NTUA – SCHOOL OF CIVIL ENGINEERING **1/6/2012**

CB22. ENGINEERING SEISMOLOGY

EXERCISE No 10

The construction site of an industrial unit is located at the middle of a seismic zone with a radius of 200 km. Earthquake events, with the same probability of occurrence and a maximum magnitude of 6.4, may occur at any location of the seismic zone. The annual seismicity of the area is given by the Guttenberg – Richter relationship: $\log(N) = 7.1 - M$

In order to estimate the seismic hazard at the examined site, the zone is divided into a square grid of 2X2 km^2, with the examined site at the center of one of the squares. The seismicity of each of the squares is considered concentrated at its center. Using this model calculate the probability of exceedence of a 0.50 g ground acceleration during the 50 years lifetime of the industrial unit.

EXERCISE No 11

A construction site is at the middle of a seismic zone with a radius of 40 km where a characteristic earthquake of 6 magnitude with a return period of 10 years is expected. The site is situated at a distance of 20 km perpendicular at the middle of a fault with a total length of 40 km where a characteristic earthquake of 7.5 magnitude with a return period of 100 years is expected. Calculate the probability of exceedence of 0.25 and 0.50 g acceleration at the examined site during a 50 year period.

EXERCISE No 12

A construction site is located at the middle of two faults having each a length of 40 km. On the one fault a characteristic earthquake of 6.0 magnitude with a return period of 10 years is expected and on the other a characteristic earthquake of 7.0 magnitude with a return period of 100 years. Calculate the probability of exceedence of 0.15 and 0.50 g acceleration at the examined site during a 50 year period.