

Department of Physics, National Dong Hwa University,

No. 1, Sec. 2, Da Hsueh Rd., Shoufeng, Hualien, 97401, Taiwan

**General Physics-I (PHYS1000AA, AB, AC)**

**Quiz - 3**

Date: 2022-12-15 Fall Semester-111

Time: 10:00 am – 11:00 pm Maximum marks: 100

Student id: Name:

1. **A standing wave is established in a 120-cm-long string fixed at both ends. The string vibrates in four segments when driven at 120 Hz. (a) Determine the wavelength. (b) What is the fundamental frequency of the string?**

**Solution:**

 We are given *L* = 120 cm, *f* = 120 Hz.

 (a) For four segments, or 

 (b)  

**2. A liquid has a density** $ρ$**. (a) Show that the fractional change in density for a change in temperature** $∆$**T is** $∆ρ/ρ$ **= -**$β∆T$ **. (b) What does the negative sign signify? (c) Fresh water has a maximum density of 1.000 0 g/cm3 at 4.0oC. At 10.0oC, its density is 0.999 7 g/cm3. What is** $β$ **for water over this temperature interval? (d) At 0oC, the density of water is 0.999 9 g/cm3. What is the value for** $β$ **over the temperature range 0oC to 4.00oC ?**

**Solution:**

 (a)  and 

 For very small changes in *V* and *ρ*, this can be expressed as

 

 (b) 

 (c) For water we have 

 (d) 