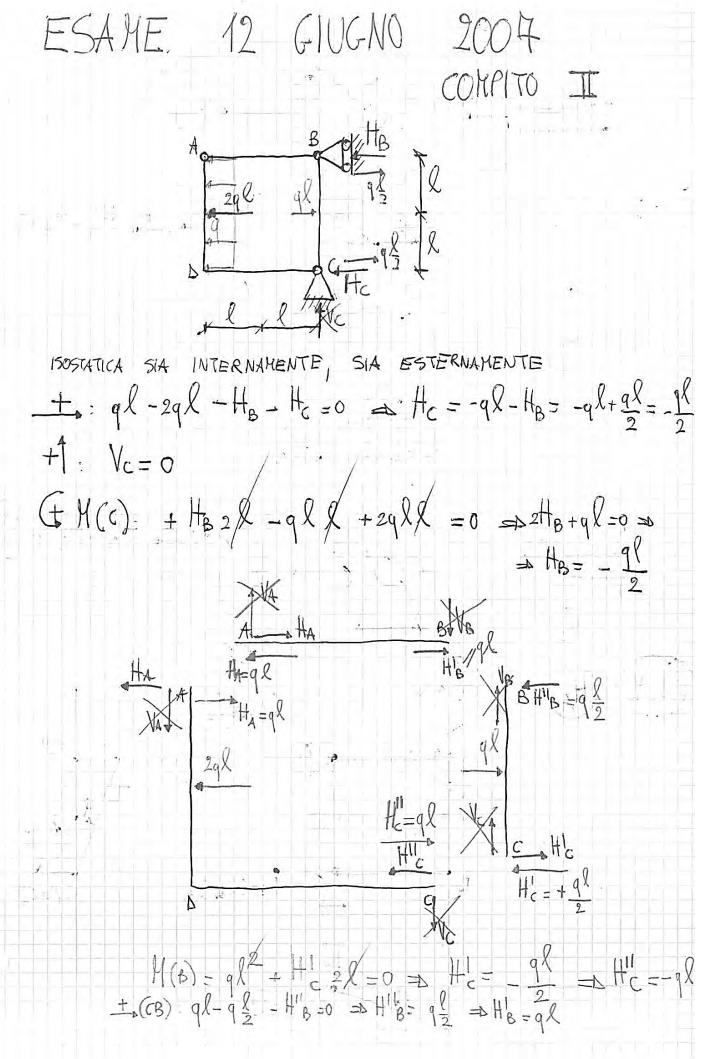


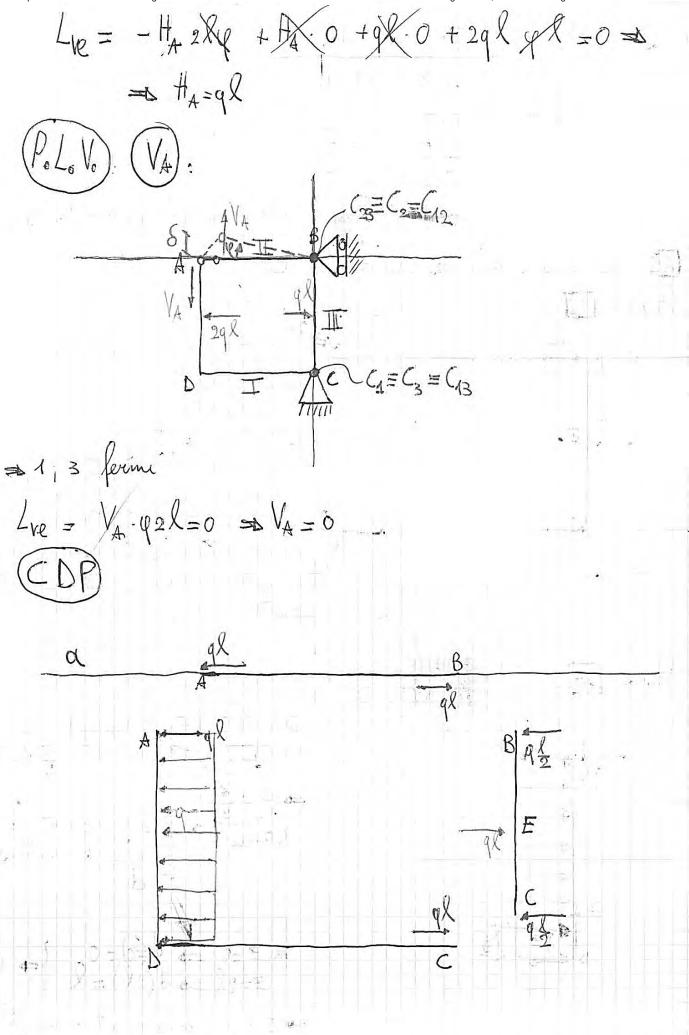




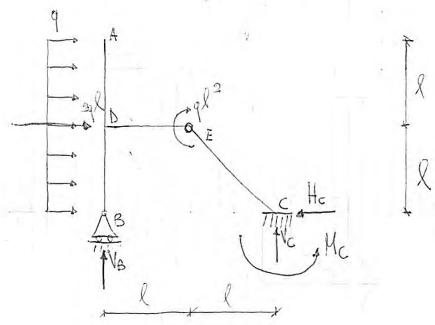


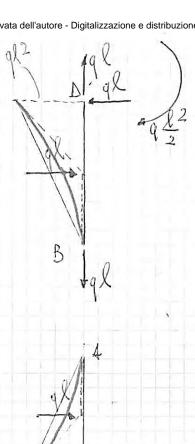




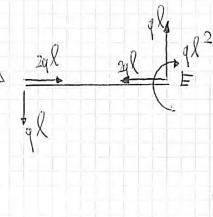


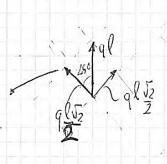
ESAME 03 LUGLIO 2007 COMPITO I

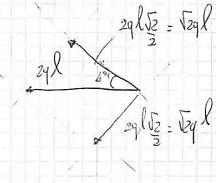




$$GH(S) = M_S - 9l_{\frac{1}{2}} = M_S = 9l_{\frac{1}{2}}^2$$

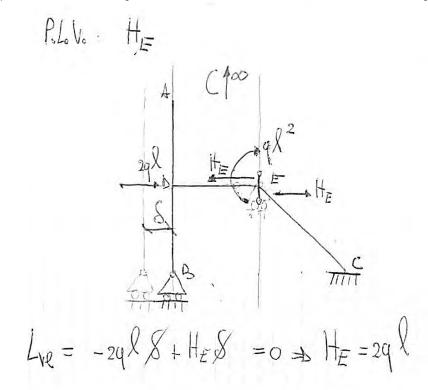


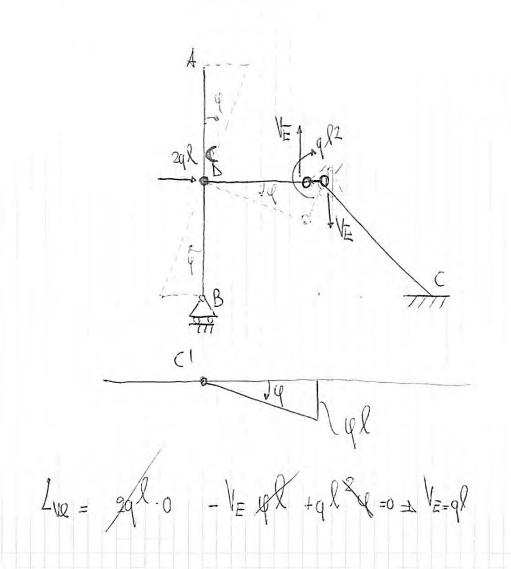


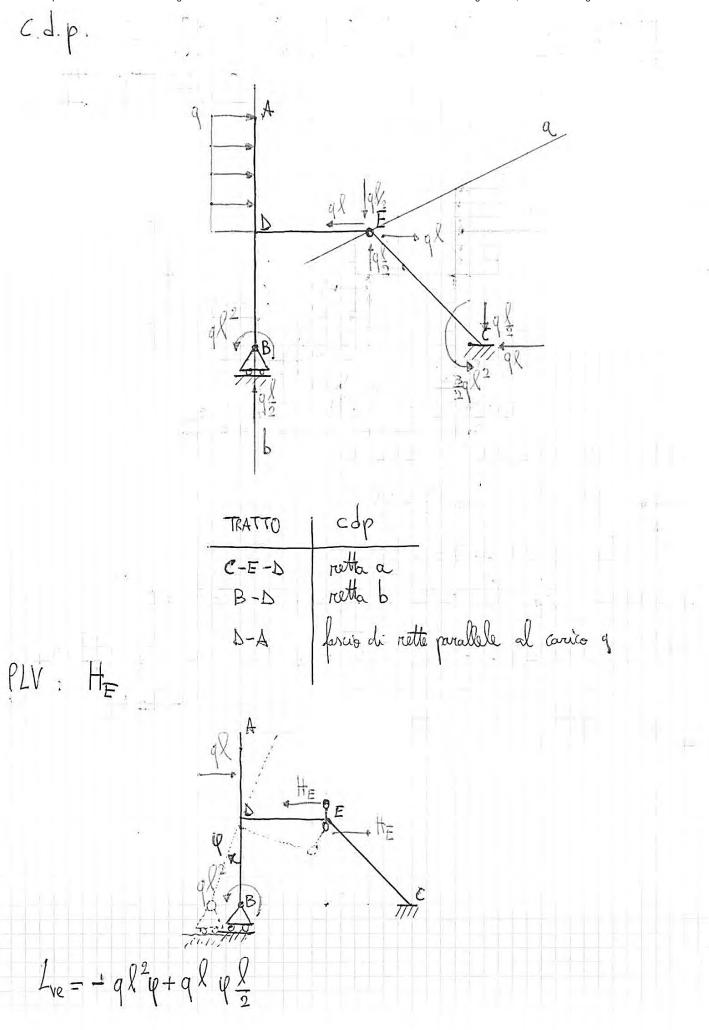


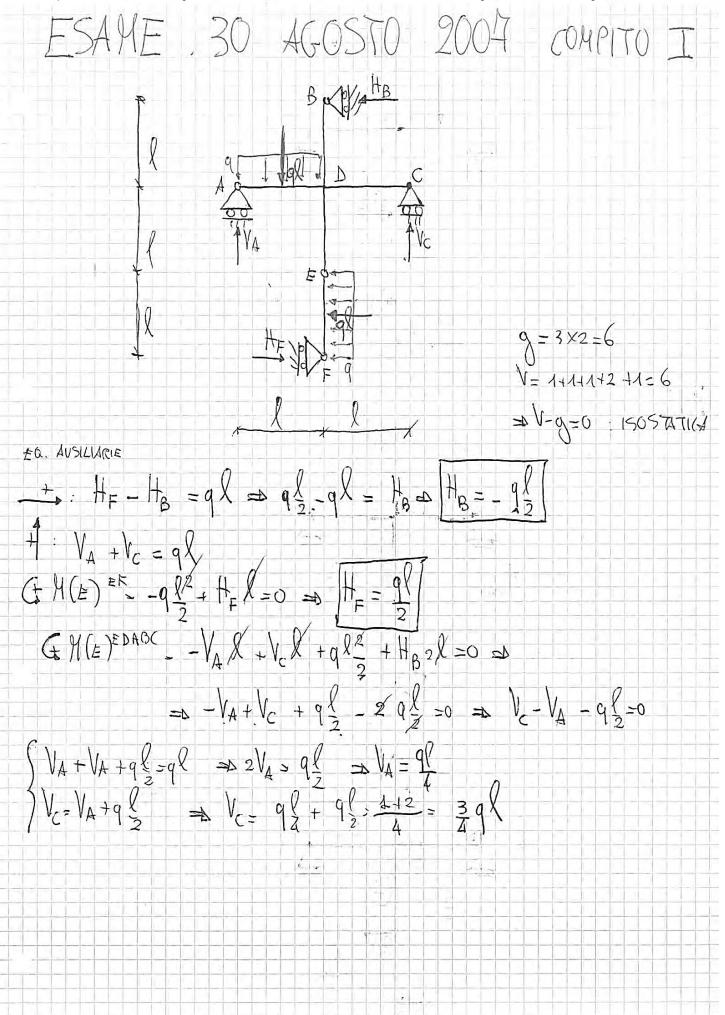
$$T = q \sqrt{\frac{1}{2}} - \sqrt{2}q = q \sqrt{\frac{12 - 2\sqrt{2}}{2}} - \sqrt{\frac{2}{2}q}$$

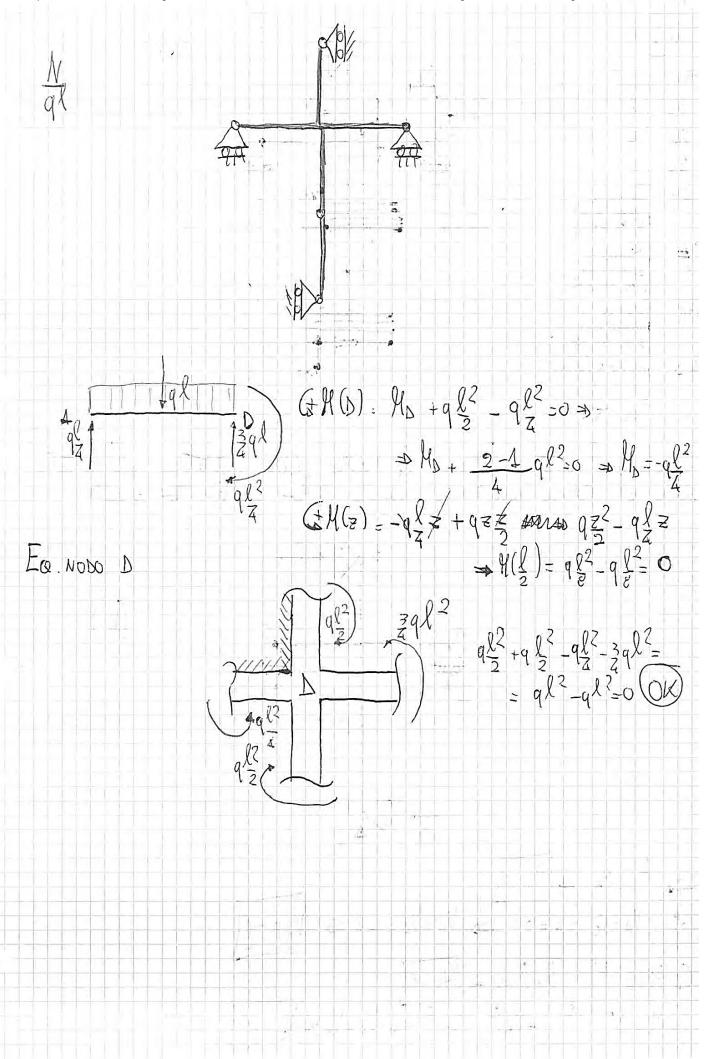
$$N = q \sqrt{\frac{1}{2}} + \sqrt{2}q - q \sqrt{\frac{\sqrt{2} + 2\sqrt{2}}{2}} - \sqrt{\frac{2}{2}q}$$

