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RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B. Sc. (General) Degree in Applied Sciences
First Year - Semester I Examination – October / November 2014

PHY 1102 - WAVES AND VIBRATIONS

Answer any two questions **Time: 1 hour**

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1. (a) Define Simple Harmonic Motion (SHM). [10 marks]

   (b) Use a graphical method to construct the resultant motion of a particle subjected to two SHMs in directions at right angles to one another given by;

   $y = 3 \sin \omega t$
   $x = 3 \sin (\omega t - \pi/2)$ [40 marks]

2. (a) What is the principle of superposition? [10 marks]

   (b) Consider two waves traveling in opposite directions described by;

   $y = A \sin (kx - \omega t)$ and

   $y = A \sin (kx + \omega t)$

   Derive an expression for the resultant of these two waves. [20 marks]

   (c) What are the characteristics of the resultant wave obtained in (b) above?

   [20 marks]

3. Write short notes on the following.

(i) Helmholtz resonator [12 marks]

(ii) Damped harmonic oscillator [12 marks]

(iii) Amplitude – Phase diagrams [14 marks]

(iv) Sound in tubes [12 marks]

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