RAJARATA UNIVERSITY OF SRI LANKA
FACULTY OF APPLIED SCIENCES

B.Sc. (General) Degree in Applied Sciences

First Year - Semester I Examination - March 2021

PHY 1102 – WAVES AND VIBRATIONS

Time: One (01) hour

Answer TWO questions only.

Symbols have their usual meaning.

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1. a) Define Simple Harmonic Motion (SHM) and derive the equation of motion of SHM. (20 marks)

b) A particle is subjected to two SHMs at right angles described by the following equations.

$$y = a \sin \omega t$$

$$x = b \sin \omega t$$

By **solving equations,** show that the particle is moving in a straight line (10 marks)

c) A particle is subjected to two SHMs at right angles described by the following equations.

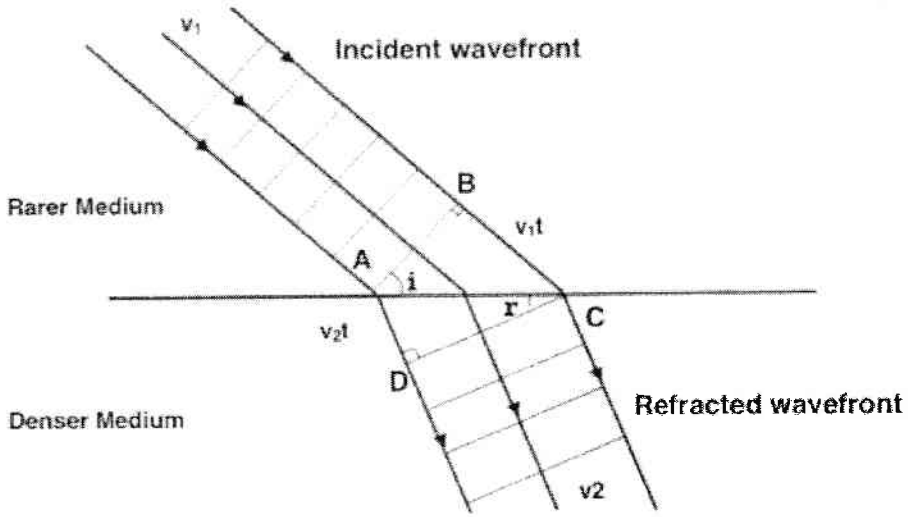
$$y = \sin \omega t$$

$$x = \sin (\omega t - \pi/4)$$

Using **a graphical method,** construct the path of the particle. (20 marks)

2. a) What is Huygens' Principle ? (15 marks)

b) As per the diagram shown below consider a plane wave front AB which is incident on the interface of two media. Let v_1 and v_2 be the velocities of the incident ray and refracted ray of medium 1 (Rarer Medium) and medium 2 (Denser Medium) respectively ($v_1 > v_2$).



Using Huygens' Principle, show that the above plane wave obeys the Snell's Law of Refraction. (35 marks)

3. Write **short notes** on the following

a) Fundamental frequency and harmonics of open tubes. (12 marks)

b) Helmholtz resonator. (12 marks)

c) "Swing door is a critically damped system". (12 marks)

d) Doppler Effect in sound. (14 marks)

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