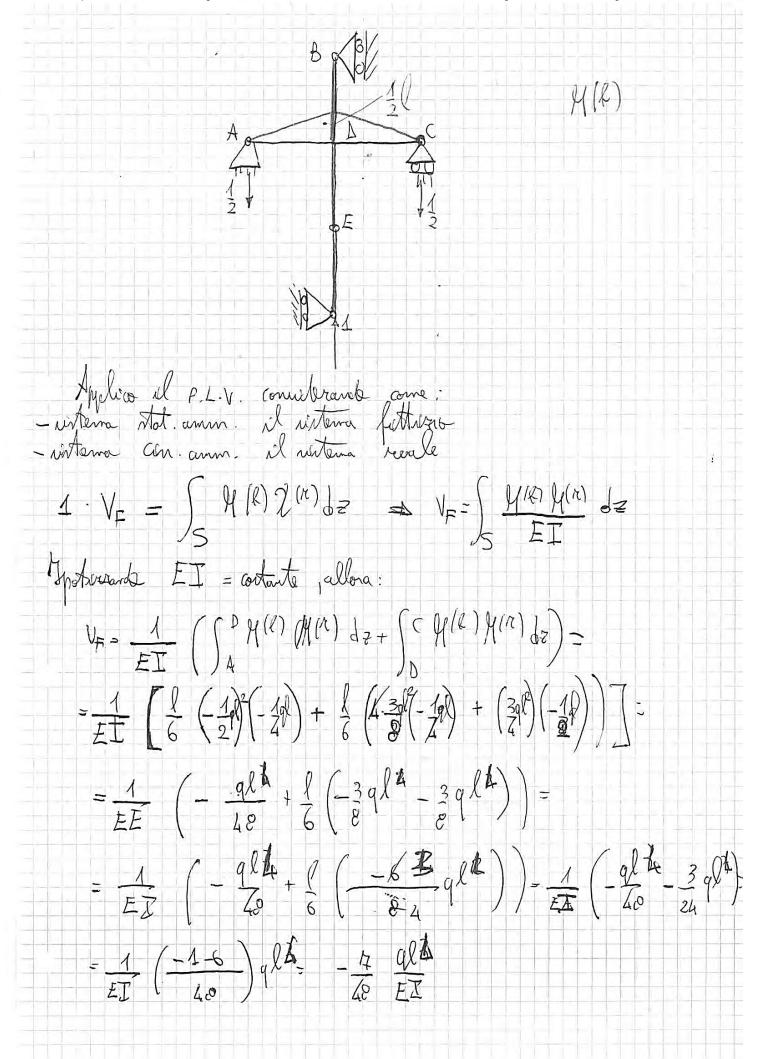


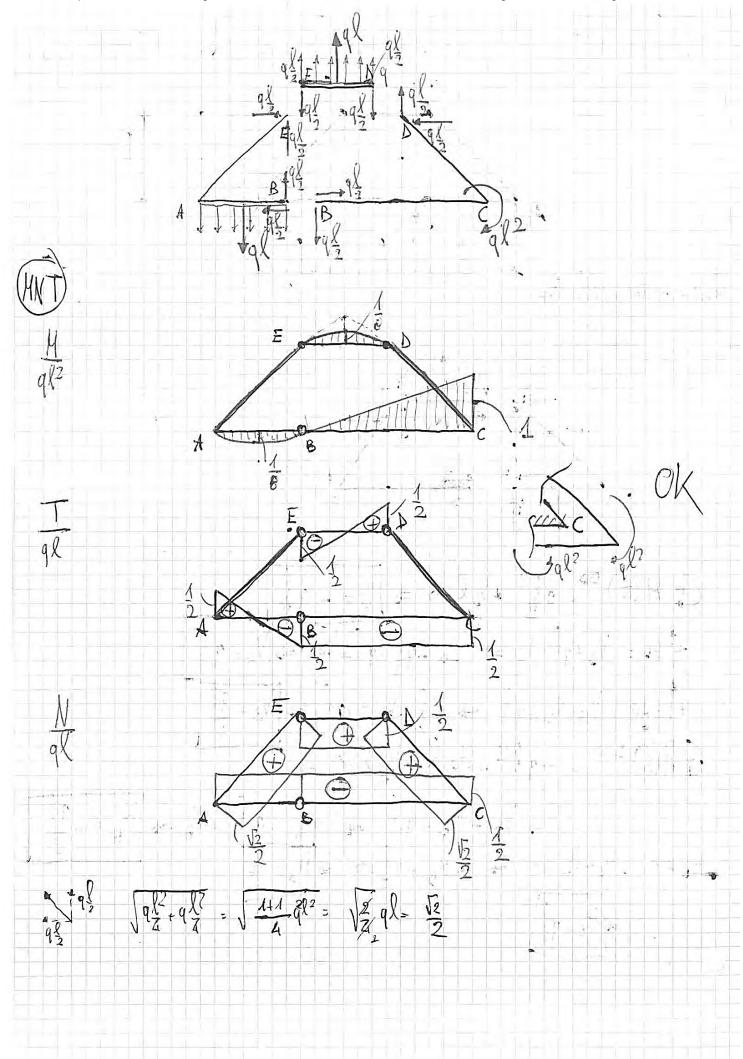


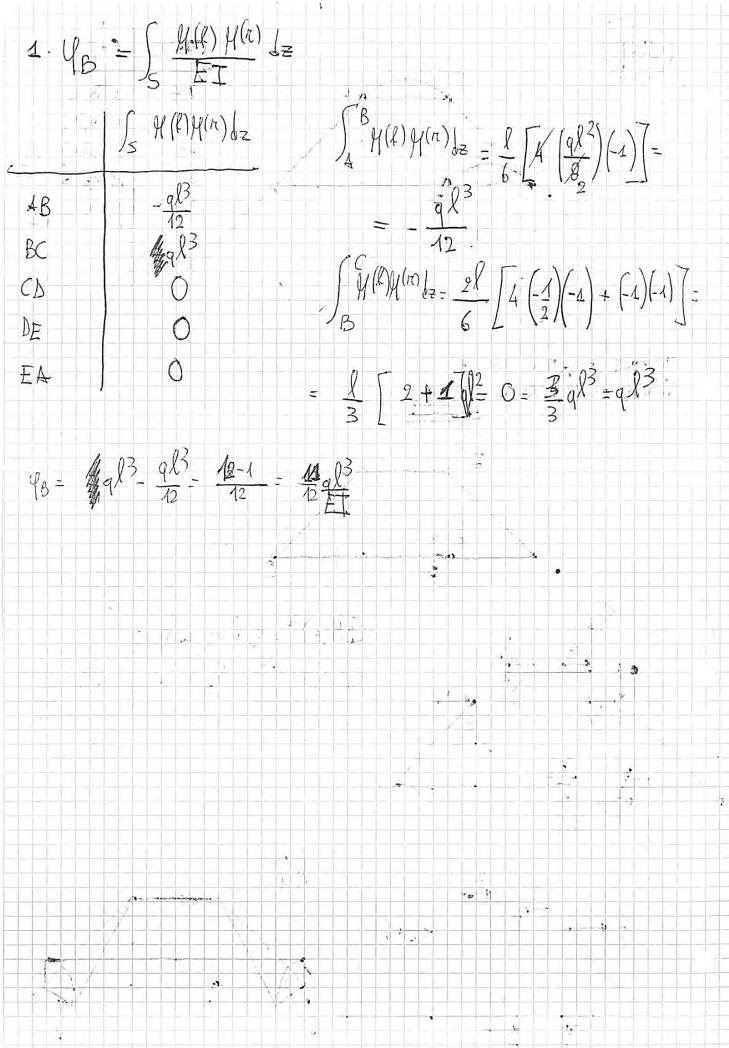


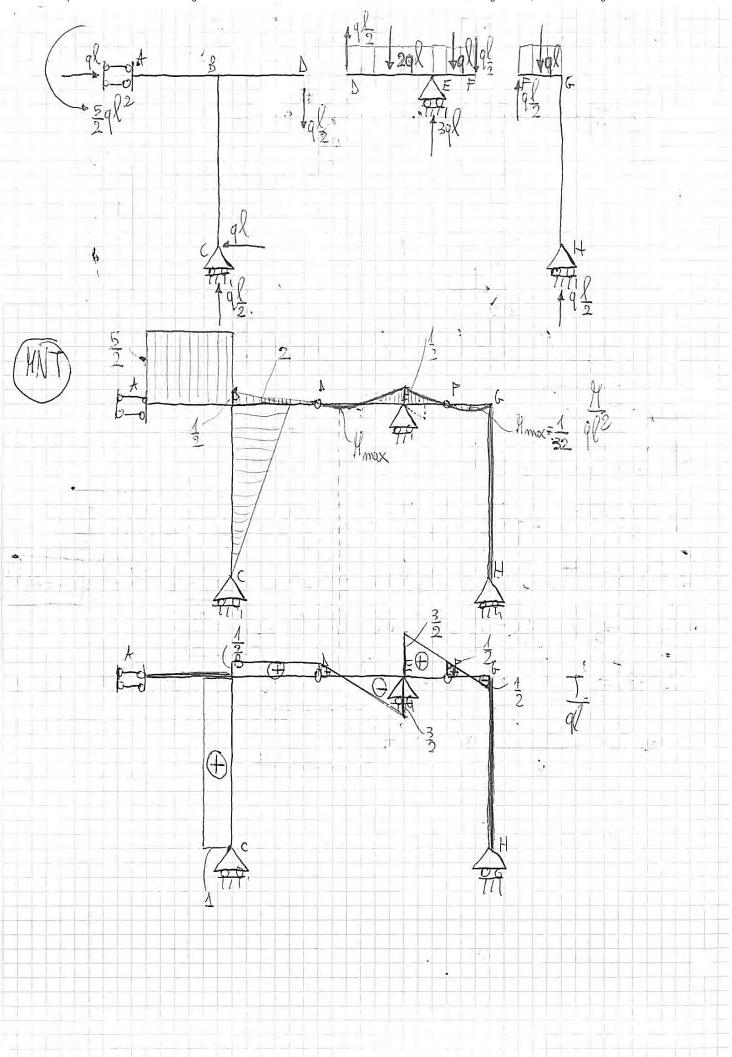


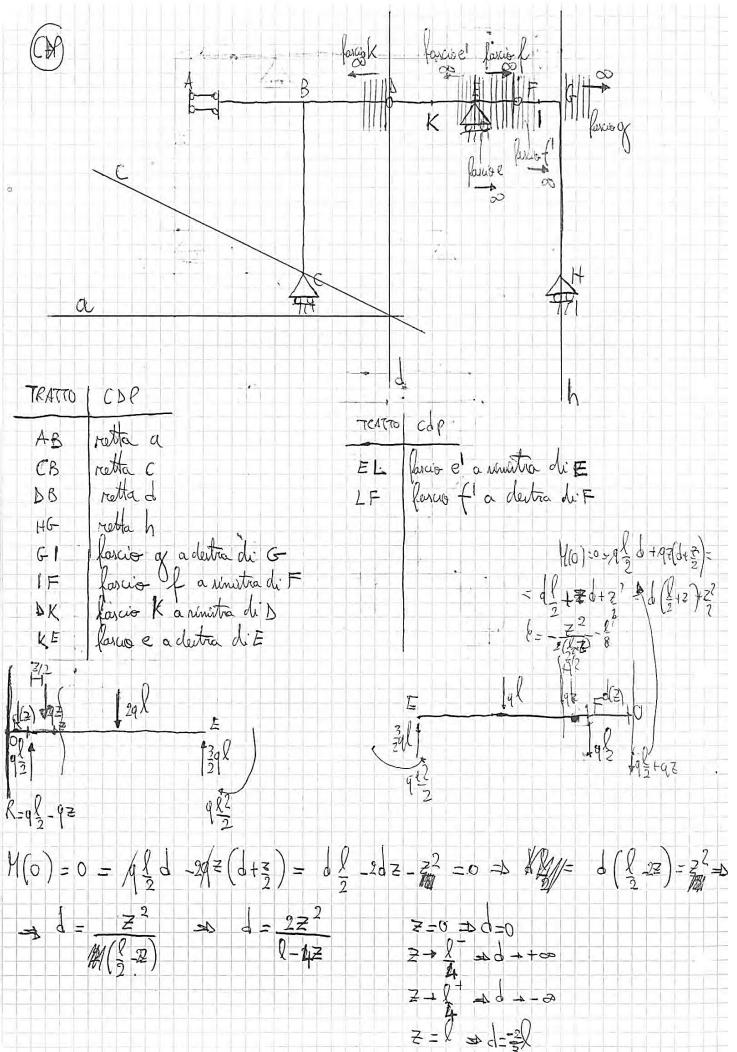


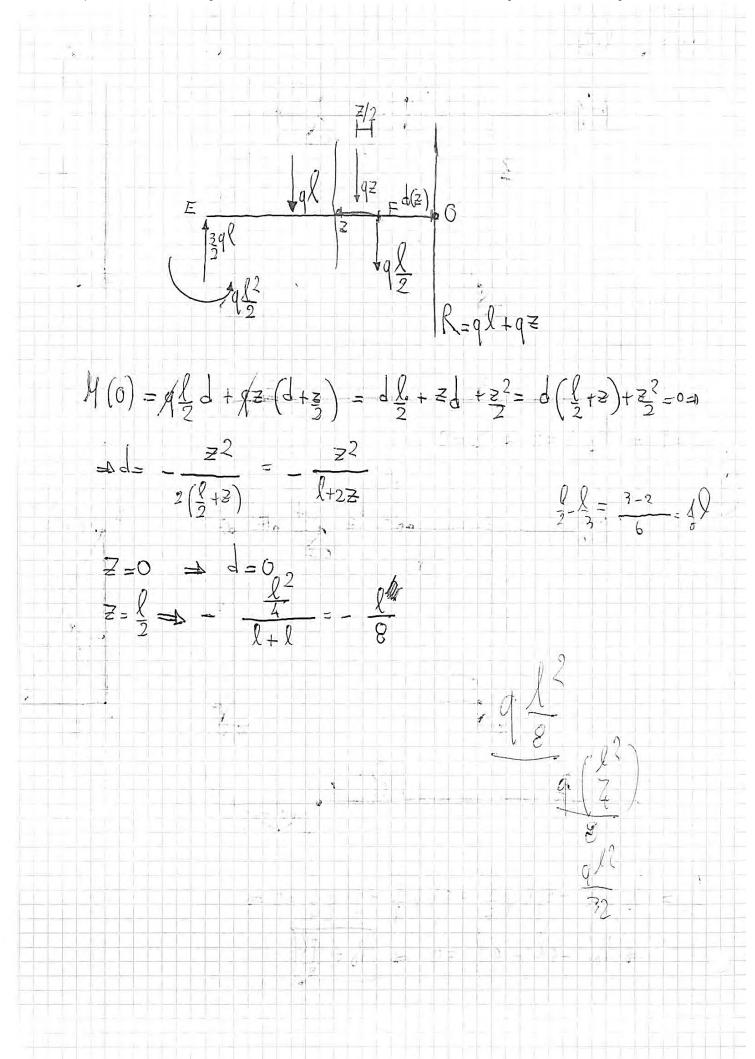


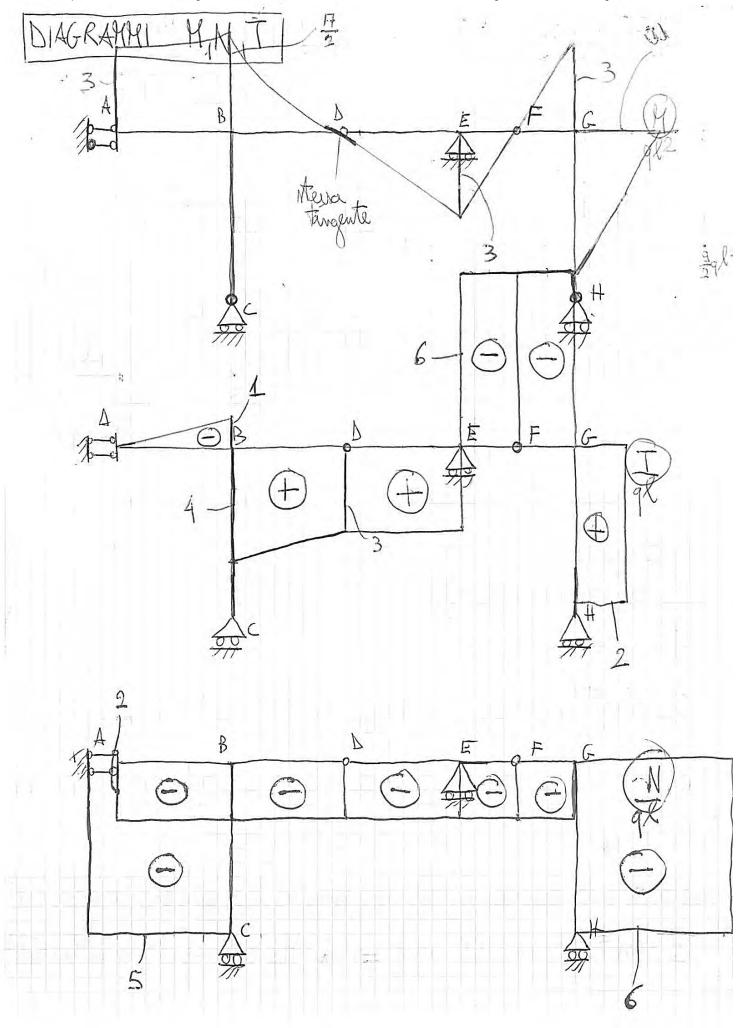








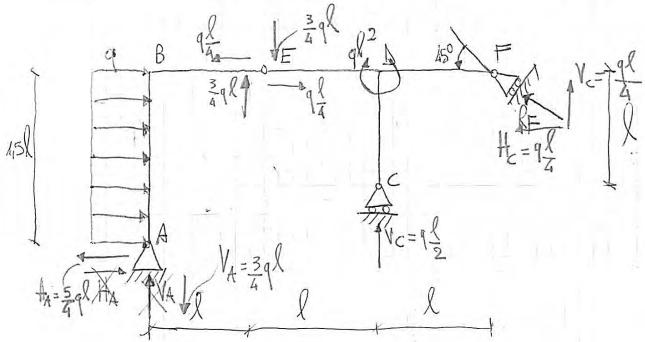




(31

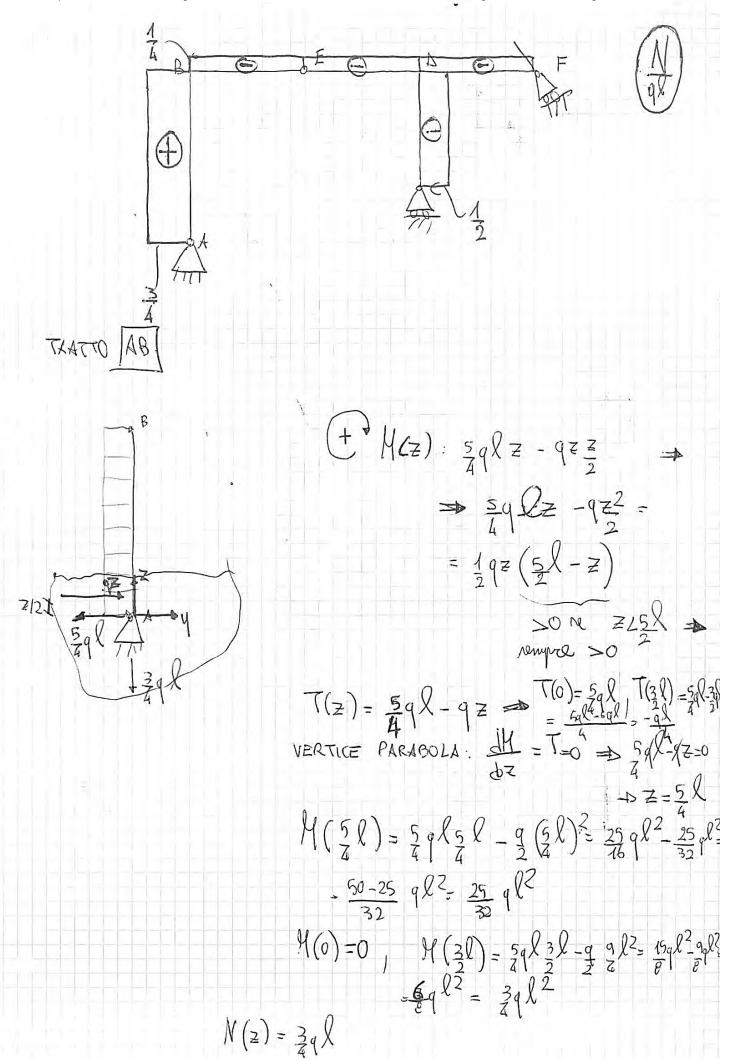
(23

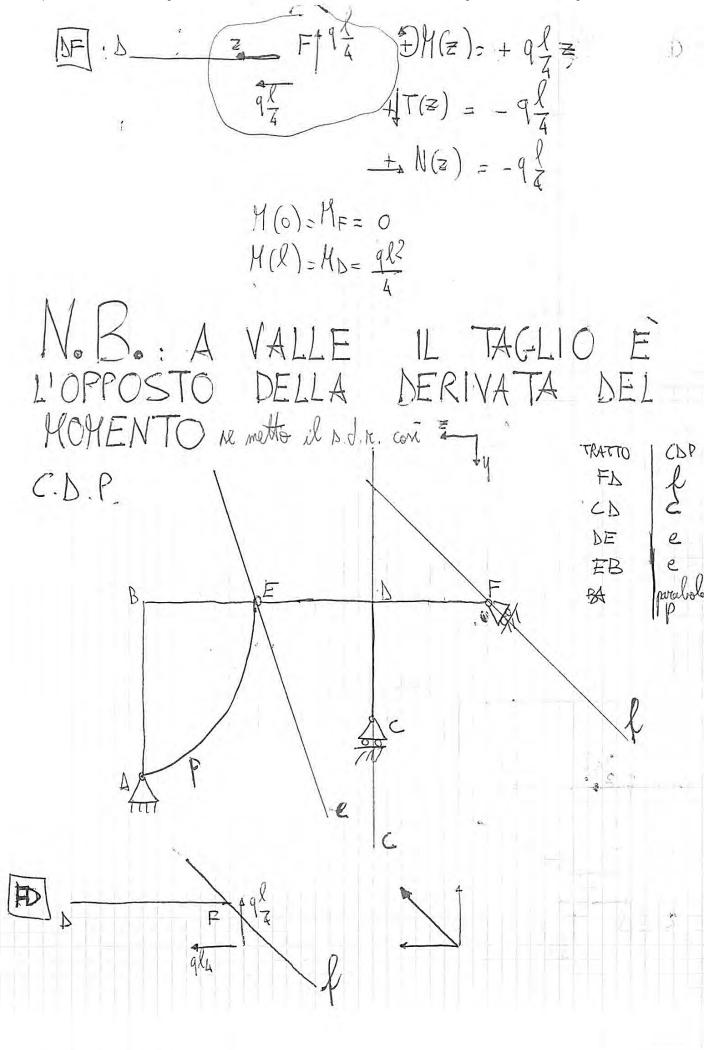
ESAME 10 GIUGNO 2008 COMPITO 1

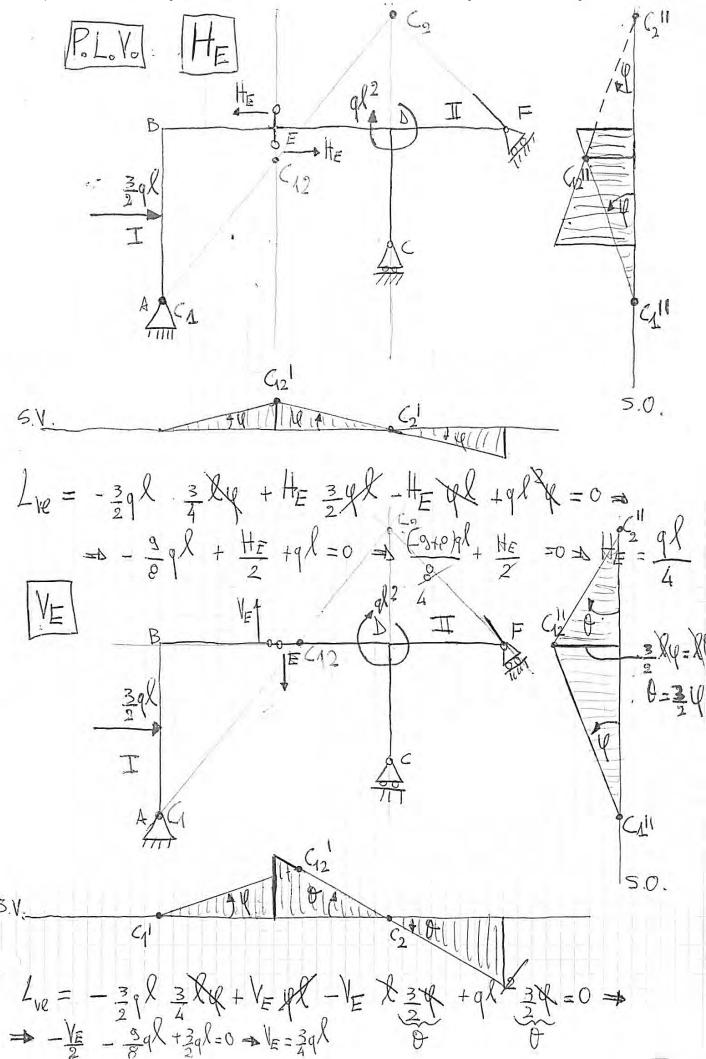


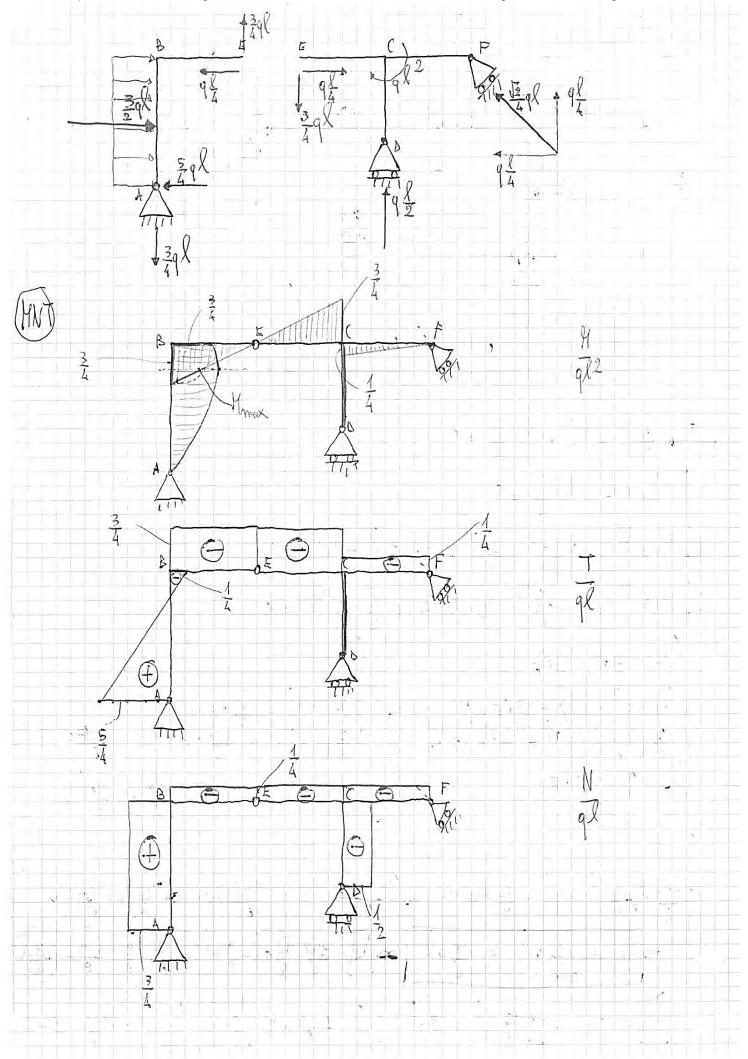
$$\frac{3+1}{+} = \frac{q_{1} a_{1} a_{2} a_{1} a_{2} a_{2} a_{3} a_{4} a_{4} a_{5} a_$$

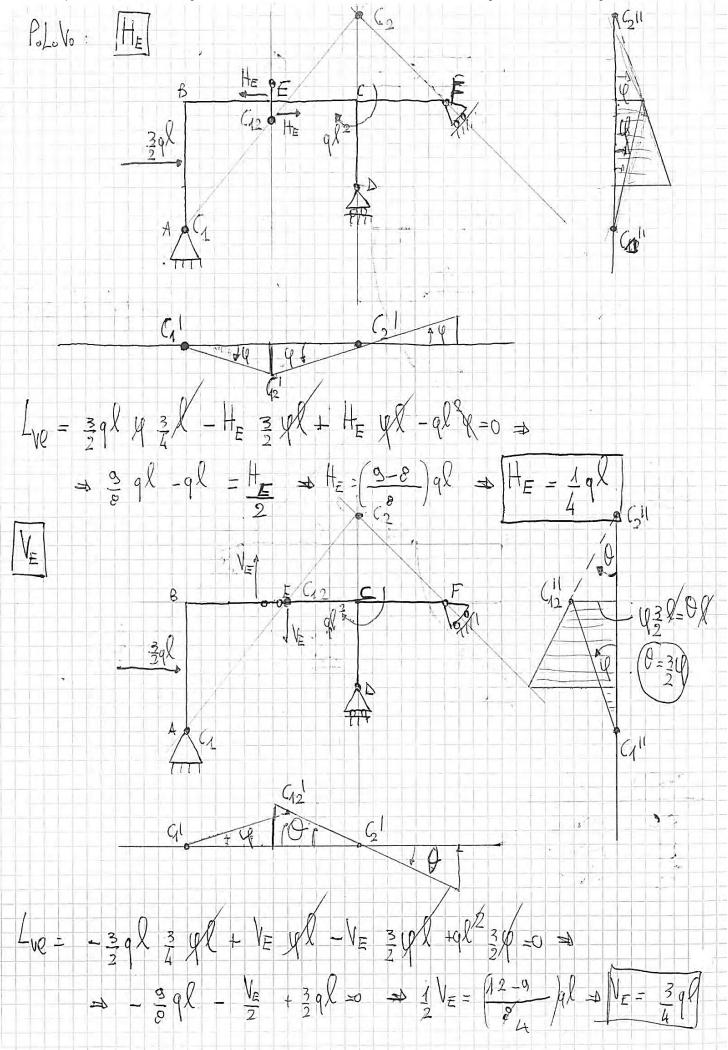
$$(\frac{1}{4})^{I} = -ql^{2} + \sqrt{c} + l_{F} + \frac{\sqrt{2}}{2} = 0$$

