THE INTERNATIONAL UNIVERSITY (IU) – VIETNAM NATIONAL UNIVERSITY - HCMC

MID-TERM EXAMINATION – CLASS

Student Name: _____ **Student ID:** _____

Date: 05 April 2021

Duration: 90 minutes

SUBJECT: PHYSICS 3	
Chair of Department of Physics: Signature: Full name: **Phan Bảo Ngọc**	Lecturer: Phan Hiền Vũ, Phạm Trung Kiên Signature: Phan H. Vũ Phạm Trung Kiên

INSTRUCTIONS: This is a closed book examination. Use of cell phones, laptops, dictionaries is not allowed.

1/ (20 pts) Three charged particles ($q_1 = q_3 = +5$ μC, and $q_2 = -15$ μC) form a straight line. Particles 1 and 2 are placed at separation of 50 cm. Determine the distance between particles 1 and 3 so that the net electrostatic force on particle 3 from particles 1 and 2 is zero.

($k = 8.99\times10^9$ N.m^2/C^2)

2/ (20 pts) Fig. 1 shows a thin rod with a non-uniform linear charge density of $\lambda = 0.2x$ μC/m. Evaluate the electric potential at point P if D = L/4 = 25 cm. Assume that the potential is zero at infinity.

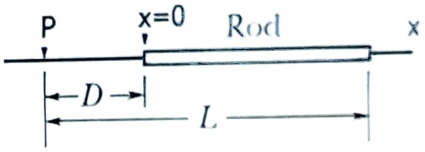

Fig. 1

Hint: $\int_a^b \frac{xdx}{d+x} = (x - dln(x+d))|_a^b$

3/ (20 pts) In **Fig. 2**, V = 9.0 V, $C_1 = C_2 = 30$ μF, and $C_3 = C_4 = 15$ μF. What is the charge on capacitor 4?

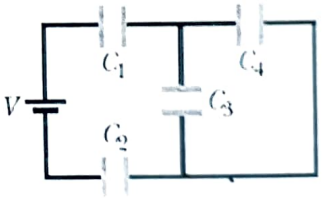

Fig. 2

4/ (20 pts) Determine the current through each resistor in the circuit in **Fig. 3**: $\varepsilon_1 = 12$ V, $\varepsilon_2 = 6$ V, $R_1 = 6\ \Omega$, $R_2 = 4\ \Omega$, and $R_3 = 12\ \Omega$.

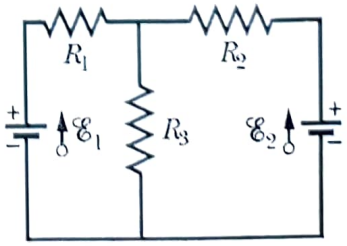

Fig. 3

5/ (20 pts) Two charged concentric spherical shells have radii 10.0 cm and 15.0 cm. The charge on the inner shell is 4×10^{-8} C, and that on the outer shell is 2×10^{-8} C. Find the electric field at:

(a) r = 12.0 cm

(b) r = 20.0 cm

END OF QUESTION PAPER