

Course No: ECGD4214
Course Title: Transportation II
Date: 25.05.2011
No. of Questions: 6 + 1
Time: 3 Hours
Using Calculator: (Yes)

University of Palestine



Open Book Final Exam
2nd Semester 2010/2011
Total Grade: 60 + 10

Instructor: Dr. Wa'el Albawwab
Student No.:
Student Name:
College Name:
Dep. / Specialist:
Using Dictionary: (Yes)

Q1- Derive a general mathematical expression for determining the middle ordinate of the horizontal curve alignment. Enhance your answer with all the necessary sketches and definitions. **(10 Marks)**

Q2- Define the different turning radii of the design vehicle, and explain their relevance to the highway design process. **(10 Marks)**

Q3- How does aging affect the behaviour of the flexible pavement? How does asphalt binder content affect the behaviour of the flexible pavement? **(10 Marks)**

Q4- A wide clay deposit is to be used as a roadbed for a major highway:
a) Is flexible or rigid paving suitable for such a site condition? Explain. **(5 Marks)**
b) What steps should be done to avoid potential distresses? Explain. **(5 Marks)**

Q5- Design the pavement for an expressway consisting of an asphalt concrete surface, a crushed-stone base, and a granular subbase using the 1993 AASHTO method. The cumulative ESAL in the design lane for a design period of 18 years is 7×10^6 . The area has excellent quality drainage with 5% of the time the moisture level is approaching saturation. The effective roadbed soil resilient modulus is 7 ksi, the subbase has a CBR value of 80, the resilient modulus of the base is 40 ksi, and the resilient modulus of asphalt concrete is 4.5×10^5 psi. Assume a reliability level of 90% and S_o of 0.4. **(10 Marks)**

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Q6- Determine the required slab thickness for an expressway with the design traffic tabulated below. The pavement is to be constructed with doweled joints, and with concrete shoulders. Concrete modulus of rupture is 650 psi. The modulus of subgrade reaction is 130 pci. **(10 Marks)**

Axle Load (kips)	Design Repetition (n)
22S	640000
24S	545000
26S	9300
28S	3100
30S	3100
40T	250000
42T	172000
44T	158000
46T	48000
48T	32000
50T	32000
52T	3100

Q7- (Laboratory) Write a brief report highlighting the main tests discussed during your field visit to the lab. **(10 Marks)**