EL-MANSOURA UNIVERSITY	4	MASTER DEGREE EXAM.		
FACULTY OF ENGINEERING	28 /0 /2012			
SIRUCIURAL ENG.DEPT.	Maximum Credit 100 Points	TIME ALLOWED: 3 HOURS.	II	
Question 1: 30(4+4+6+6+10) pc	bints			
1-Write about :	hidemaating lineit land instabilit	- and matheda of analysis		
Limit state design, types of bifurcation, limit load instability, and methods of analysis.				
influencing frame stability.	for computing the first elastic	critical loads and factors		
3. Rearrange the portal frames critical loads, confirming you	shown in Figs(1) starting with t r answers.	he frame having the lowest		
<ol> <li>For a perfectly straight men</li> <li>Find the expressions formula</li> </ol>	aber shown in Fig.(2), find the s ae to compute the deflection an	stability functions S and C. Id moment for both beam		
columns shown in Figs.(3). Th	en, compute the maximum mor	nents and deflections in both:		
case $I(P = 200t, Q = 20t)$	, w = 3 t/m' ), and case II( $P_{\rm s}$	=0. $Q = 4 t$ , $w = 3t/m'$ ).		
Question 2: 55(10+15+10+20) pc	pints			
1-Confirm that the critical load	s in both frames shown in Fig.	(4) are equals .		
2- For both portal frames shown in Fig.(5), sketc buckling . If both frames have one story only ,	h the various possible buckling modes. Find the d give your comment.	eterminate conditions for symmetrical modes o	f	
3- For the portal frame shown in Fig.(6), prove that the prevented sway critical load occurs when (S+2)(S+4)(S+6)=0.				
4. For the portal frame shown is prevented and sway permitted 9.87 $EI/L^2 < P < 20.1 EI/L^2$ (sy	in Fig.(7) , and using the different $I_{\rm r}$ , show that, cosidering: Lb = way prevented), and 0.0< P <	ential equations in case of swa Lc= L 2.47 EI/L <sup>2</sup> (sway permitted)	ay	
Question 3: 25(10+15) points				
1 For the frame shown in Fig.(8) compute the load P taking the buckling into consideratio if the section of column bd is B.F.I.B. 28 with given				
properties. If the section of the column buils turned so degree recalculate the load P, giving your comment.				
2. For both members ABC and EBD in column panel (Fig.9) and Cantilever column (Fig.10)				
compute the critical load us	ing the differential equations.	-		
	D	⊧ 2P		
x-	r → Ki → r	K2		
	EI ,L	EI ,L		
Fig.(9)				
	Fig.(10)	Ŷ		
	3			
			-	



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EL-MANSOURA UNIVERSITY	1	MASTER DEGREE EXAM.
STRUCTURAL ENG.DEPT.	23/9/2013	THEORY OF ELASTIC STABILITY
0 uestion 1: 30(4+4+6+6+10)	Maximum credit 100 Fomts	TIME ALLOWED: 3 HOURS.
1-Write about : Limit state design, types o	f bifurcation, limit load instabilit	y. and methods of analysis.
2. Mention shortly two method influencing frame stability.	ls for computing the first elastic	critical loads and factors
3. Rearrange the portal frame critical loads, confirming yo	s shown in Figs $(1)$ starting with our answers.	the frame having the lowest
4. For a perfectly straight me 5. Find the expressions formu	and the fig. (2), find the slae to compute the deflection an	nd moment for both beam
columns shown in Figs.(3). 1	Then, compute the maximum mor	nents and deflections in both:
case $I(P = 200t, Q = 20)$	t , w = 3 t/m' ), and case II( P $$	=0. $Q = 4$ t, $w = 3t/m'$ ).
Question 2: 55(10+15+10+20)	points	
<ol> <li>Confirm that the critical los</li> <li>For both portal frames shown in Fig.(5), ske buckling . If both frames have one story only</li> </ol>	ads in both frames shown in Fig. Atch the various possible buckling modes. Find the d , give your comment.	(4) are equals . leterminate conditions for symmetrical modes of
3— For the portal frame shown in Fig.(6), prove	e that the prevented sway critical load occurs wher	n (S+2)(S+4)(S+6)=0.
4. For the portal frame shown prevented and sway permitt 9.87 $EI/L^2 < P < 20.1 EI/L^2$ (	in Fig.(7) , and using the differ ed, show that, cosidering: Lb = (sway prevented), and $0.0 < P < 100$	ential equations in case of sway Lc= L 2.47 EI/L <sup>2</sup> (sway permitted)
		M1.
Question 3: 25(10+15) points		
1 For the frame shown in Fig.(8) compute the	e load P taking the buckling into consideratio if the	section of column bd is B.F.I.B. 28 with given
properties. If the section of the column bd	is turned 90 degree recalculate the load P, giving	your comment.
2. For both members ABC and	d EBD in column panel (Fig.9) an	nd Cantilever column (Fig.10)
compute the critical load u	ising the differential equations.	
$  \times  $		
	P P	⊧ 2P
E C X	K1 >1	K2
	EI,L	EI ,L
Fig (9)		
F1g.(3)	Fig.(10)	Ŷ
	3	
	3	
	-	