**PHYS 232 Assignment # 3** Due: Monday 23/3/2020

Instructor: Professor Henry Jaqaman

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| 1 | 2a | 2b | 2c | 2d | 2e | ترتيب | Total |
| 40 | 10 | 10 | 10 | 10 | 10 | 10 | 100 |
|  |  |  |  |  |  |  |  |

Draw the above table at the top of the first page of your solutions.

You can submit a total of 2 pages only (1 page per problem).

1. X-rays with a wavelength of 1.88 Å are incident on a cubic crystal with atoms separated by d0 = 4.00 Å. Consider diffraction from the planes with spacing d1 as in Figure P3.38 page 104. How many different maxima are diffracted from these planes? Give the angles (with respect to these planes) at which these maxima are observed.
2. In Compton scattering the photon is incident along the x-axis and has an energy of 2.00 MeV. It is scattered by a free electron initially at rest through an angle θ = 60.0° (see Figure 3.22 page 90). Find
   1. The wavelength of the incident photon. (10%)
   2. The wavelength of the scattered photon. (10%)
   3. The energy of the scattered photon. (10%)
   4. The final kinetic energy of the electron. (10%)
   5. The angle φ through which the electron is scattered. (10%)

**+10%** for good hand-writing and clear and well-organized solutions.

**You are expected to work alone. Academic honesty is very important. Cheating will make you lose grades.**