

系所組別： 水利及海洋工程學系乙組

考試科目： 海岸工程

考試日期： 0307，節次： 1

※ 考生請注意：本試題 可 不可 使用計算機

1. (50%) Write a short, qualitative definition of the following terms or the difference between two terms :
  - (a) Shoaling
  - (b) Refraction (of waves)
  - (c) Diffraction (of waves)
  - (d) Significant wave height
  - (e) Groin effect
  - (f) Wave breaking
  - (g) Wave generated longshore current
  - (h) Shallow water wave & Deep water wave
  - (i) Wave celerity & Particle velocity
  - (j) Spring tide & Neap tide
2. (20%) The dispersion relationship based on linear wave theory can be described by
$$\omega^2 = gk \tanh kh \quad (1)$$
where  $\omega$  is the angular frequency,  $k$  the wavenumber,  $g$  the gravitational acceleration and  $h$  the water depth. Using this relationship to simplify equation (1) as:
  - (a) in the case of shallow water condition.
  - (b) in the case of deep water condition.
  - (c) A wave in water 100 m deep has a period of 10 second and a height of 2m. Determine the wave celerity, length and steepness.
  - (d) What is the wave celerity and length when the wave propagates into a nearshore depth of 2.2m.
3. (15%) The protection of beaches against erosion is an important aspect of coastal engineering works. Explain what are the soft engineering structures and hard engineering structures used in shore protection. Give one example for each type of structure and state their advantages and disadvantages.
4. (15%) The equilibrium beach profile is a useful concept for a variety of coastal engineering analysis and design purposes. The most common form of an equation to define the equilibrium beach profile is  $h = \alpha x^{2/3}$ , where  $h$  is the depth below the mean water level for a given distance  $x$  offshore and  $\alpha$  is a coefficient which is function of grain particle diameter. State two main drawbacks of such a profile.