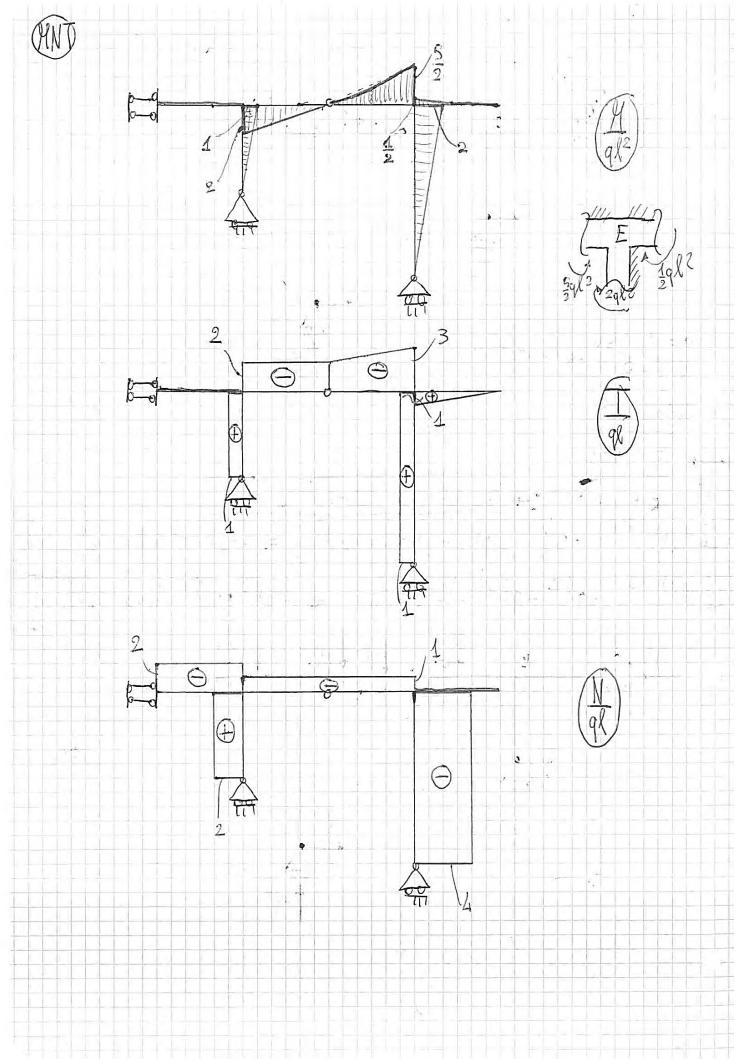


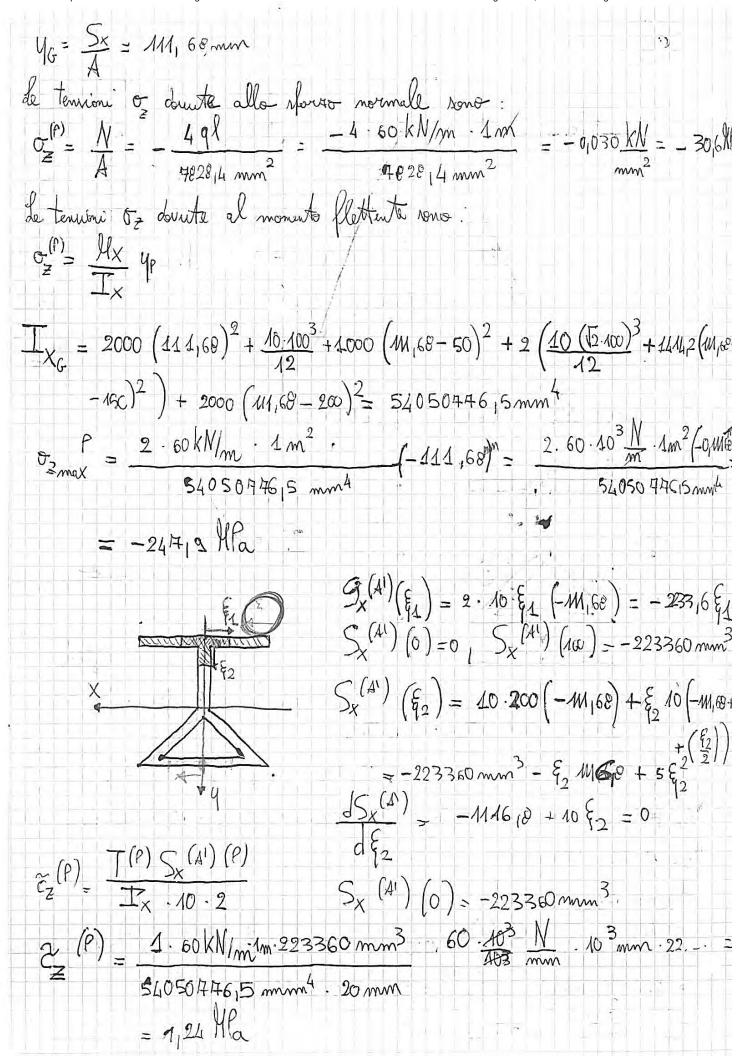


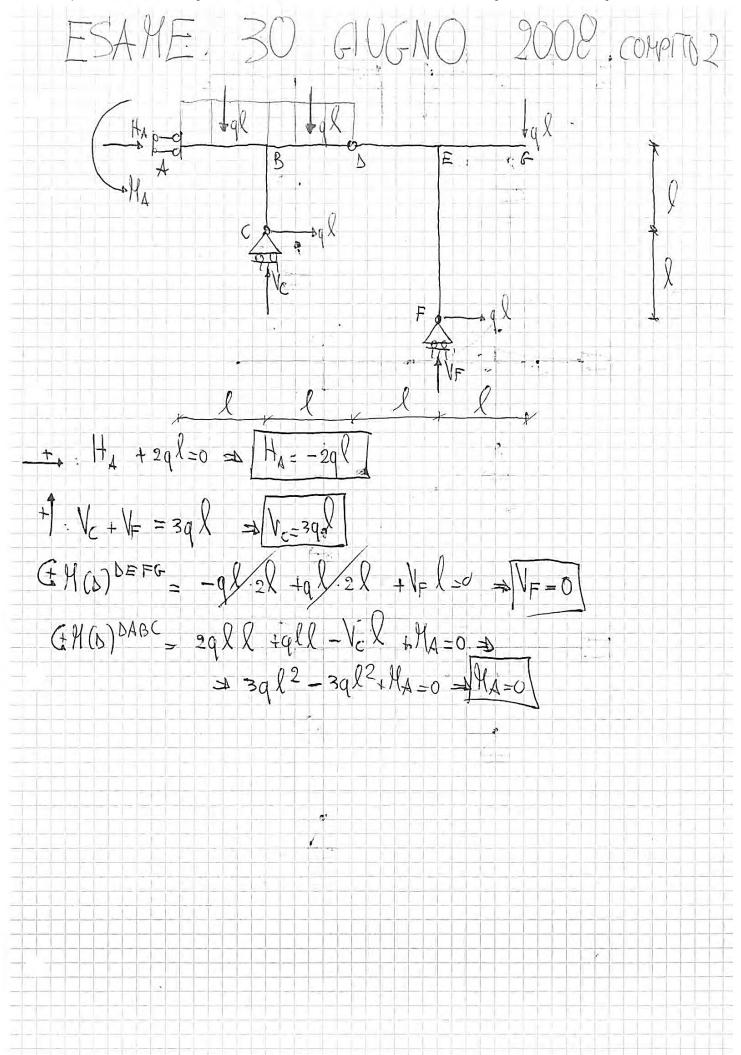


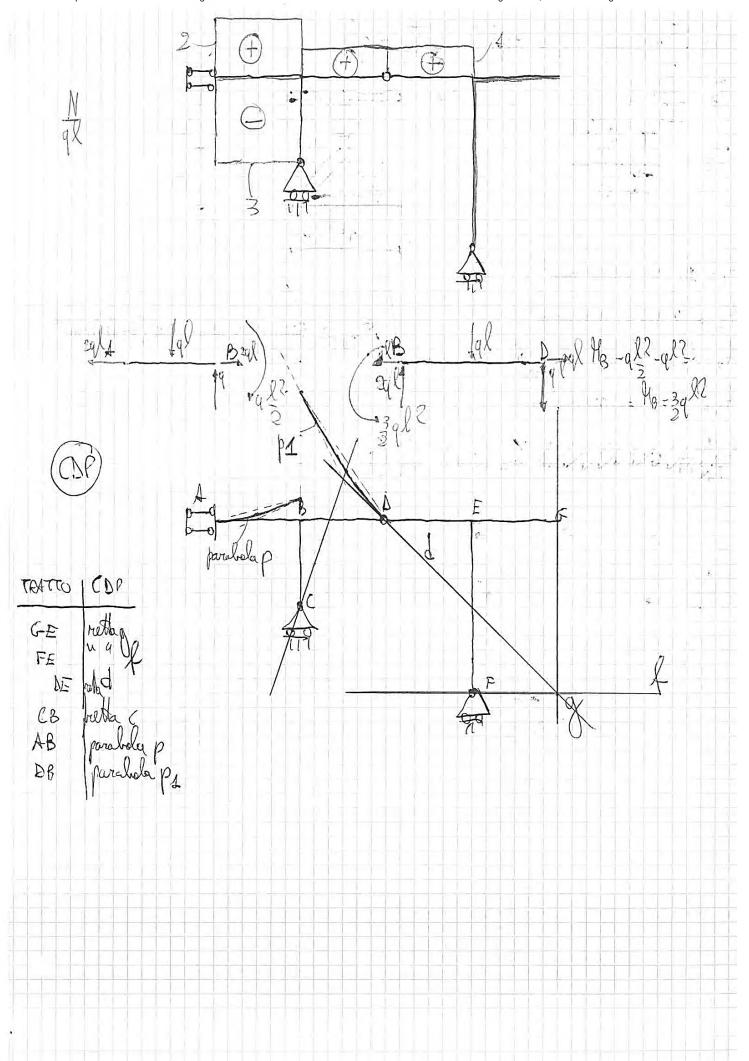


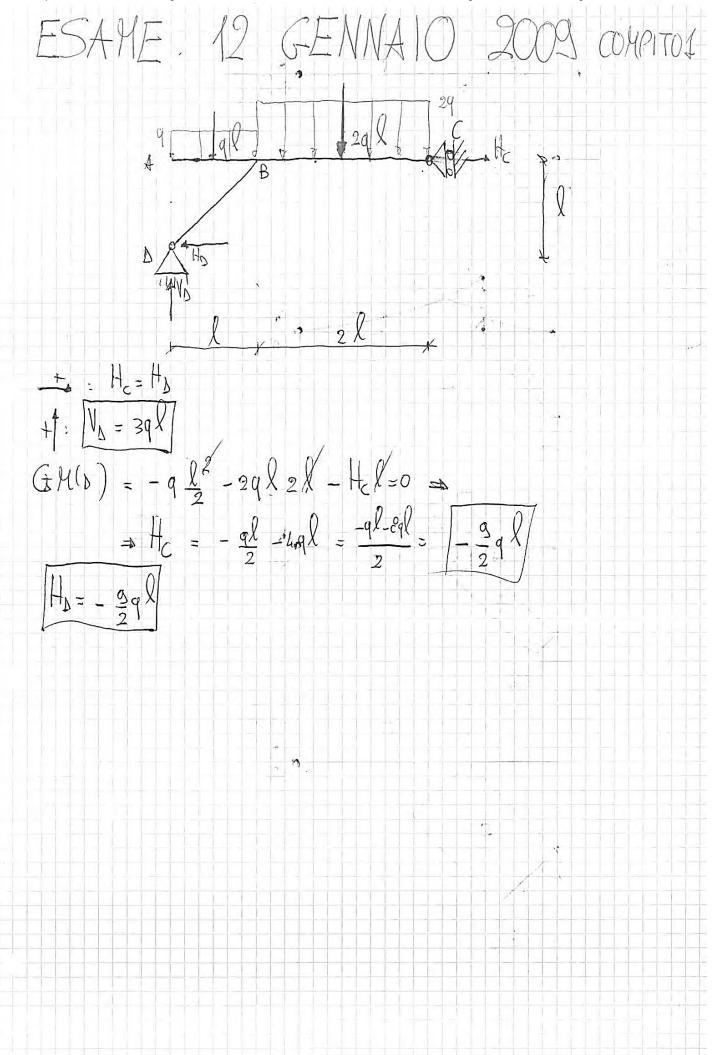


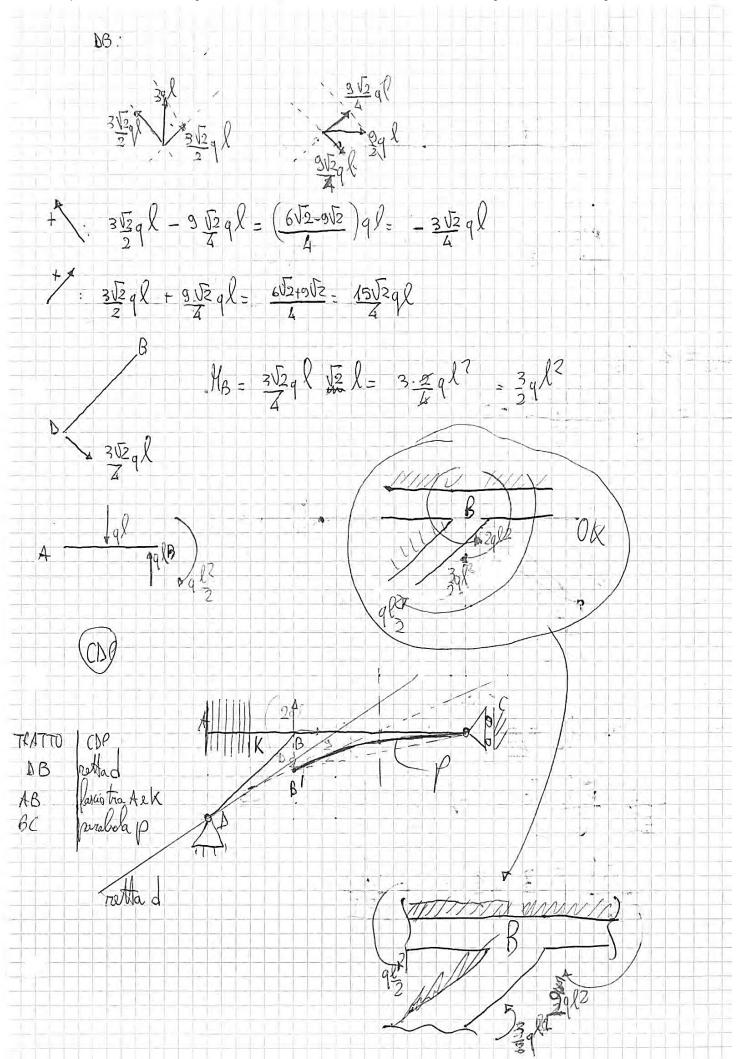


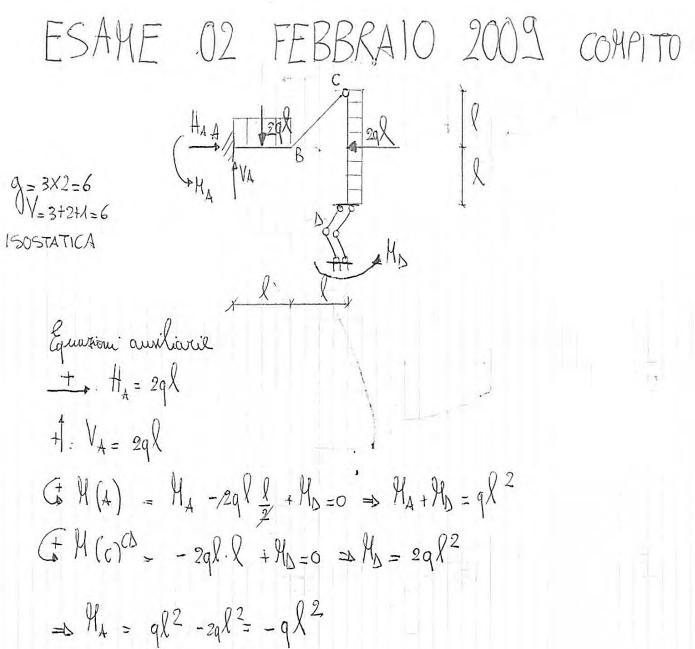


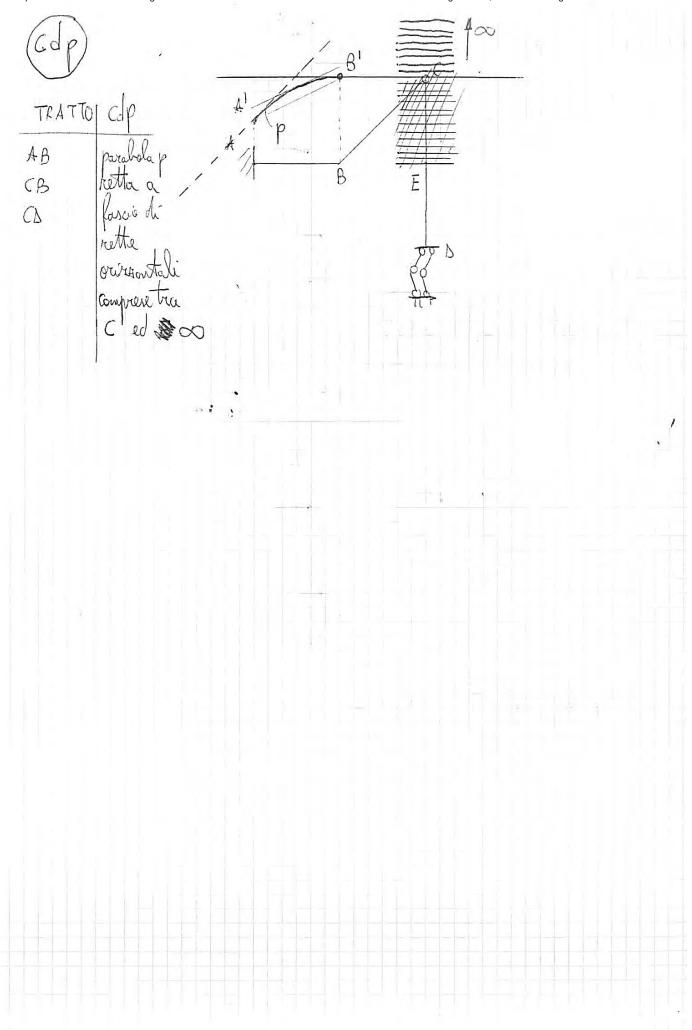


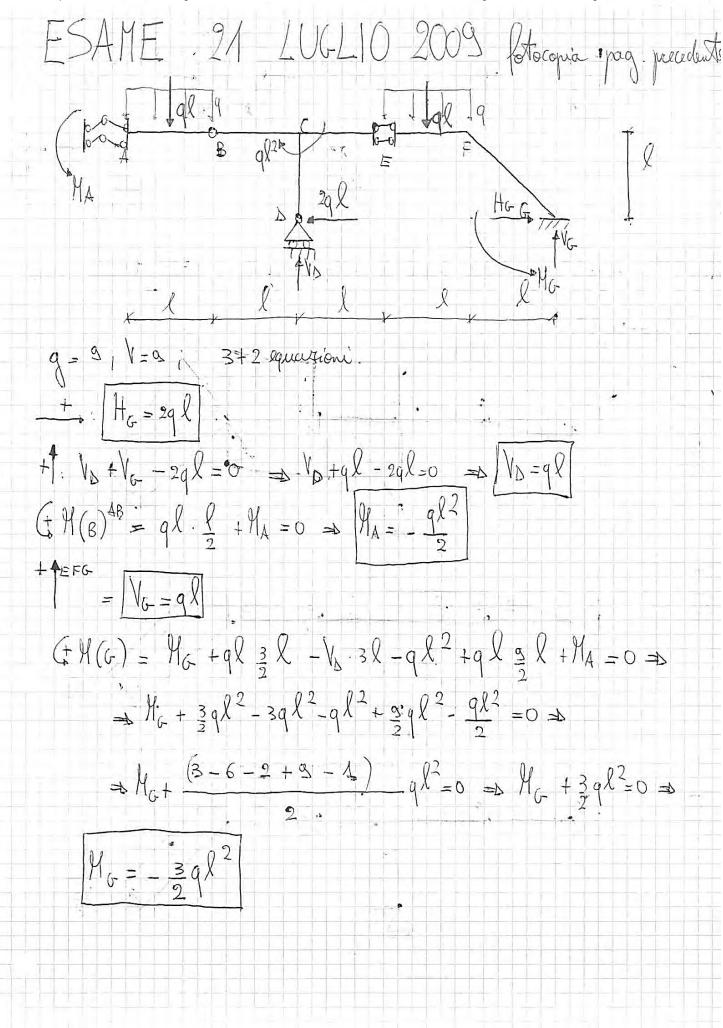


