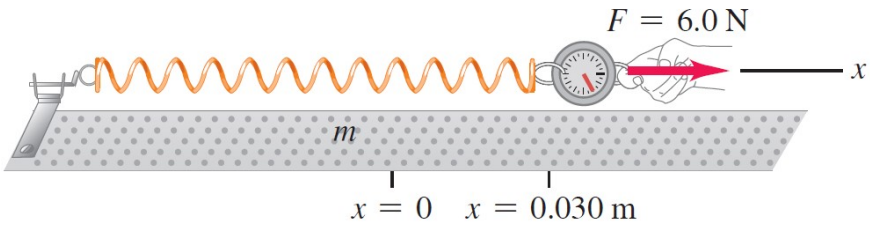
ALLAMA IQBAL OPEN UNIVERSITY
Semester Terminal Exam Autumn 2020

Program /level:	B.Ed	Maximum Marks	100
Title /Course Code	**Physics II (6442)**	Pass marks	50

Instructions for Exams:

1. Attempt All Questions.
2. Write answers in your own words and avoid copying from an internet source or any book.
3. Be precise, avoid unnecessary details, answer to each question must be between 600-800 words.
4. Students are advised to upload their answer sheets/solutions on LMS portal as soon as they complete their answers and not to wait for 8:30 PM.
5. Submissions after due date & time will not be entertained. Attach undertaking with each course code which were allowed to attempt in Urdu.
6. If plagiarism found, Student may be declared fail.

Q. No.	Questions	Marks
Q.No.1	(a) Explain the concept of Simple Harmonic Oscillations by providing examples from daily life, also derive its formula. (b) A spring is mounted horizontally, with its left end fixed. A spring balance attached to the free end and pulled toward the right (**Fig. below**) indicates that the stretching force is proportional to the displacement, and a force of 6.0 N causes a displacement of 0.030 m. We replace the spring balance with a 0.50 kg glider, pull it 0.020 m to the right along a frictionless air track, and release it from rest. (a) Find the force constant k of the spring. (b) Find the angular frequency v, frequency f, and period T of the resulting oscillation.  (c) Two argon atoms form the molecule Ar2 as a result of a van der Waals interaction with $U_0 = 1.68\times10^{-21}$ J and $R_0 = 3.82\times10^{-10}$ m. Find the frequency of small oscillations of one Ar atom about its equilibrium position.	**13+10+10**

Q.No.2	a) A two-slit interference experiment in which the slits are 0.200 mm apart and the screen is 1.00 m from the slits. The $m = 1$ bright fringe in the figure is 9.49 mm from the central bright fringe. Find the wavelength of the light. b) A common lens coating material is magnesium fluoride, with n = 1.38. What thickness should a non-reflective coating have for 500 nm light if it is applied to glass with n= 1.52? c) A camera lens with focal length f = 50 mm and maximum aperture f>2 forms an image of an object 9.0 m away. (a) If the resolution is limited by diffraction, what is the minimum distance between two points on the object that are barely resolved? What is the corresponding distance between image points? (b) How does the situation change if the lens is "stopped down" to f>16? Use λ= 500 nm in both cases.	**10+10+13**
Q.No.3	a) The incident unpolarized light has intensity I_0 . Find the intensities transmitted by the first and second polarizers if the angle between the axes of the two filters is 30 degree. b) A laser pointer with a power output of 6.00 mW emits red light (λ= 650 nm). (a) What is the magnitude of the momentum of each photon? (b) How many photons does the laser pointer emit each second?	**16+18**