	بسم الله الرحمن الرحيم	
Course No: Course Title: Advanced Structural Design Date: 14 / 11 / 2011 No. of Questions: 3 Time: 90 min Using Calculator (Yes)	University of Palestine Final Exam Fall Semester 2010/2011	Instructor: Dr. Nader Okasha Student No.: Student Name: College Name: Engineering College Dep. / Specialist: Using Dictionary (No)
OPEN BOOK EXAM	1 otal Grade: 20	Using Dictional y (110)

Problem 1 (2 points):

Draw the live load pattern that produces the critical internal responses in the following cases:



(1) Maximum negative moment at support A.



(2) Maximum positive moment at midspan point B.



(3) Maximum negative moment at support C.



(4) Maximum negative moment at support D.

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Problem 2 (6 points):

Determine the stiffness of an interior column in a typical storey that should be used to analyze the indicated E-W interior frame of the flat plate structure shown in Figure P2 below using the Equivalent Frame Method. The slab is 27 cm thick. All columns are 40x40 cm in cross section. Storey height = 3.0 m.



Figure P2



Problem 3 (12 points):

Figure P3 shows a plan of a building for class rooms in a school to be designed and constructed on a very dense soil and soft rock in the City of Jeddah, Saudi Arabia. The floor dead load is 10 kN/m^2 . The thickness of all shear walls = 30 cm. Use the IBC2009 procedures, and consider the attached tables F-1 and F-2 of the UFC2010 to perform the following tasks:

- 1. Determine the base shear induced due to design EQ activity acting in the East-West direction (5 points).
- Determine the base shear induced due to design wind activity acting on the leeward side of the building in the East-West direction. You may need the conversion: 1 mph = 0.45 m/sec. (5 points).
- 3. Neglect the accidental eccentricity and calculate the base shear in wall W4 induced by EQ activity (2 points).



Plan

Figure P3

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TABLE F	<u>-1</u>		Ground Snow	Wind Speed	Frost Penetration	Ground Snow	Wind Speed	Frost Penetration
Continent / Region	Country	Base / City	(psf)	(mph) Note (a)	(inches)	(kPa)	(km/h) Note (a)	(mm)
Asia	Saudi Arabia	Hafr al Batin	0	80	0	0.00	129	0
		Khamis Mushayt	0	80	0	0.00	129	0
		Jeddah	0	80	0	0.00	129	0
		Jubail	0	80	0	0.00	129	0
		Qadimah	0	80	0	0.00	129	0
		Riyadh	0	80	0	0.00	129	0
		Tabuk	0	80	0	0.00	129	0

TABLE F-2			Seis	mic Loadin	g (Site Clas	s B)
Continent / Region	Country	Base / City	S _s (%g)	S₁ (%g)	10/50 S _s (%g)	10/50 S₁ (%g)
Asia	Oman	Central, Southern, and Coastal Areas Sur to Sarfait				
Pakista Qatar Saudi J		- Barik				
		- Dawqa	3	1	2	1
		- Hayma	0	0	0	0
		- Salalah	8	3	4	2
		- Shalim	0	0	0	0
		High Jabal Locations				
		- Miskin	107	43	54	21
		- Sumail				
		- Rikshah	98	39	49	20
		- Shaww	99	40	50	20
		Kuria Muria Island				
		Masirah Island	19	8	9	4
		Mussandam Island				
	Pakistan	Peshawar	105	42	53	21
	Qatar	Doha	6	6	3	3
	Saudi Arabia	Dhahran	10	4	5	2
		Hafr al Batin				
		Khamis Mushayt	6	2	3	1
		Jeddah	49	20	24	10