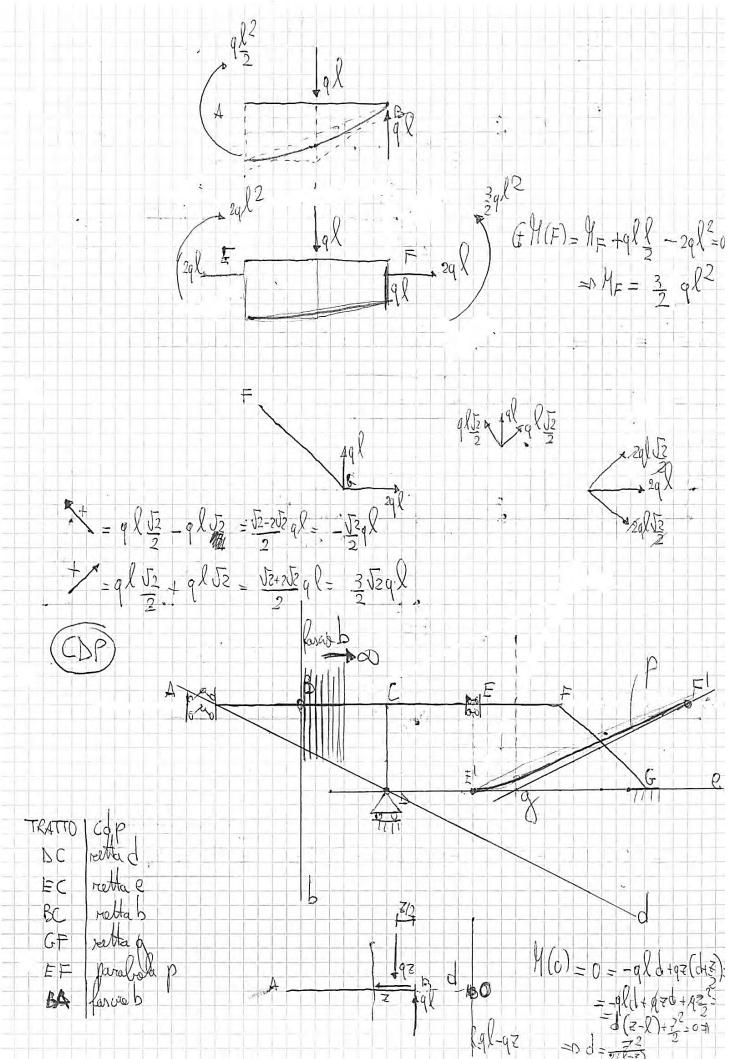


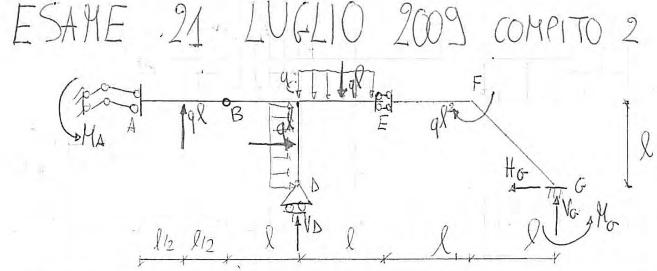


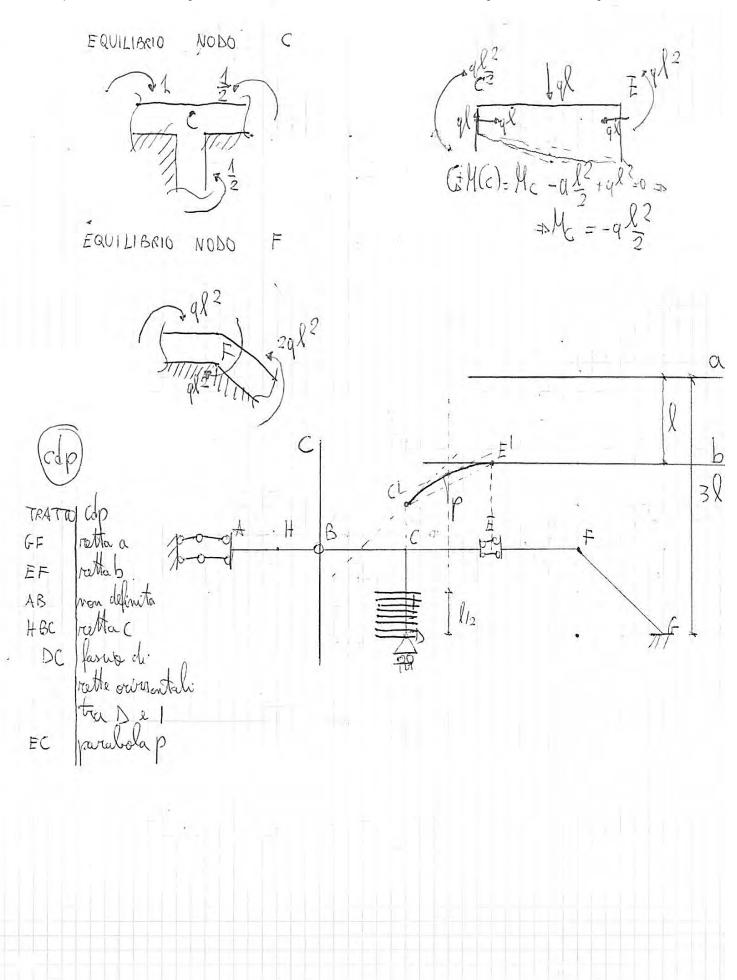


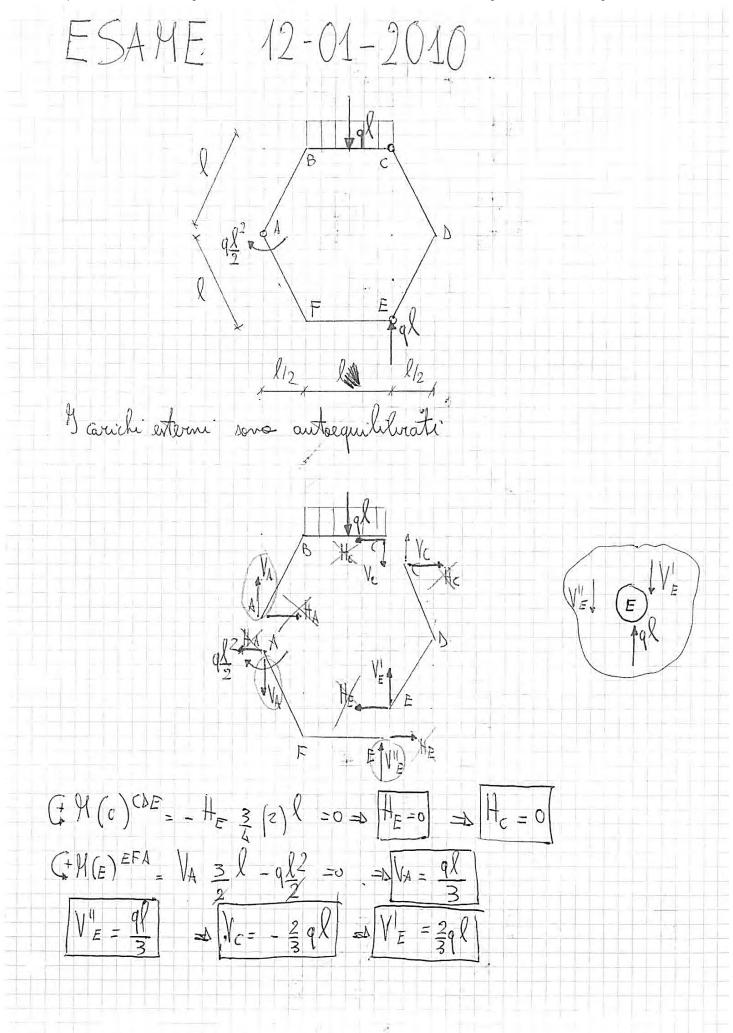


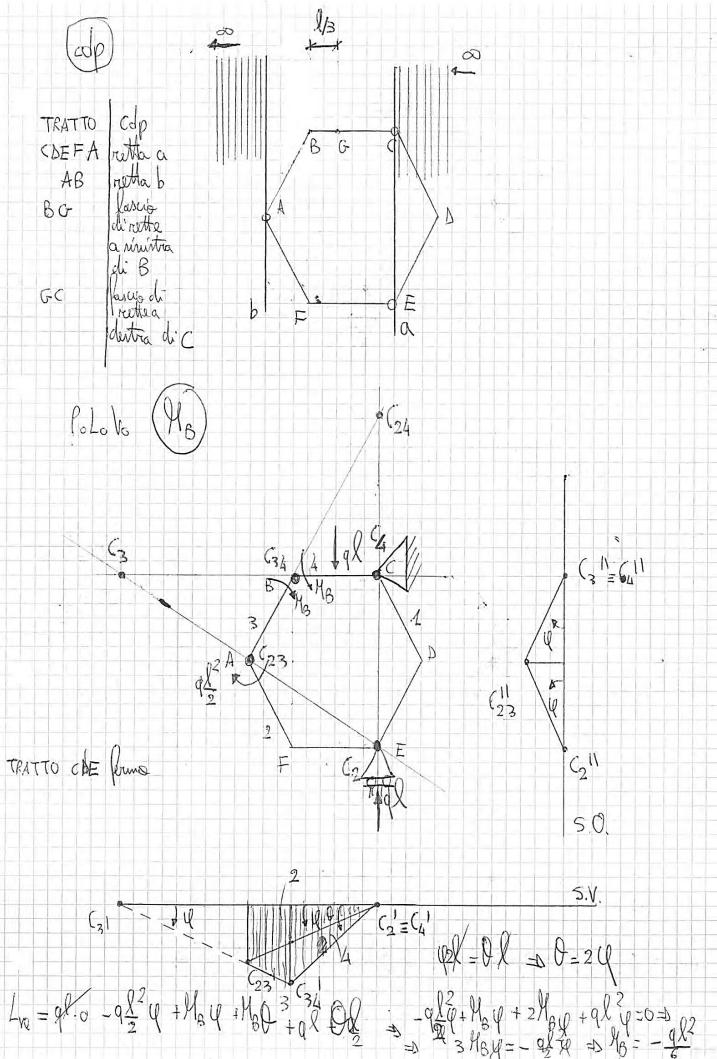










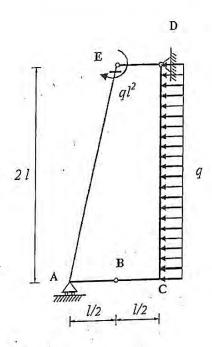


22 Giugno 2009

COMPITO I

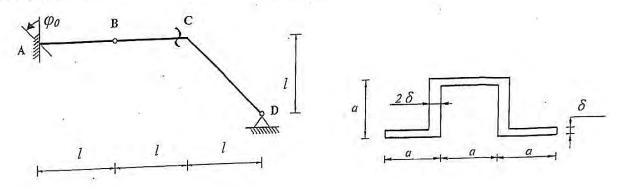
COGNOME :	CORSO DI LAUREA:
NOME:	MATRICOLA:

