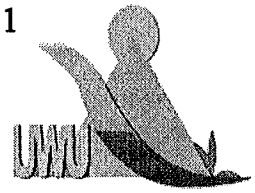




Uva Wellassa University, Sri Lanka
End Semester Examination – August/September 2011
SCT 252-2 Physics II
(Repeat Examination)



Time: Two (02) hours

Total four (04) Questions
Answer all questions
25 marks for each question

- 01) Clearly explain the followings.
- Superposition theorem
 - Huygens' principle
 - The phenomenon of interference
 - Fraunhofer diffraction
 - Fresnel diffraction
- 02) I. State three types of damping vibrations.
II. Find the half logarithmic decrement in "under damping".
III. A weight of mass 0.1 kg is attached to the lower end of a helical spring and upper end is fixed to a rigid support. The period of small vertical oscillations of the weight is found to be 1 s.
- Calculate the spring constant of the spring.
 - Calculate the magnitude of the damping resistance which would be necessary to cause the amplitude of the oscillations to fall by 10% per complete cycle.
- 03) I. A particle is simultaneously subjected to three simple harmonic motions, all of the same frequency and the X direction. If the amplitudes are 0.25, 0.30 and 0.15 mm, respectively and the phase difference between the first and second is 60° and between the second and third 30° . Find the amplitude of the resultant displacement and its phase relative to the first (0.25 mm amplitude) component.
- II. Construct the Lissajous figures of the combined motion.
- $x = \cos(2\omega t)$ and $y = \sin(2\omega t)$
 - $x = \cos(2\omega t)$ and $y = \cos(2\omega t - 45^\circ)$

- 04).
- I. Describe the arrangement you would use to show the interference of light from two similar small sources and point out the conditions that are essential to the success of the experiment.
 - II. Derive the formula relating the fringe width with the wavelength of the light and the constants of the apparatus in a Young's double slit experiment.
 - III. In a Young's double slit experiment two narrow slits were 0.5 mm apart and the fringes were observed in a plane 100 cm from the plane of the slits. It was found that the distance from the first to the eleventh bright fringe was 9.72 mm. Calculate the wavelength of the light used.