THE INTERNATIONAL UNIVERSITY (IU)
VIETNAM NATIONAL UNIVERSITY - HCMC

ASSIGNMENT
SUBJECT: PHYSICS 4
GROUP: 8 –10 STUDENTS
(Deadline: 8:00 21st AUGUST 2024)

Question 1 (25 marks)

An object of height 4 cm is placed in font of a concave mirror of focal length 20 cm. The distance from this object to the mirror is 40 cm.

(a) Find the position of the image formed by the mirror. What is the size of this image?

(b) Draw a ray diagram showing formation of the image.

Question 2 (25 marks)

A ground-state electron is trapped in the one-dimensional infinite potential well with width a =100 pm.

(a) What is the probability that the electron can be detected in the middle one-third of the well (between $x_1 = a/3$ and $x_2 = 2a/3$)?

(b) What is the probability that the electron can be detected in the left one-third of the well (between $x_1 = 0$ and $x_2 = a/3$)? Verify this result by using normalization condition.

Question 3 (25 marks)

Energy levels of hydrogen atom are given by $E_n = -\frac{13.6}{n^2}(eV)$, where n is an integer.

(a) Show that all the spectral lines of the Paschen series are in the infrared region of the electromagnetic scale.

(b) Find the three longest wavelength of the Paschen series.

Question 4 (25 marks)

A particle is in the ground level of a box that extends from x = 0 to x = L.

(a) What is the probability of finding the particle in the region between 0 and L/4?

(b) What is the probability of finding the particle in the region x = L/4 to x = L/2?

(c) How do the results of parts (a) and (b) compare? Explain.

(d) Add the probabilities calculated in parts (a) and (b). Explain the result.

END OF QUESTIONS