Esercizio 1

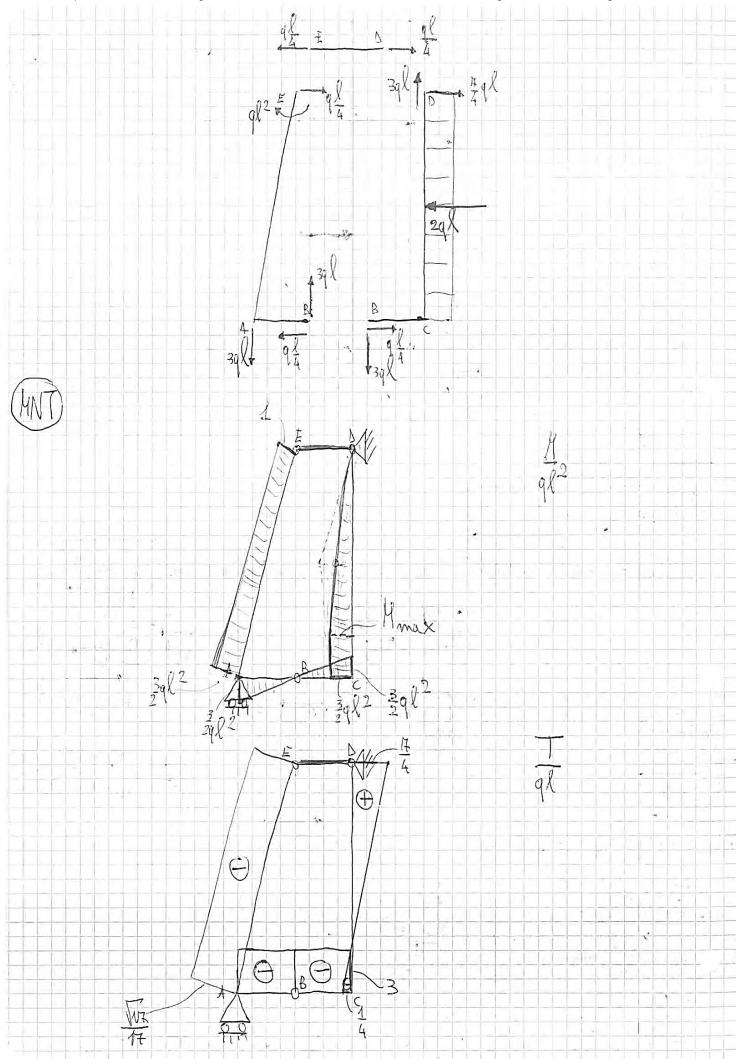


- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni.
- 3. Determinare le reazioni nella cerniera B con il Principio dei Lavori Virtuali.

Esercizio 2

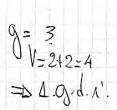


- 1. Tracciare in scala i diagrammi M, N, T.
- 2. Tracciare la curva delle pressioni e la deformata qualitativa.
- 3. Verificare la sezione C con il Criterio di Tresca sapendo che le caratteristiche geometriche della sezione sono quelle indicate in figura e che $\delta = \frac{1}{20}a$
- 4. Determinare la rotazione relativa in B

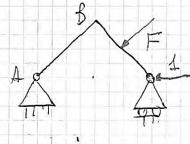


ESAME. 12 GENNAIO 2009 COMPITO 2

1/2







$$\frac{+}{4}: H_{A} = f \int_{2}^{1/2}$$

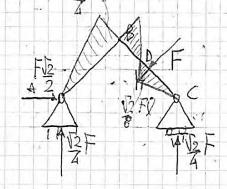
$$\frac{+}{4}: V_{A} + V_{C} = F \int_{2}^{1/2}$$

$$\frac{+}{2} V_{A} = F \int_{2}^{1/2}$$

$$\frac{+}{4} V_{A} + V_{C} = F \int_{2}^{1/2}$$

$$\frac{+}{4} V_{A} + V_{C} = F \int_{2}^{1/2}$$

$$\frac{+}{4} V_{$$

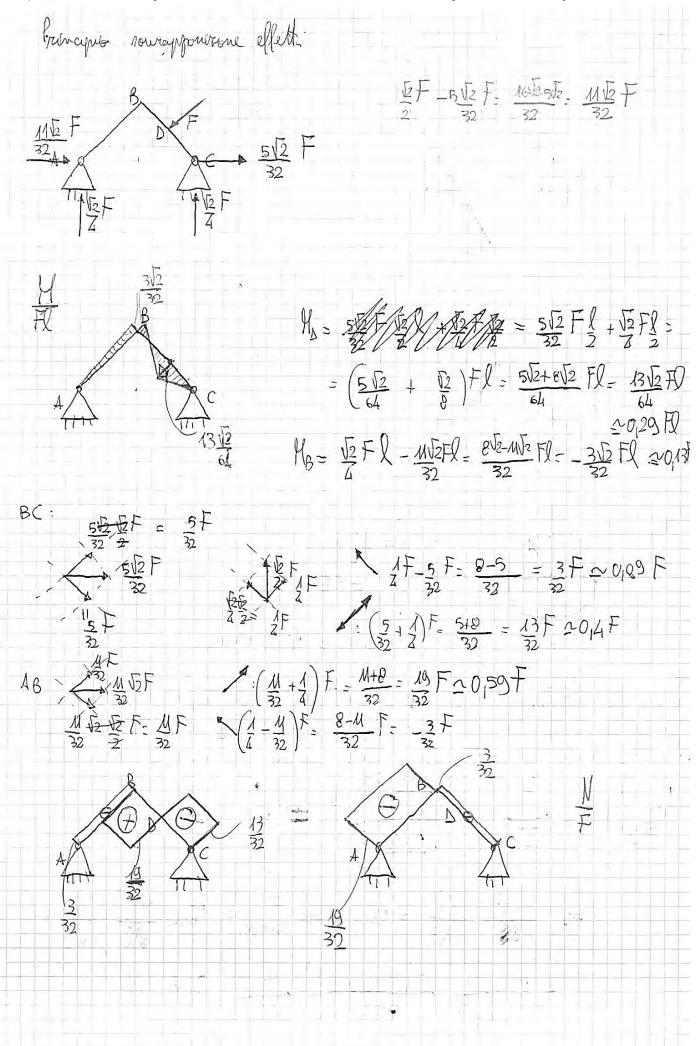


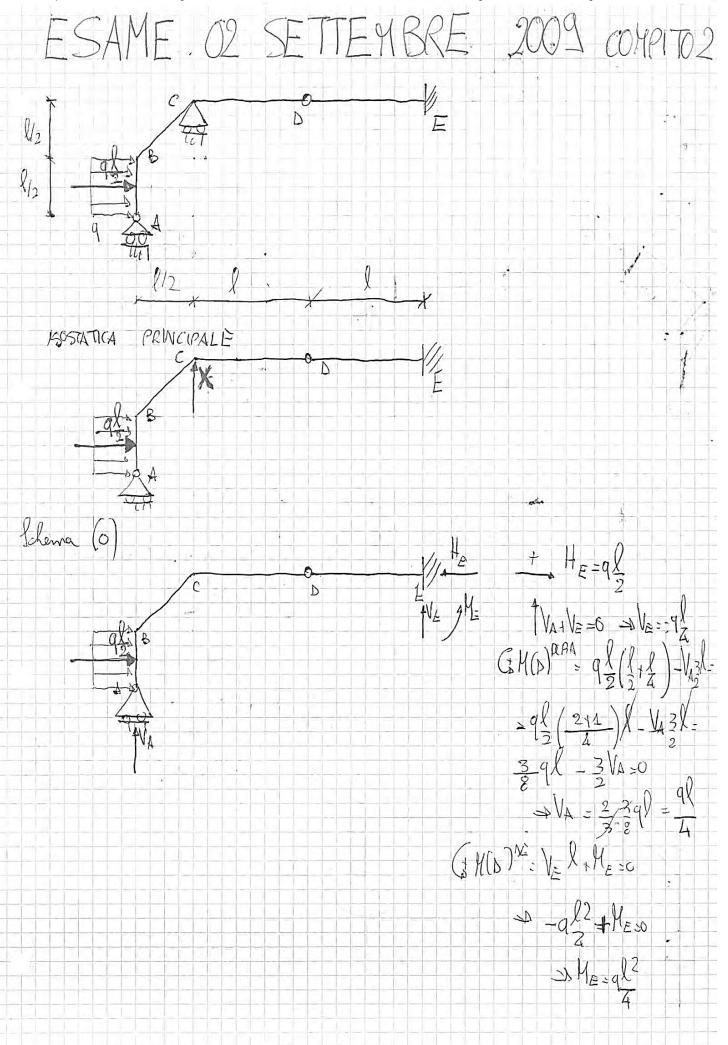
$$\frac{\sqrt{2}}{4} + \sqrt{2} + \sqrt{2} = \frac{2\sqrt{2} - \sqrt{2}}{8} + \sqrt{2} = \sqrt{2} + \sqrt{2}$$

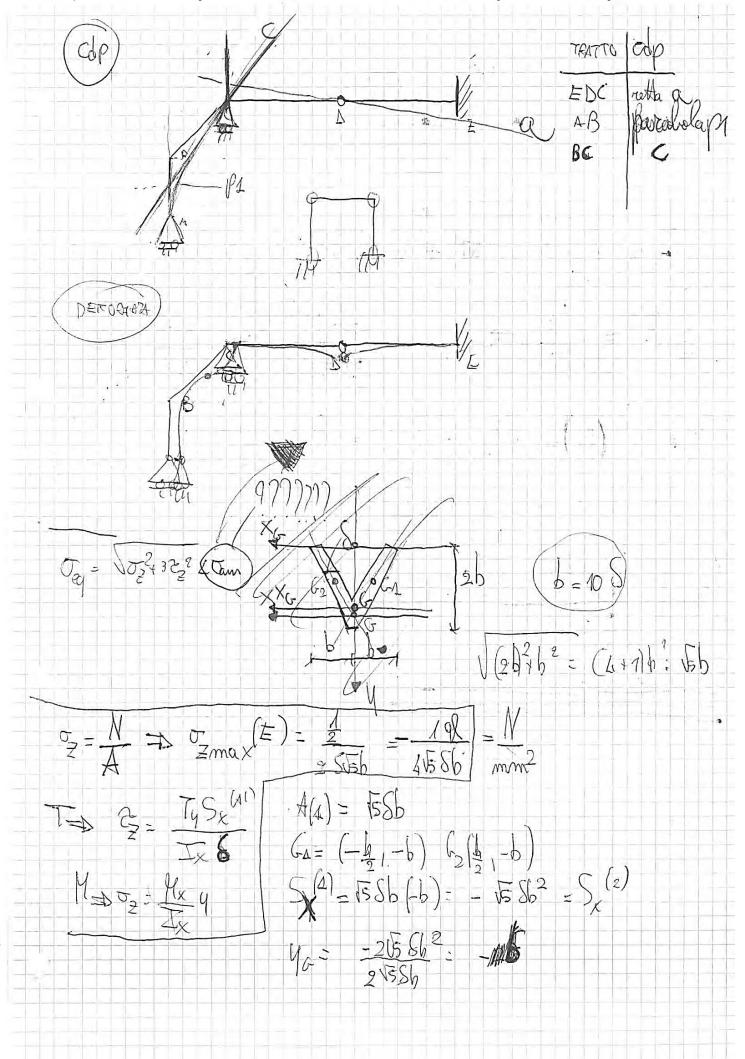
$$\frac{\sqrt{2}}{4} + \sqrt{2} = \frac{2\sqrt{2} - \sqrt{2}}{8} + \sqrt{2} = \sqrt{2} + \sqrt{2}$$

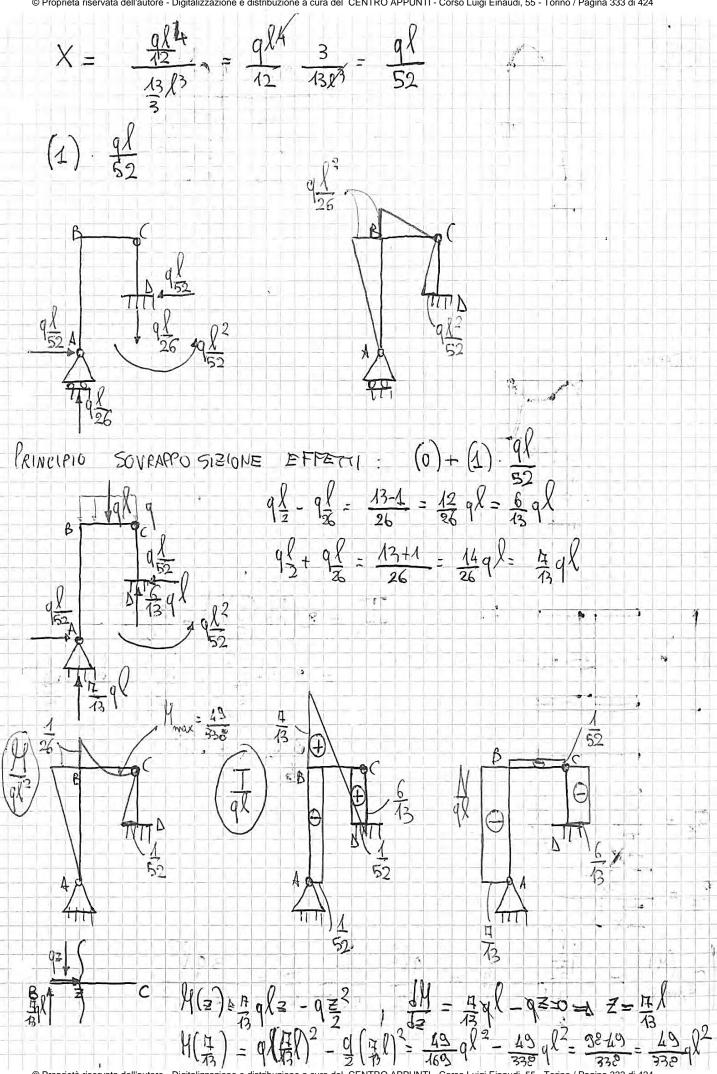
$$H_{B} = \frac{F\sqrt{2}}{2} \left(\frac{1}{2} - \frac{\sqrt{2}}{4} + \frac{1}{2} + \frac{\sqrt{2}}{4} + \frac{\sqrt{2}}{4} \right)$$

$$H_{H} = \frac{\sqrt{2}}{4} + \frac{1}{2} - \frac{\sqrt{2}}{2} + \frac{1}{2} + \frac{\sqrt{2}}{2} + \frac{1}{2} + \frac{$$



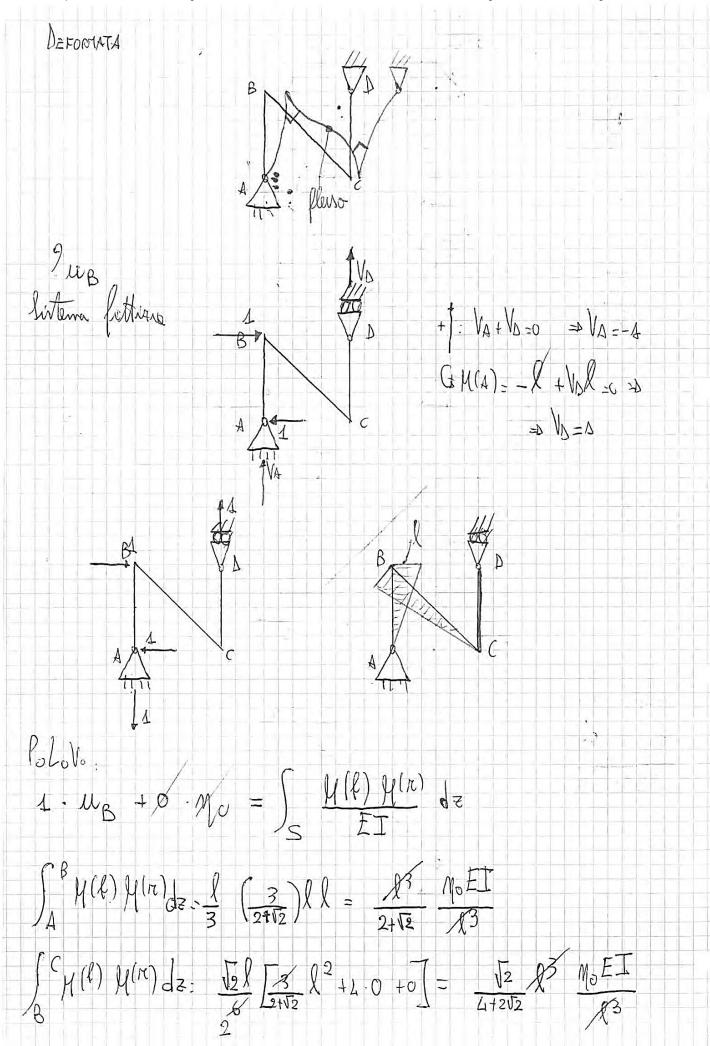






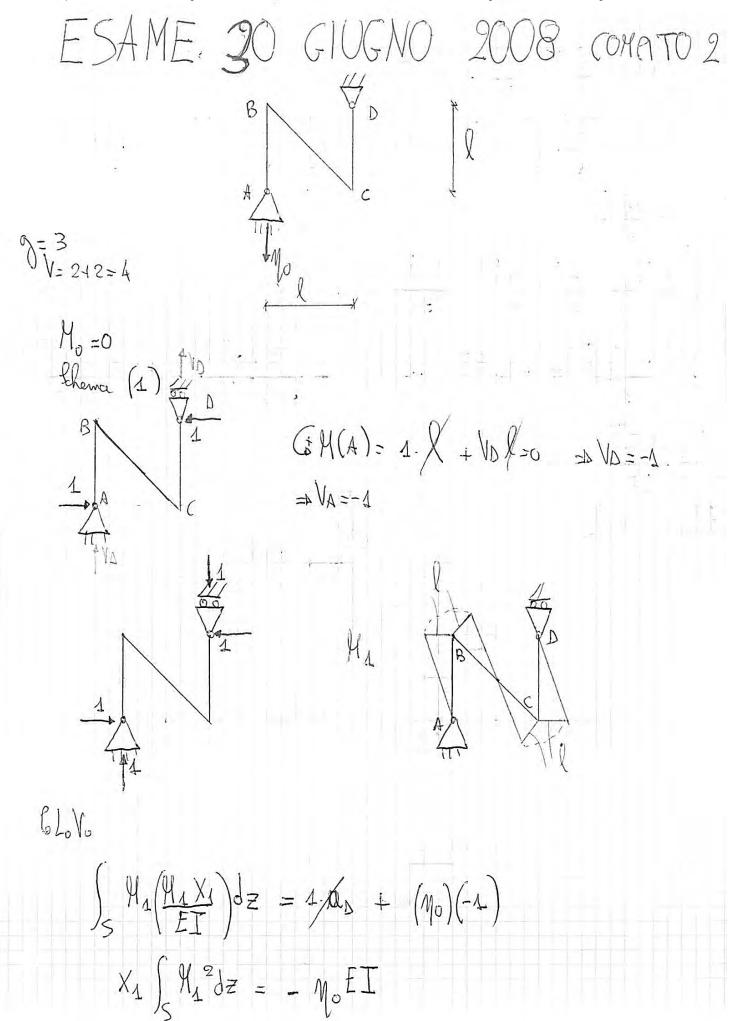
$$|\sigma_{Z,max}(N)| = \frac{N}{A} = \frac{\frac{6}{33}qR}{2hb+2hh} = \frac{36qR}{43(khh)} = \frac{3qR}{26hh}$$

