

Chemistry

- 1) How much water (in ml) should be added to 400 ml of a solution of concentration C_1 to obtain a new solution of concentration $C_2=0.625 C_1$?
- a) 225 ml
 - b) 240 ml
 - c) 625 ml
 - d) 640 ml
 - e) None of the above
- 2) A kinetic constant of a chemical reaction can be expressed with:
- a) Beer-Lambert's law
 - b) Hess's law
 - c) Arrhenius's law
 - d) Clapeyron's law
 - e) none of the above

Physics

1. Spherical waves are created at the surface of water. At a distance of 15 cm of the source a detector is able to count the numbers of crests (maximum positive amplitude). It detects 30 crests in 1 minute. The wave velocity is 0.6 cm/s. The value of the wavelength λ is
- a. 12 cm
 - b. 3 mm
 - c. 0.012 m
 - d. 0.3 m
 - e. None of the above
2. A light beam is refracted at the interface between two medium. The incident medium is water ($n_i = 1.33$) and the refracted medium is glass ($n_r = 1.5$). The angle between the incident ray and the normal with the interface is $\alpha = 16^\circ$. What is the value of the refracted angle?
- a. 14°
 - b. 18°
 - c. 16°
 - d. 12°
 - e. None of the above

Mathematics

1. How many common positive divisors own the two integers 54600 and 16380?

- a) 6
- b) 8
- c) 12
- d) 16
- e) 48

2. How many different teams of basketball can the coach form with his 10 players? (Precision: we consider a team is composed by 5 numbered players 'on the spot, with different positions', and 5 substitute players 'on the bench'.)

- a) 302
- b) 3024
- c) 30240
- d) 302406
- e) 3024064

Scientific General Culture

1) The Caspian Sea level is:

- a) 25 meters higher than the ocean level
- b) 28 meters lower than the ocean level
- c) at same altitude than the ocean level
- d) in the ground state level
- e) none of the above

2) Moore's law:

- a) is the result of an observation
- b) is computed from silicon design
- c) is about climate change
- d) says what you can and cannot do in computer science
- e) is none of the above