Nepal College of Information Technology

**Unit Test**

Fall 2012

Program : BE IT Time : 2 hrs

Semester : (I) FM : 70

Subject : Physics PM : 35

* *Candidates are requested to give their answer as far as practicable in their own words.*
* *The figure in the margin indicates the full marks*
* ***Attempt ALL question***

1. a) Define angular simple harmonic motion with its differential equation. Derive the relation for time period of bar pendulum and show that the time period will be minimum when the radius of gyration is equal to the effective length of the pendulum. 9

b) The pressure variation due to a raveling wave is given by P = - 1.5 sin (πx-330πt), where x is in meters, t in seconds and P in Pa. Calculate pressure amplitude, frequency, wave length and speed of wave. 6

2. a) Starting from the progressive wave equation, show the relation between wave velocity and particle velocity. Also derive the one dimensional differential wave equation that relate the particle acceleration and wave velocity. 9

b) A loudspeaker diaphragm is vibrating in simple harmonic motion with a frequency of 440 Hz and a maximum displacement of 7.5 mm. What is the angular frequency and maximum speed? 6

3. a) Explain why the velocity of sound is greater in solid medium than in liquid and gaseous medium. Derive the pressure wave equation and show the relation between pressure amplitude and displacement amplitude graphically. 9

b) Newton’s rings that are formed by sodium light between the flat glass plate and convex lens are viewed normally from above. What will be the order of the dark ring, which will have double the diameter of that of 40th dark ring? 6

4. a) How the interference is differ from the diffraction? Explain the Newton's ring experiment to determine the wavelength of monochromatic light. 9

b) Calculate the thickness of quarter wave plate for quartz has refractive indices µE = 1.553, µo = 1.544, and λ = 6x 10-5 cm. **6**

5) Write short notes on any two: 5\*2

a) Malus law

b) Doppler's Effect

c) Brewster's law