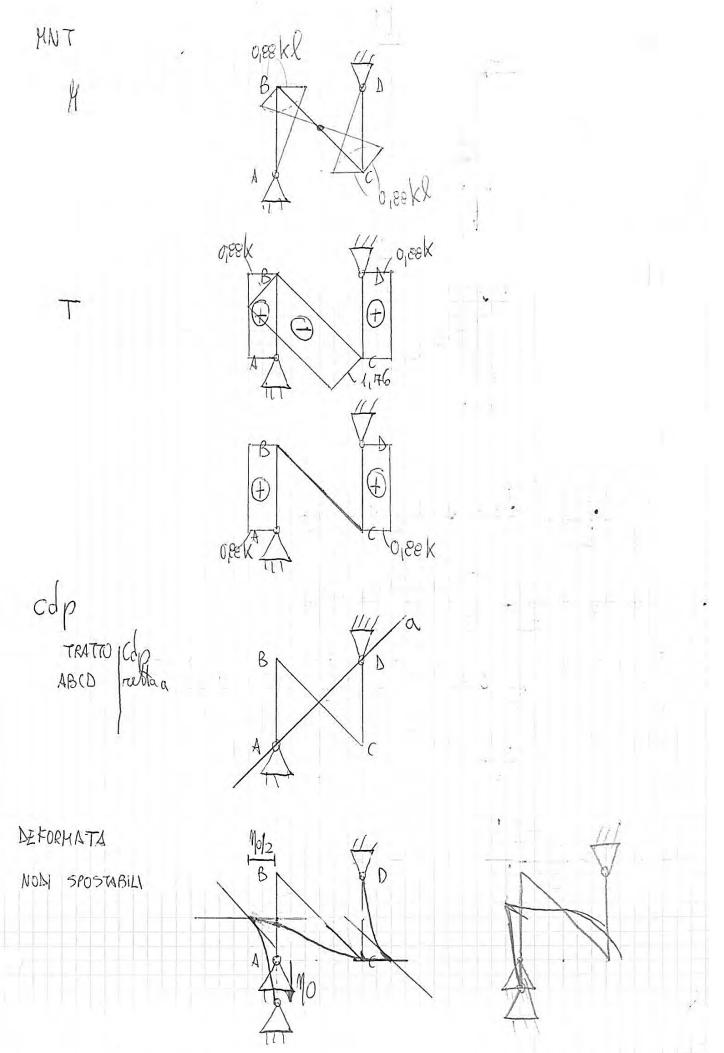
$$\sum_{X} \frac{(A)}{(k_2)} = \frac{h}{h} \frac{1}{4} + \frac{2}{4} \frac{\xi}{h} \frac{h}{h} \left(\frac{h}{4} - \frac{k_2}{2}\right) = \frac{h}{2} \frac{h}{2} + \frac{\xi}{h} \frac{h}{2} \frac{h}{2} + \frac{k_2}{2} \frac{h}{2} = \frac{1}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} \frac{h}{2} = \frac{h}{2} \frac{$$

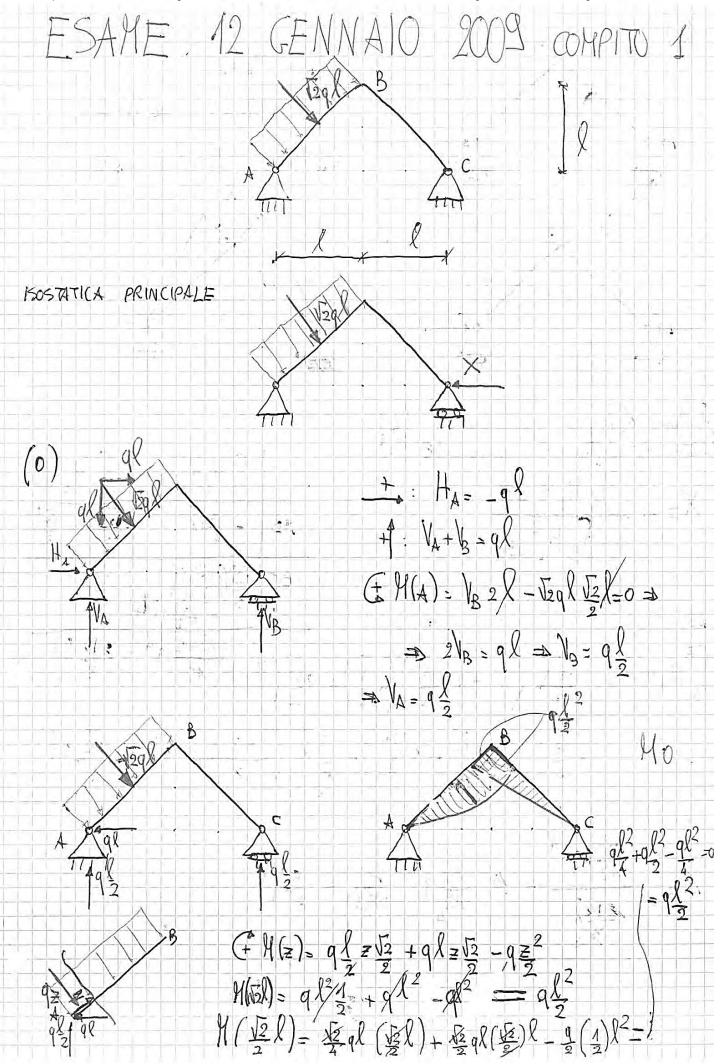


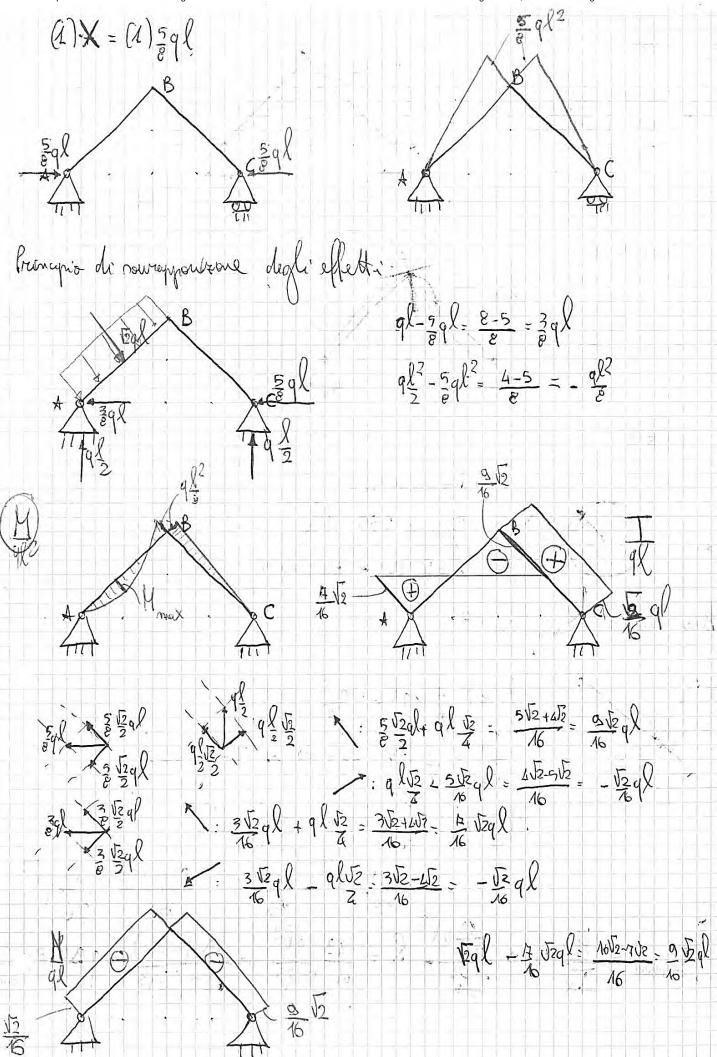
Applies it folds.

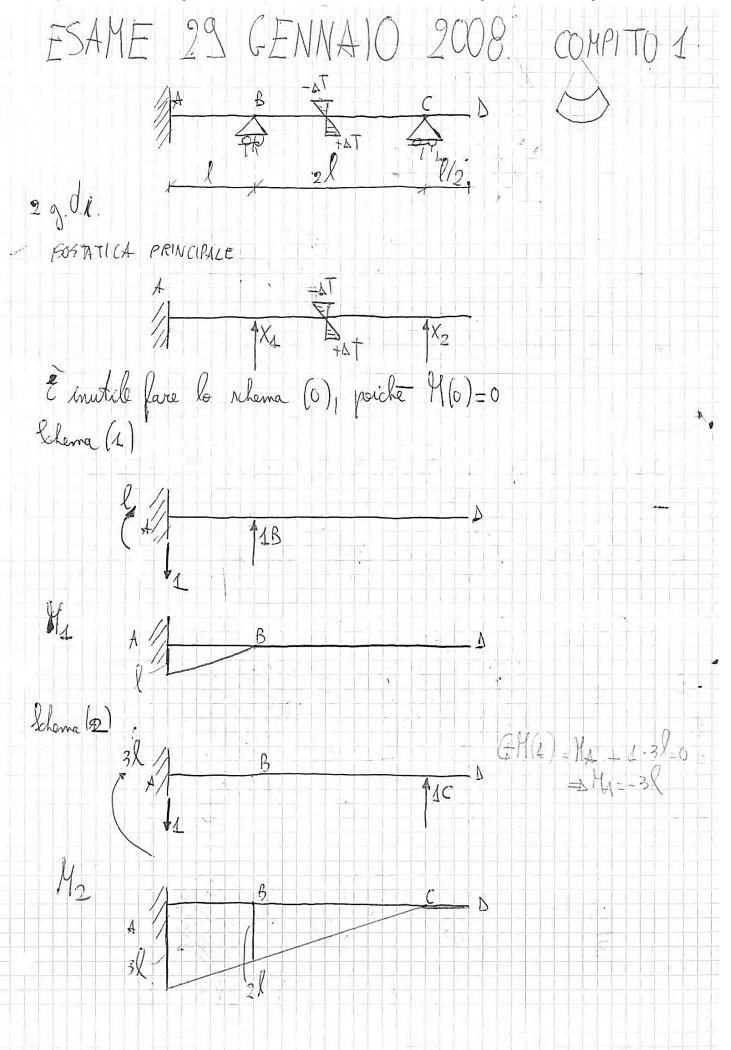
4.
$$M_0 = \int_S M_4 \frac{(M_4 \times)}{EI} dz = A$$
 $\frac{X}{EI} \int_S M_4^2 dz = M_0 \Rightarrow X = \frac{M_0 EI}{\int_S M_4^2 dz}$
 $\int_A M_4^2 dz = \frac{1}{3} (f^2) = \frac{1}{3} = \int_A M_4^2 dz = \frac{1}{2} \int_A M_4^2 dz = \frac{1}{3} \int_A M_4^2 dz = \frac{1$

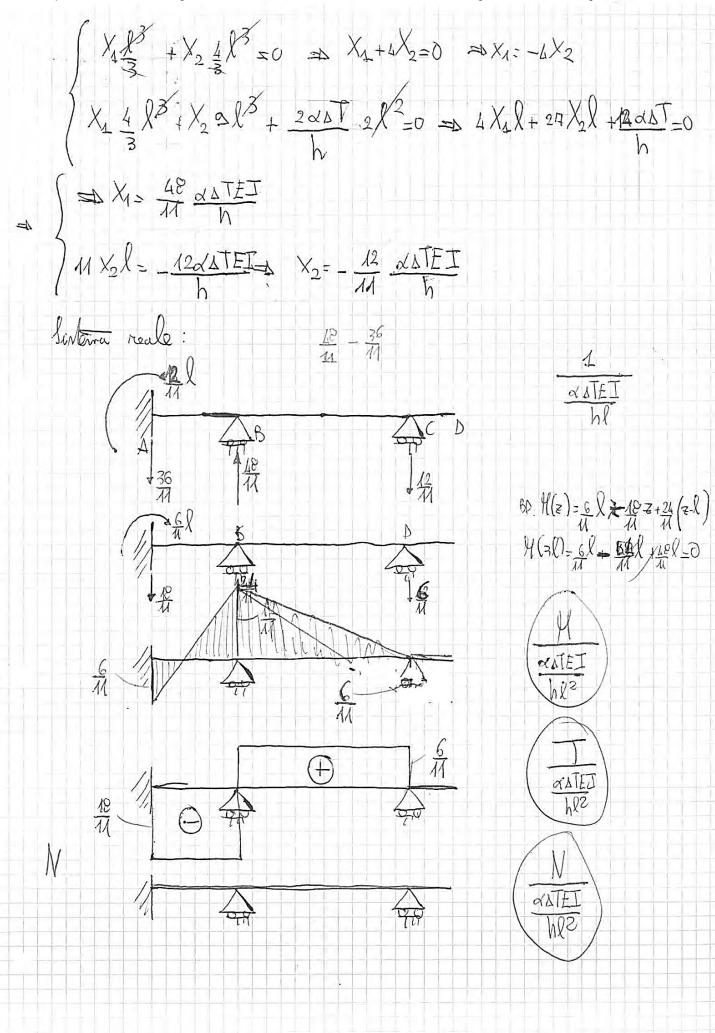


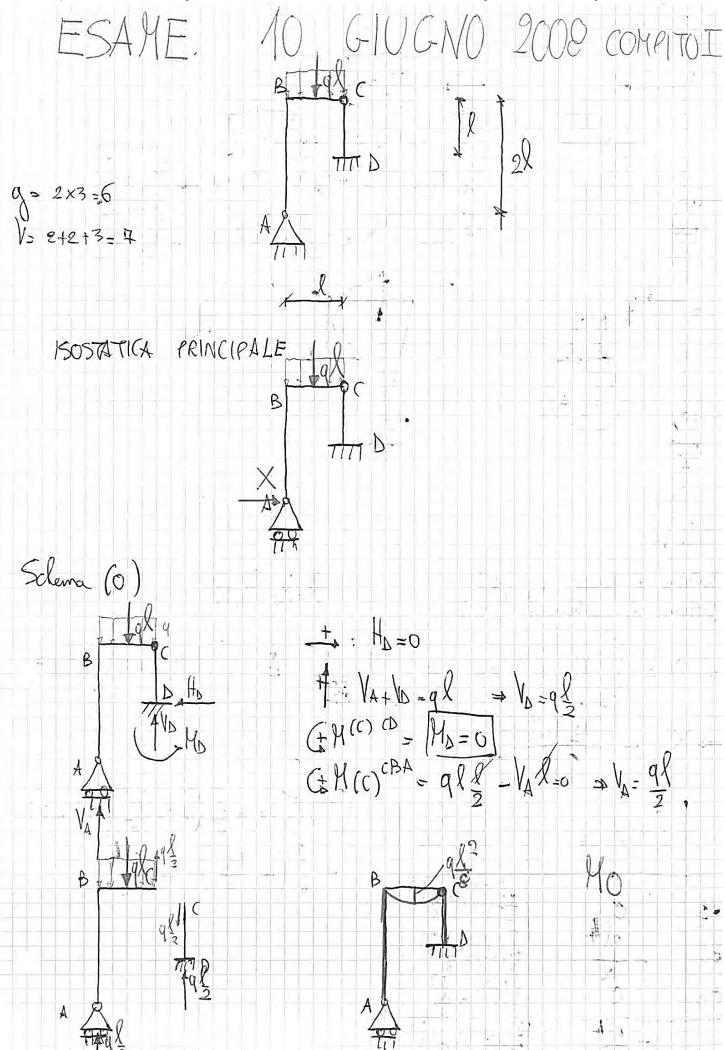












1E. 15 GENNAIO 20 PRINCIPALE 150 STATICA Thema (o) $\frac{1}{4} = \frac{1}{4} = \frac{1}$

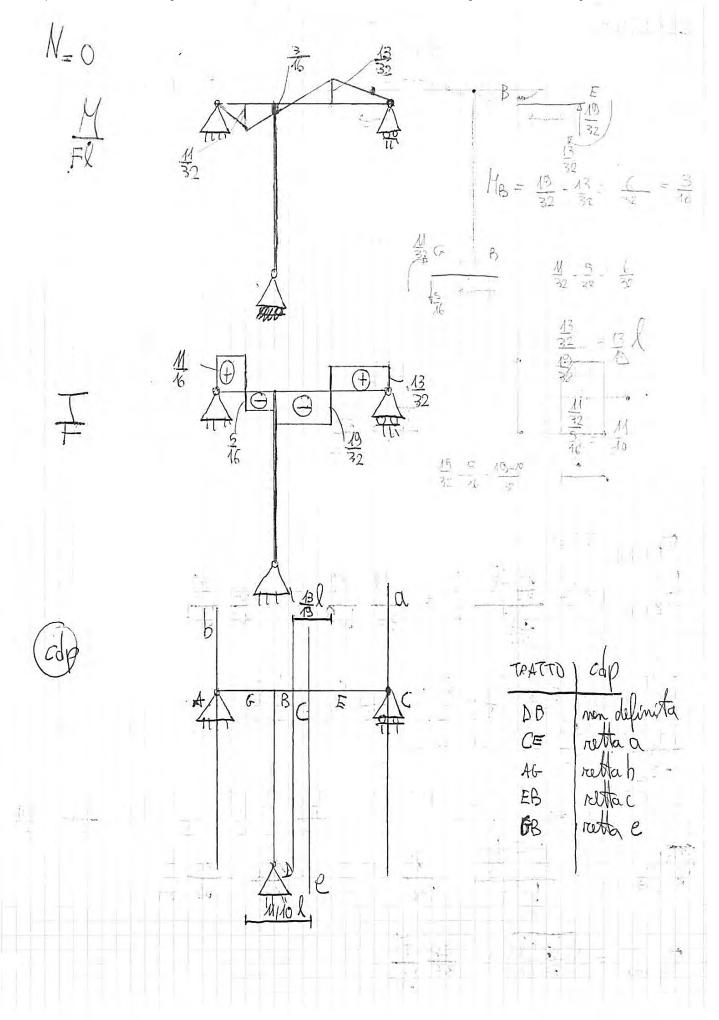
$$\begin{cases} \int_{S} H_{1} H_{0} dz + X_{4} \int_{S} H_{1}^{2} dz + X_{2} \int_{S} H_{1} H_{2} dz = 0 \\ \int_{S} H_{2} H_{0} dz + X_{4} \int_{S} H_{2} H_{2} dz + X_{2} \int_{S} H_{2}^{2} dz = 0 \end{cases}$$

$$\begin{cases} \int_{A} H_{1} H_{0} dz + X_{4} \int_{S} H_{2} H_{1} dz + X_{2} \int_{S} H_{2}^{2} dz = 0 \end{cases}$$

$$\begin{cases} \int_{A} H_{1} H_{0} dz + X_{4} \int_{S} H_{2} H_{1} dz + X_{2} \int_{S} H_{2}^{2} dz = 0 \end{cases}$$

$$\begin{cases} \int_{A} H_{1} H_{0} dz + X_{4} \int_{S} H_{2} H_{2} dz + X_{2} \int_{S} H_{2} H_{2} dz = 0 \end{cases}$$

$$\begin{cases} \int_{B} H_{1} H_{0} dz + \int_{C} \frac{1}{2} \int_{C} \frac{1$$



$$\frac{JS_{x}(h)(f_{2})}{Jf_{2}} = \frac{gh}{2} + \frac{Sh^{2}}{h^{2}} = \frac{gh}{2}$$

$$S_{x}(h)(f_{2}) = Sh^{2} + \frac{Sh^{2}}{4} - \frac{Sh^{2}}{e} = \frac{g+2+4}{e} - \frac{gSh^{2}}{e}$$

