試卷碼	CCUME99B-4202352C-M002					任課老師	林派臣
學年	99	學期	下	日期	2011/06/01	試別	□期中考
科目	Mechanics of Materials II					評分	
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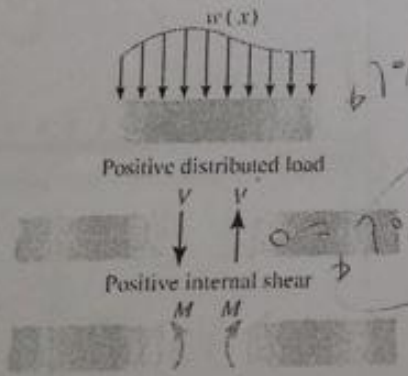
Midterm Exam – Part II (70%)
Time: 2 hr & 30 min

Equations:
A.

Loading	Loading Function $w = w(x)$	Shear $V = -\int w(x)dx$	Moment $M = \int V dx$
(1) M			
(2) P			
(3)			
(4) slope = m			

B. $\theta_{B/A} = \int_A^B \frac{M}{EI}dx$; $t_{A/B} = \bar{x}\int_A^B \frac{M}{EI}dx$; $t_{B/A} = \bar{x}'\int_A^B \frac{M}{EI}dx$

C. The sign convention of the external loads applied to the beam.



Beam sign convention

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7. The acrobat has a weight of 150 lb, and suspends himself uniformly from the center of the high bar. Determine the maximum bending stress in the pipe and its maximum deflection. The pipe is made of L2 steel and has an outer diameter of 1.5 in. and a wall thickness of 1/8 in. Use moment area method. ($E = 29 \times 10^3\ ksi$) (20%)

8. The beam is subjected to the load shown. Determine the equation of the elastic curve. *EI* is constant. Use discontinuity functions. (15%)

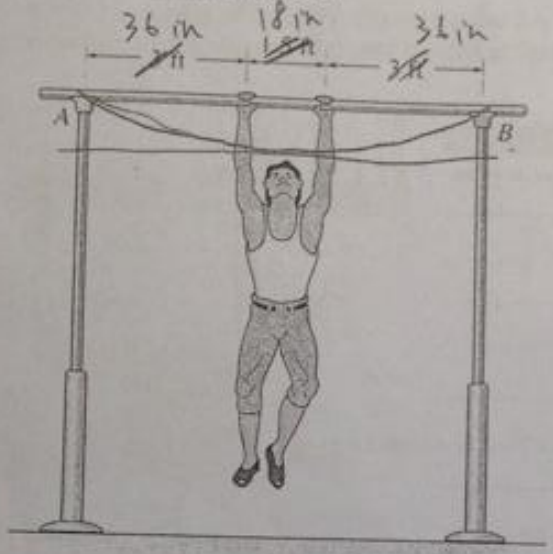

Fig. 7

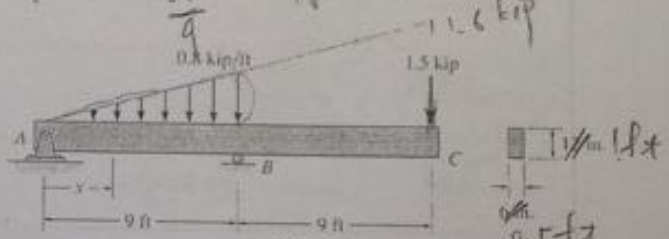

Fig. 8

9. Determine the reactions at the supports A, B, and C. *EI* is constant. Use method of superposition. (Check the number of redundants first) (15%)

10. Determine the moment reactions at the supports A and B. Use the method of integration. *EI* is constant. (Check the number of redundants first) (20%)

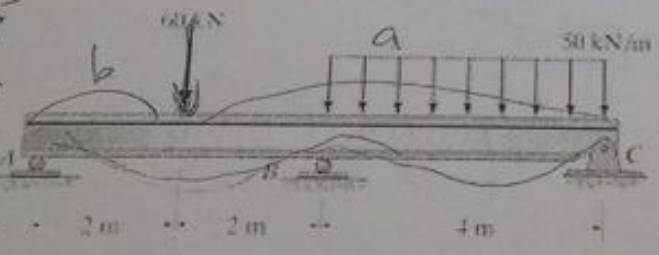

Fig. 9

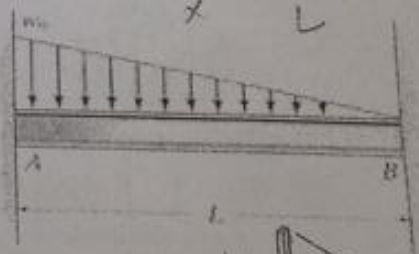

Fig. 10

	$\theta_1 = \frac{-Pab(L+b)}{6EIL}$ $\theta_2 = \frac{Pab(L+a)}{6EIL}$	$v\Big\|_{x=a} = \frac{-Pba}{6EIL}(L^2 - b^2 - a^2)$	$v = \frac{-Pbx}{6EIL}(L^2 - b^2 - x^2)$ $0 \le x \le a$
	$\theta_1 = \frac{-3wL^3}{128EI}$ $\theta_2 = \frac{7wL^3}{384EI}$	$v\Big\|_{x=L/2} = \frac{-5wL^4}{768EI}$ $v_{max} = -0.006563\frac{wL^4}{EI}$ at $x = 0.4598L$	$v = \frac{-wx}{384EI}(16x^3 - 24Lx^2 - 9L^3)$ $0 \le x \le L/2$ $v = \frac{-wL}{384EI}(8x^3 - 24Lx^2 + 17L^2x - L^3)$ $L/2 \le x < L$