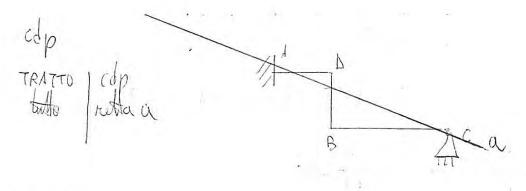
$$\frac{Sh^{2}}{2}$$

$$\frac{Sh^{2}}{2}$$

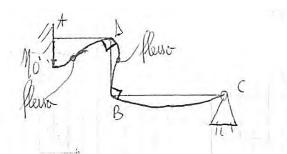
$$\frac{Sh^{2}}{2}$$

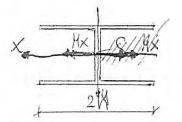
$$\frac{Sh^{2}}{2}$$

$$\frac{JSh^{2}}{2} = \frac{JSh^{2}}{JSh^{2}} = \frac{J9^{2}}{JSh} + \frac{J}{JSh} = \frac{J9^{2}}{JSh} + \frac{J}{JSh} = \frac{J9^{2}}{JSh} + \frac{J}{JSh} = \frac{J9^{2}}{JSh} + \frac{J}{JSh} = \frac{J}$$



DEFORMATA





$$\sigma_{z}(y) = \frac{y}{T}y$$

$$\frac{1}{1} = \frac{2}{12} \left(\frac{2h}{5} \left(\frac{h}{2} \right)^{2} \right) + \frac{5h^{3}}{42} = \frac{43}{42} = \frac{43}{$$

$$|\sigma_{z_{max}}(H)| = \frac{6}{\frac{64}{13}} \frac{kl}{h} = \frac{36}{793} \frac{kl}{5h^3} = \frac{36}{793} \frac{10}{5h^2} \frac{10}{13} = \frac{36}{793} \frac{10}{5h^2} = \frac{36}{793} \frac{10}{5h^2}$$

$$\frac{h}{2} = \frac{36}{793}$$

$$\frac{kl}{sh^3} = \frac{36}{793}$$

$$z = \frac{T_4 S_x(x)}{T_x S}$$

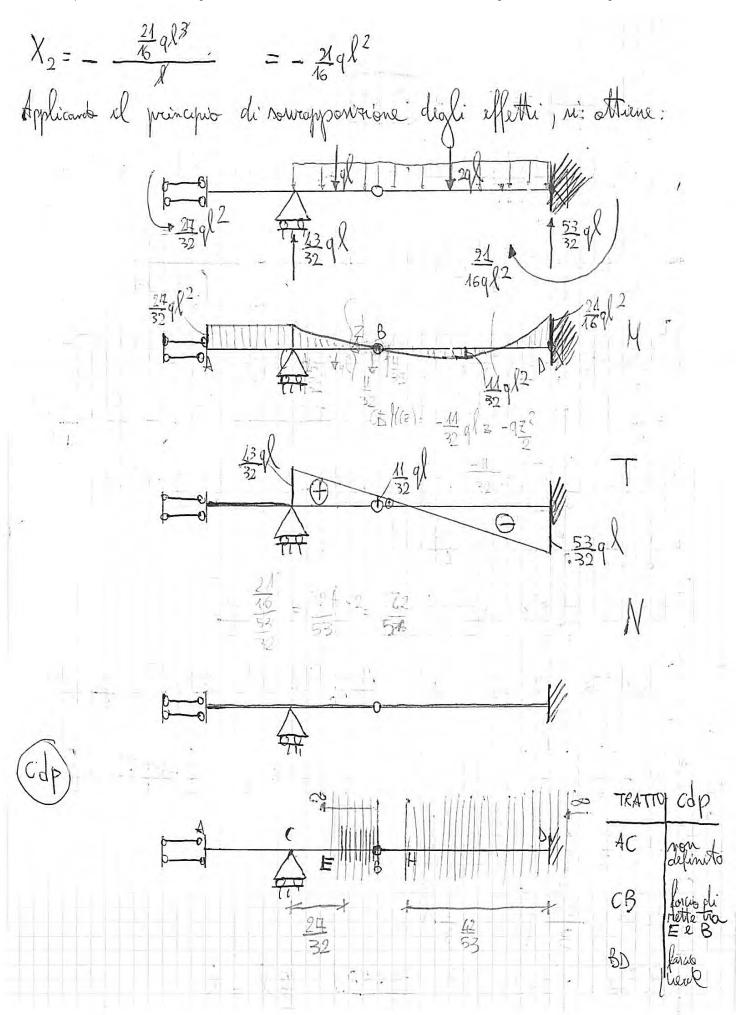
$$S_{x}^{(A')}(\xi_{1}) = S_{\xi_{1}} + \frac{1}{2}$$
, $S_{x}(0) = 0$, $S_{x}(h) = \frac{Sh^{2}}{2}$

$$\int_{X} (0) = 0, \int_{X} (h) = \frac{Sh^{2}}{2}$$

$$S_{\xi}^{(A1)}(\xi_{2}) = 2h S h + \xi_{2} S \left(\frac{h}{2} - \left(\frac{\xi_{2}}{2}\right)\right)$$

$$= Sh^{2} + \frac{Sh}{2} \xi_{2} - \frac{S\xi_{2}^{2}}{2}$$

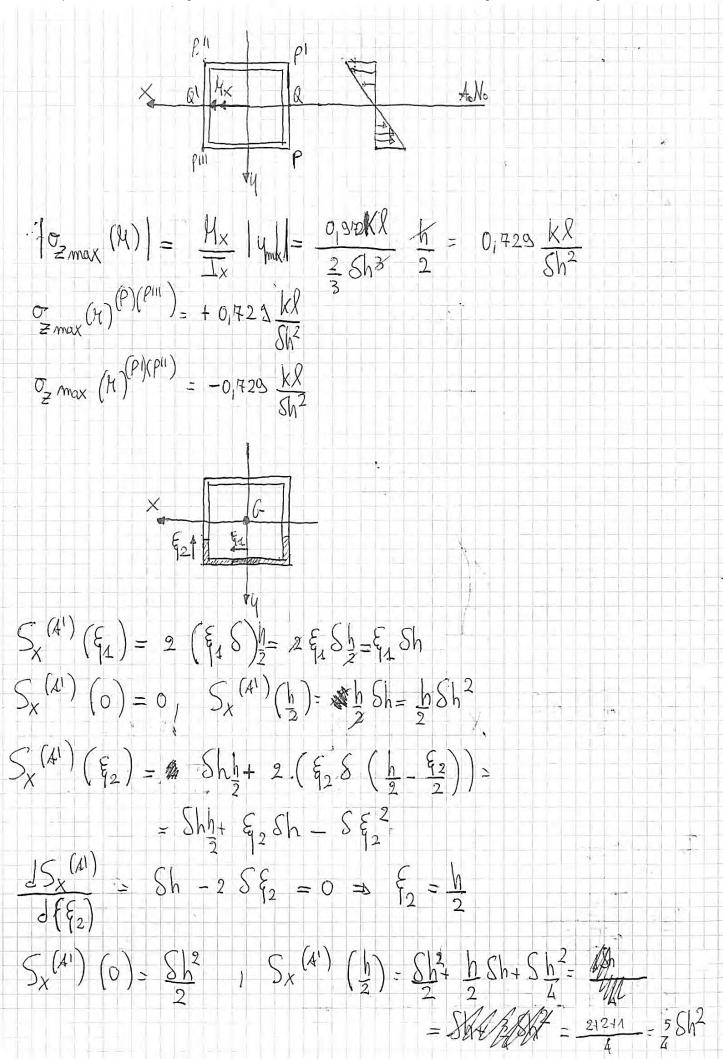
$$\begin{aligned} & \begin{cases} \int_{S} M_{4} \left(\frac{M_{4} X_{1} + M_{2} X_{2}}{ET} \right) = 4 \cdot M_{c}^{0} + 4 \cdot M_{D} \\ & \begin{cases} \int_{S} M_{2} \left(\frac{M_{4} X_{1} + M_{2} X_{2}}{ET} \right) = 4 \cdot M_{c}^{0} + 6 \cdot M_{D} \\ & \begin{cases} X_{4} \int_{S} M_{4}^{2} dz + X_{2} \int_{S} M_{4} M_{2} dz = M_{0} ET \\ X_{4} \int_{S} M_{4} M_{2} dz + X_{2} \int_{S} M_{2}^{2} dz = 0 \end{cases} \\ & \begin{cases} \int_{A}^{2} dz = \left(\frac{A_{3}^{2} + \frac{B}{2} + A_{3}^{2} \right) R_{2}^{2} dz = 0 \\ \int_{S} M_{4}^{2} dz = \left(\frac{A_{3}^{2} + \frac{B}{2} + A_{3}^{2} \right) R_{2}^{2} dz = 0 \end{cases} \\ & \begin{cases} \int_{A}^{3} M_{4}^{2} dz = \left(\frac{A_{3}^{2} + \frac{B}{2} + A_{3}^{2} \right) R_{3}^{2} + 4 R_{3}^{2} R_{3}^{2} + 4 R_{3}^{2} R_{3}^{2} \\ \int_{S}^{3} M_{4}^{2} dz = \left(\frac{A_{3}^{2} + A_{3}^{2} + A_{3}^{2} \right) R_{3}^{2} + 2 R_{3}^{2} R_{3}^{2} \\ \int_{S}^{3} M_{4} M_{2} dz = \left(\frac{A_{3}^{2} - A_{3}^{2} \right) R_{3}^{2} + 2 R_{3}^{2} R_{3}^{2} \\ \int_{S}^{3} M_{4} M_{2} dz = -\frac{1}{6} \left(\frac{A_{3}^{2} + A_{3}^{2} R_{3}^{2}}{R_{3}^{2} + A_{3}^{2} R_{3}^{2}} \right) R_{3}^{2} R_{3}^{2} \\ \int_{S}^{3} M_{4} M_{2} dz = -\frac{1}{3} \left(\frac{A_{3}^{2} + A_{3}^{2} R_{3}^{2}}{R_{3}^{2} + A_{3}^{2} R_{3}^{2}} \right) R_{3}^{2} R_{3}^{2} R_{3}^{2} \\ \int_{S}^{3} M_{4}^{2} dz = R_{3}^{2} R_{3}^{2} R_{3}^{2} R_{3}^{2} R_{3}^{2} R_{3}^{2} R_{3}^{2} \\ \int_{S}^{3} M_{4}^{2} dz = R_{3}^{2} R_{3}^{2$$



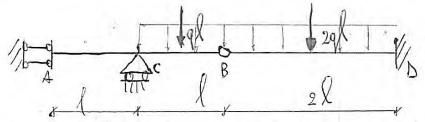
$$\int_{4}^{3} H(\ell) H(\ell) = \frac{1}{6} \left[\left(-\frac{3}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(\frac{3}{2} \right) \left(-\frac{2\pi}{32} q \ell^{2} \right) + \left(\frac{3}{2} \right) \left(-\frac{2\pi}{32} q \ell^{2} \right) \right] = \frac{1}{6} \left(-\frac{81}{64} - \frac{81}{46} - \frac{81}{64} \right) q \ell^{2} = \frac{1}{6} \left(-\frac{106}{64} \right) = \frac{81}{64} q \ell^{3}$$

$$\int_{4}^{3} H(\ell) H(\ell) = \frac{1}{6} \left[\left(-\frac{3}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5}{2} \right) \left(\frac{2\pi}{32} q \ell^{2} \right) + \mu \left(-\frac{5\pi}{32} q \ell^{2} \right) + \mu \left($$

Pala Va 1º quarione: virtema di forre (1), virtema di sportamenti (1) 1.0 = (H1 2(n) dz + (c) dz = = $= \int_{C} \mathcal{H}_{1} \left(\frac{\mathcal{H}_{1} X_{1} + \mathcal{H}_{2} X_{2}}{FT} \right) dz + \int_{C} \mathcal{H}_{\Delta} \frac{2 \alpha \Delta T}{b} dz =$ $= \frac{1}{FT} X_1 \int_{C} H_1^2 dt \frac{1}{FT} X_2 \int_{C} H_1 M_2 dz + \frac{2 \alpha \Delta T}{L} \int_{D}^{C} H_1 dz = 0$ 2º equazione: nistema di forze (2), nistema di Mostamenti (r) 4.0 = \ M2 7e(n) dz + \ M2 77 dz = $=\int_{C}H_{2}\left(\frac{H_{1}X_{1}+H_{2}X_{2}}{EI}\right)dz+\int_{R}^{C}H_{2}\frac{2dbT}{b}dz$ = 1 X1 MMdz + 1 X2 M2 dz + 2xAT CM2 dz EI X1 FI C 2 dz + 2xAT B SH12 JZ | SH1H2 JZ | SSH22 ZZ | SRH162 $\frac{1}{2}\left[(21)^{2} + 4(31)^{2} + 1\right] + \frac{1}{2}\left[21^{2} + 4(31)^{2} + 1\right] + \frac{1}{2}\left[1 + 41^{2} + 1\right]^{2} + \frac{1}{2}\left[1 + 41^{2$ AB $=\frac{1}{4}\left(2\lambda^{2}+3\lambda^{2}+3\lambda^{2}\right)==\frac{1}{4}\left(2\lambda^{2}+6\lambda^{2}+\lambda^{2}\right)=$ 52 P 2 52 83 $\sqrt{\frac{1}{2}} \left(\sqrt{2} \right) = \sqrt{2} \sqrt{3}$ $(\frac{3}{2},\frac{1}{3})$ $(\frac{1}{2},\frac{1}{3})$ $(\frac{1}{2},\frac{$ TOTALE

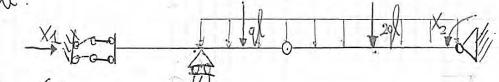


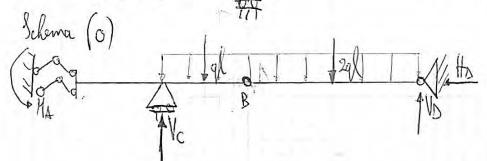
ESAME. 06 FEBBRAIO 2007 COMPTTO 2



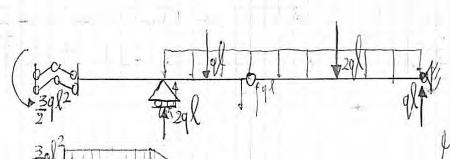
9=2×3=6 V=2+1+2+3=8 => V-9=2 gradi di ipervlaticità

Cer ottenere la truttura isottatica principale ni dovranno degradure due



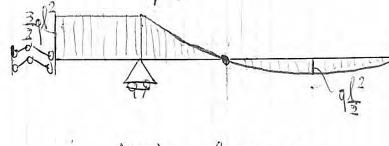


$$+1$$
: $+1$:



$$| \frac{1}{2} \sqrt{c} = 2q l | \frac{1}{2}$$

$$| \frac{1}{2} \sqrt{c} | \frac{1}{2} \sqrt{c}$$

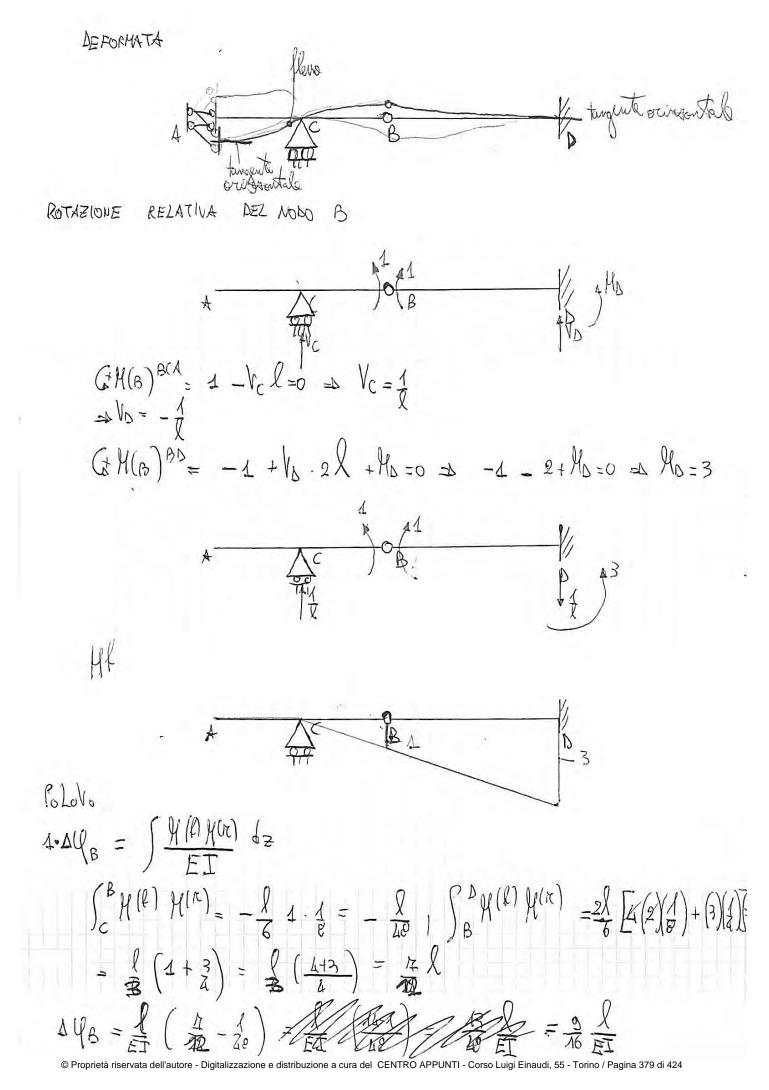


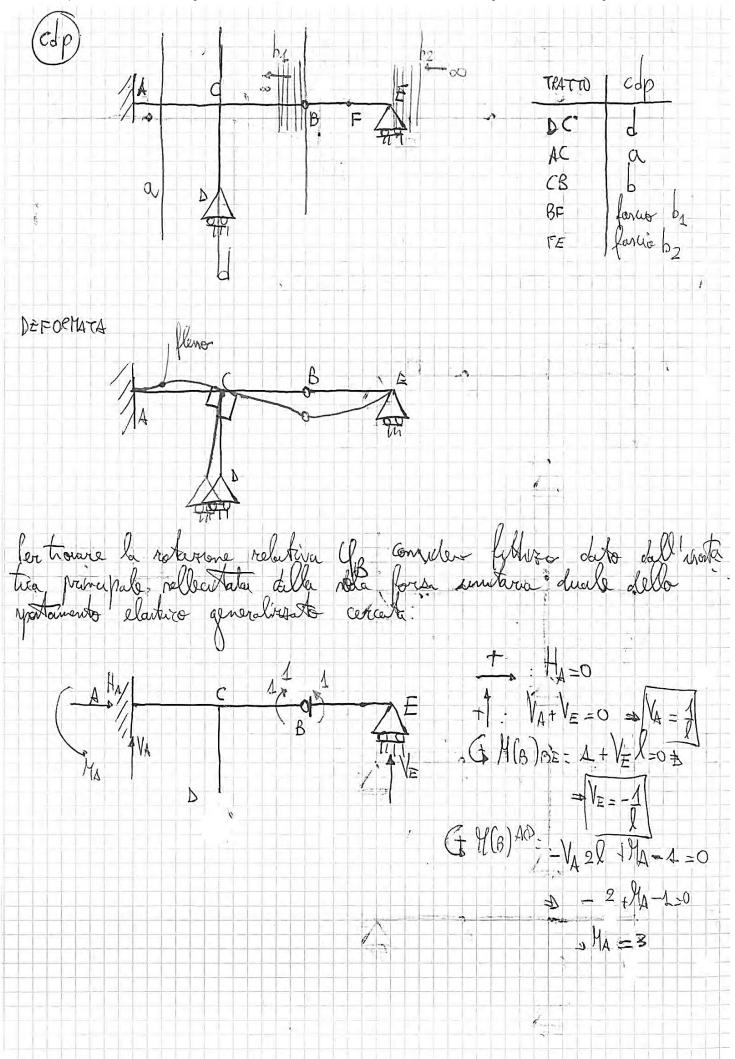
BD:
$$M(z) = q l z = q \frac{1}{2}$$

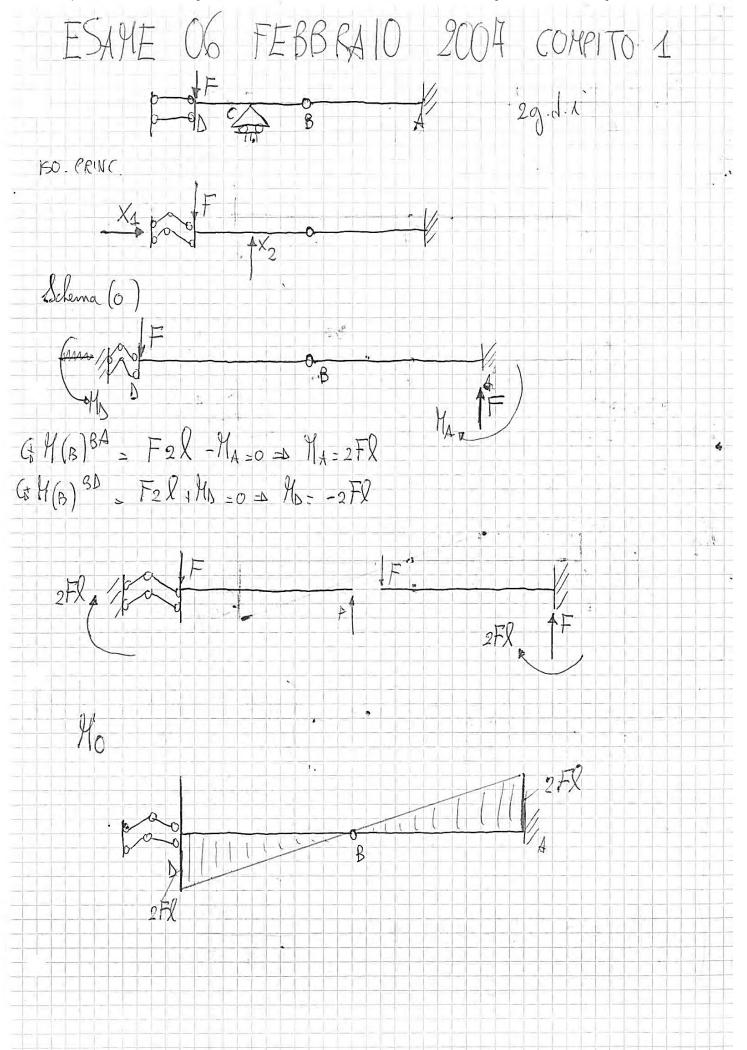
 $M(l) = q l^2 - q \frac{1}{2} = q \frac{1}{2}$

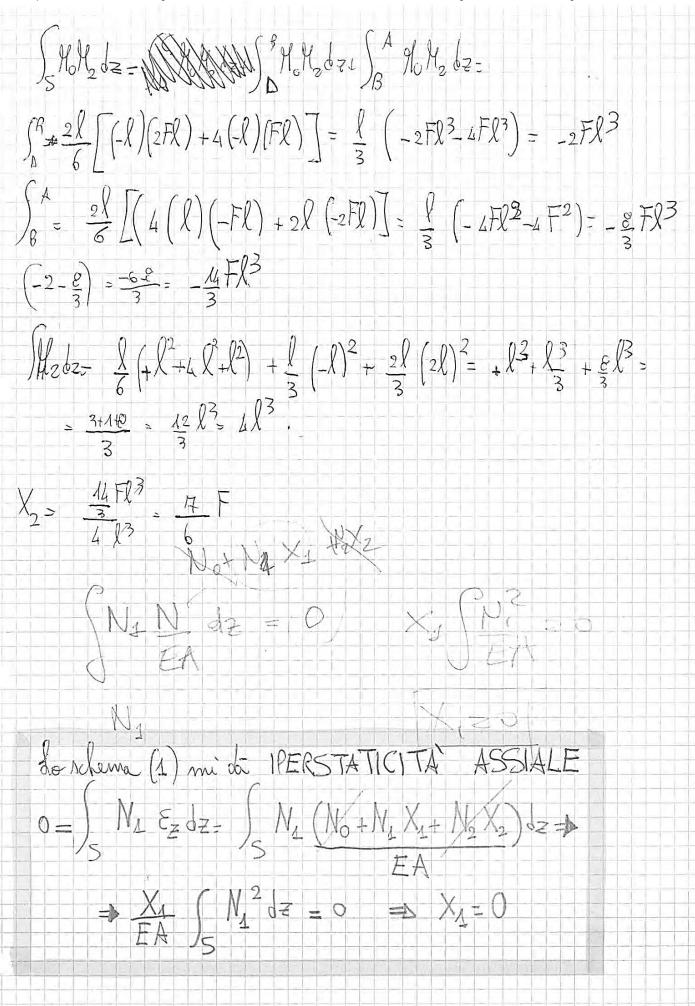
BC:
$$M(z) = -q l z - q z^2$$

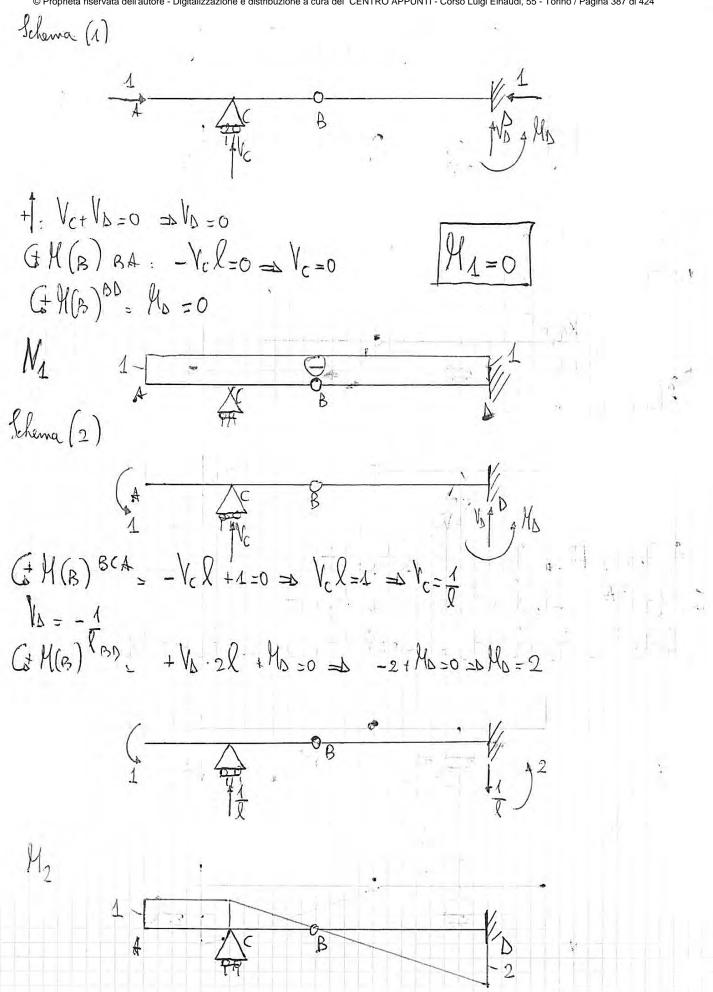
 $M(l) = -q l^2 - q (l^2) = -q l^2 - q l^2 = \frac{-h-4}{8} q l^2 = \frac{5}{8} q l^2$

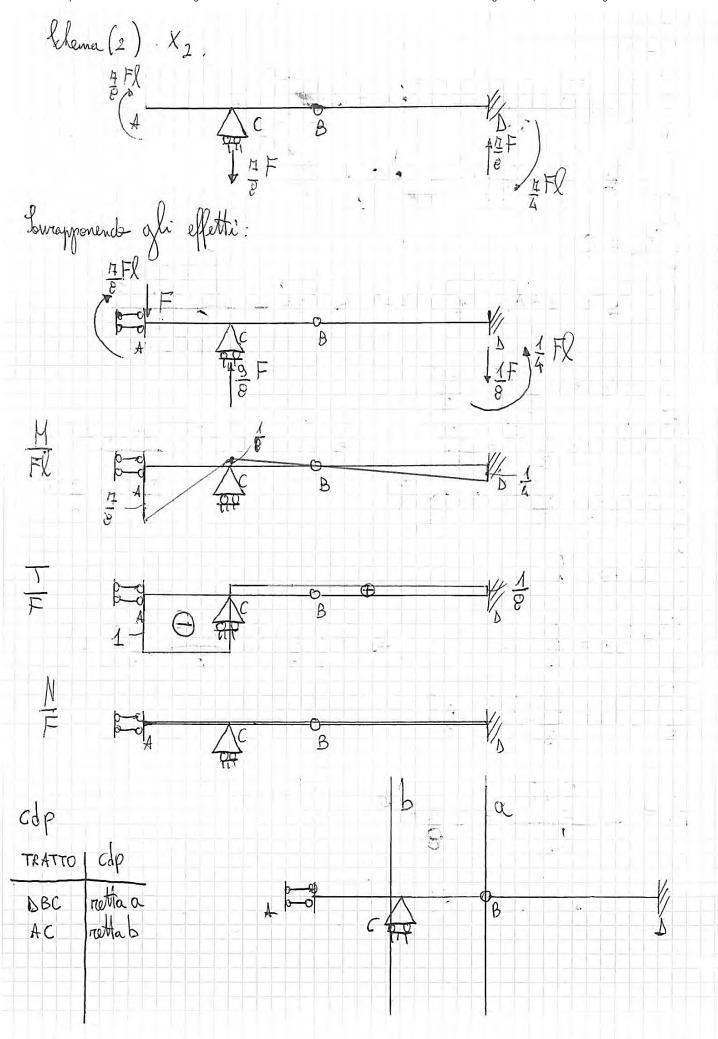


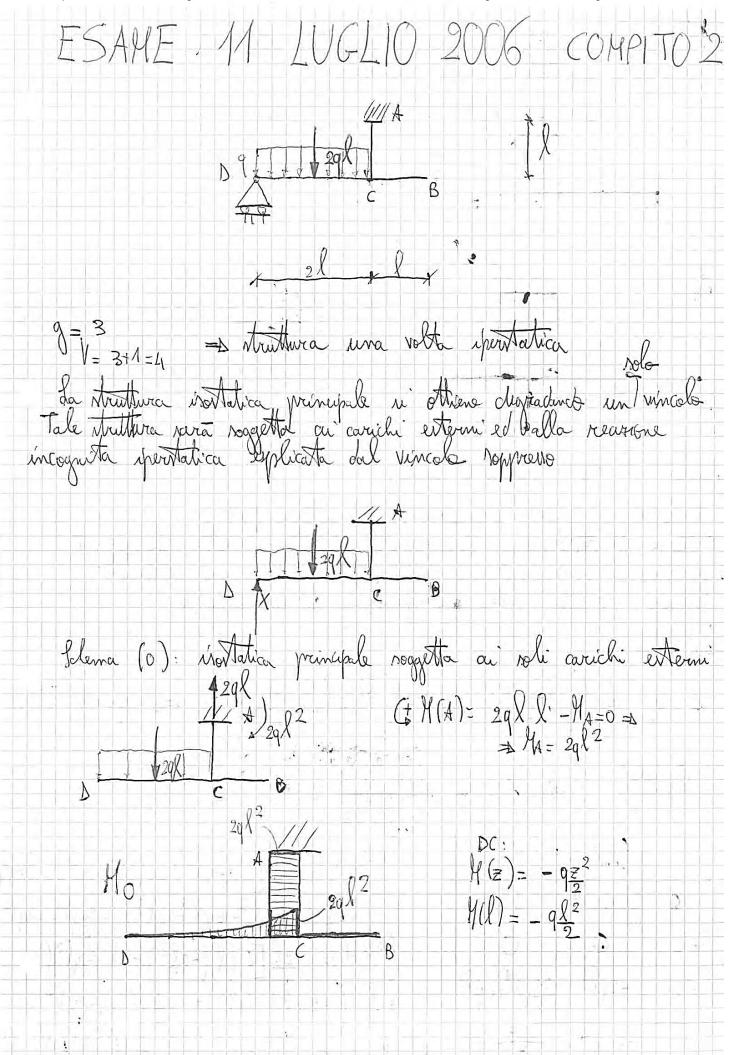


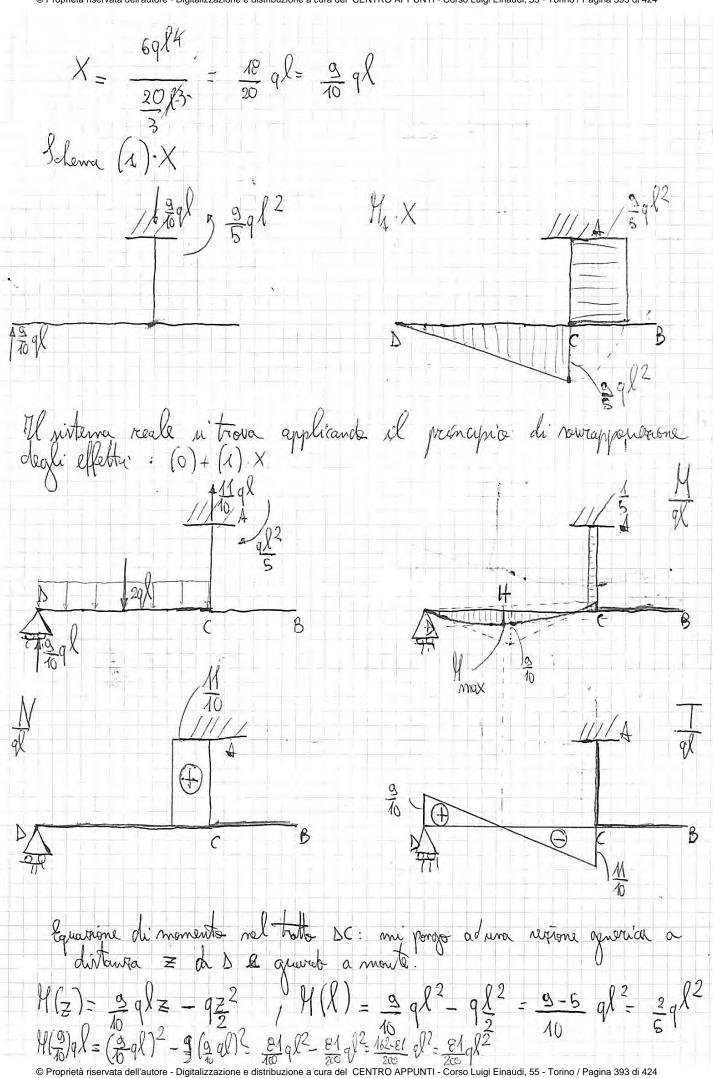


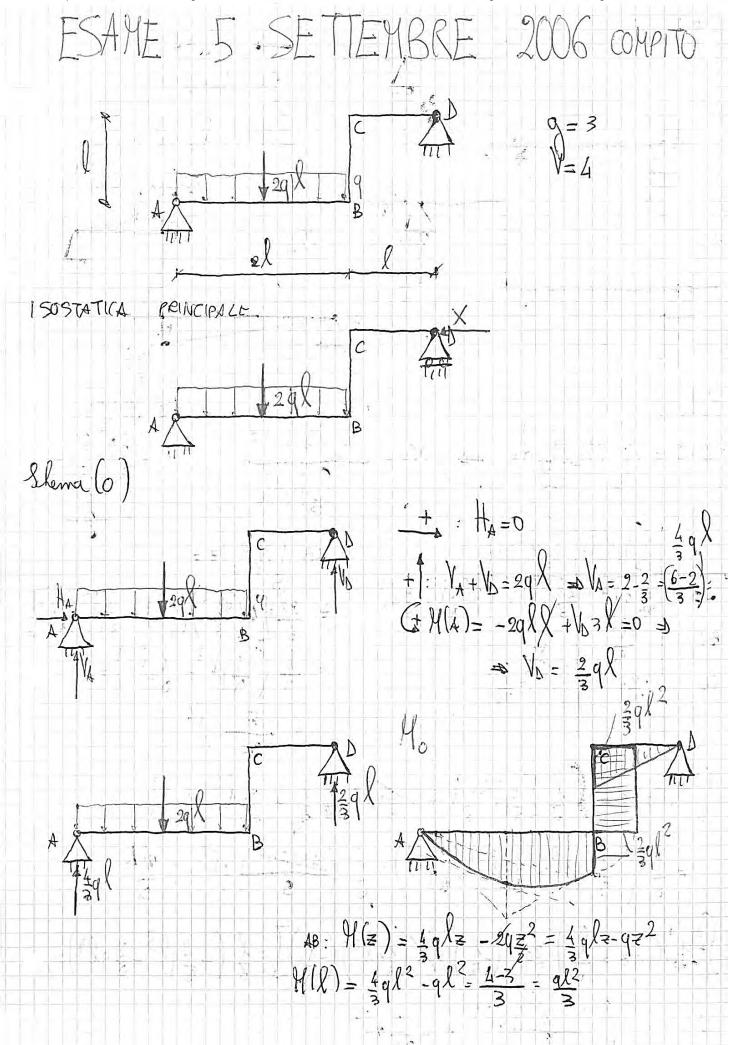












$$\int_{3}^{6} y_{1}^{2} dz = \frac{1}{6} \left[\frac{2}{3} \right]^{2} + 4 \left(\frac{1}{6} \right)^{2} + \left(\frac{1}{3} \right)^{2} \right] = \frac{1}{6} \left(\frac{1}{4} k^{2} + \frac{1}{3}^{2} + \frac{1}{3}^{2} \right) = \frac{1}{6} \left(\frac{1}{4} k^{2} + \frac{1}{3}^{2} + \frac{1}{3}^{2} \right) = \frac{1}{6} \left(\frac{1}{4} k^{2} + \frac{1}{3}^{2} + \frac{1}{3}^{2} \right) = \frac{1}{6} \left(\frac{1}{4} k^{2} + \frac{1}{3} + \frac{1}{3}^{2} + \frac{1}{3}^{2} \right) = \frac{1}{6} \left(\frac{1}{3} k^{2} + \frac{1}{3} + \frac{1}{3}$$