

First Midterm Exam Academic Year 1445 H – 1 st Semester	الامتحان الفصلي الأول العام الدراسي ١٤٤٥ هـ - الفصل الأول
---	--

15

Exam Information		معلومات الامتحان	
Course name:	General Physics II	فيزياء عامة - ٢	اسم المقرر:
Course code:	104 PHYS	١٠٤ فيز	رمز المقرر:
Exam date:	Thursday 05/10/2023G	الخميس ٢٠ / ٠٣ / ١٤٤٥ هـ	تاريخ الامتحان:
Exam time:	07:00 PM	٠٧:٠٠ مساء	وقت الامتحان:
Exam duration:	1.5 Hours	ساعة ونصف	مدة الامتحان:

Student Information		معلومات الطالب	
Student's name:			اسم الطالب:
Student ID no.:			الرقم الجامعي:
Section no.:			رقم الشعبة:
Roll no.:			رقم التحضير:
Exam room no.:			رقم قاعة الامتحان:
Lecturer's name:			اسم أستاذ المقرر:

The exam consists of **15 QUESTIONS** and **5 PAGES** (including the cover page and the graph sheet)

All answers are given in **MKS** (unless the unit is stated)

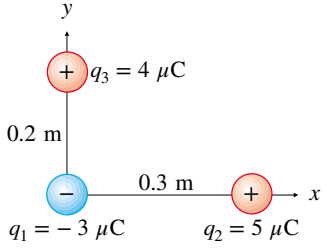

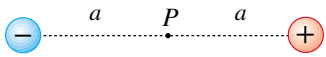
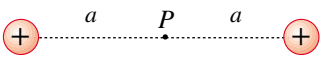
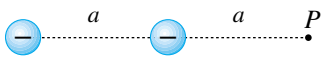

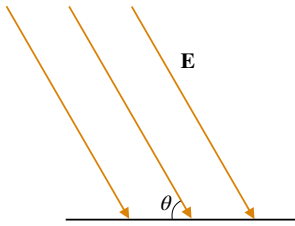
Physical Constants

$k_e = 9 \times 10^9 \text{ N} \cdot \text{m}^2 \cdot \text{C}^{-2}$	$\epsilon_0 = 8.85 \times 10^{-12} \text{ C}^2 \cdot \text{N}^{-1} \cdot \text{m}^{-2}$	$\mu_0 = 4\pi \times 10^{-7} \text{ T} \cdot \text{m} \cdot \text{A}^{-1}$	$ e = 1.6 \times 10^{-19} \text{ C}$
$g = 9.8 \text{ m} \cdot \text{s}^{-2}$	$N_A = 6.02 \times 10^{23} \text{ mol}^{-1}$	$m_e = 9.1 \times 10^{-31} \text{ kg}$	$m_p = 1.67 \times 10^{-27} \text{ kg}$

Choose the letter of the correct answer and write it in **CAPITAL LETTER** in the appropriate box

1	2	3	4	5	6	7	8	9	10
A	C	A	C	C	C	B	A	D	A

11	12	13	14	15
D	D	B	B	D

#	Questions	(1 mark for each)
01.	<p>Three-point charges are arranged as shown in the figure. The magnitude of the resultant electric force on the charge q_2 in (N) unit equals:</p>	 <p>A. 0.84 B. 0.92 C. 1.38 D. 1.5</p>
02.	<p>In the <i>previous question (Q.01)</i>, the angle of the resultant electric force on the charge q_2 counterclockwise with respect to the positive x-axis in (°) unit is:</p>	<p>A. 65.63 B. 114.37 C. 245.63 D. 294.37</p>
03.	<p>A charged particle of mass 6.64×10^{-27} kg and charge $q = +2 e$ is projected with $v_i = 5 \times 10^5$ m/s in the positive x-direction into a region of uniform electric field $E = 1 \times 10^5$ N/C pointing to the negative x-direction as shown in the figure. The distance that the particle travels before coming to rest in (cm) unit is: [ignore any gravitational effects]</p>	 <p>A. 2.6 B. 4.2 C. 5.1 D. 8.7</p>
04.	<p>The figures below show four different configurations of point charges all having the same magnitude. The configuration where the electric field vanishes at the point P is:</p>	<p>A.  C </p> <p>B.  D. </p>
05.	<p>A uniform electric field of magnitude $E = 435$ N/C makes an angle $\theta = 60^\circ$ with a plan of surface area $A = 35$ cm² as shown in the figure. The electric flux through this surface in (N · m²/C) unit is:</p>	 <p>A. 0.76 B. 1.08 C. 1.32 D. 2.32</p>
06.	<p>A cube of side $l = 20$ cm and the electric flux through each of its six faces is 2×10^2 N · m²/C, the magnitude of the charge inside the cube in (nC) unit is:</p>	<p>A. 1.8 B. 2.3 C. 10.6 D. 13.6</p>

07. An insulating solid sphere of radius 18 cm has a total positive charge of $22 \mu\text{C}$ uniformly distributed throughout its volume. The magnitude of the electric field at a distance of 9 cm from the center of the sphere in (MV/m) unit is:

- A. 0.6 B. 3.1 C. 6.1 D. 9.4

08. The electric field just above a large flat conducting sheet is 175 kN/C. The surface charge density on the sheet in ($\mu\text{C}/\text{m}^2$) unit equals:

- A. 1.55 B. 3.15 C. 6.25 D. 9.35

09. For a charged particle that travels a distance d in the same direction of a uniform electric field E :

- A. the electric potential increases by E/d .
B. the electric potential decreases by E/d .
C. the electric potential increases by Ed .
D. the electric potential decreases by Ed .

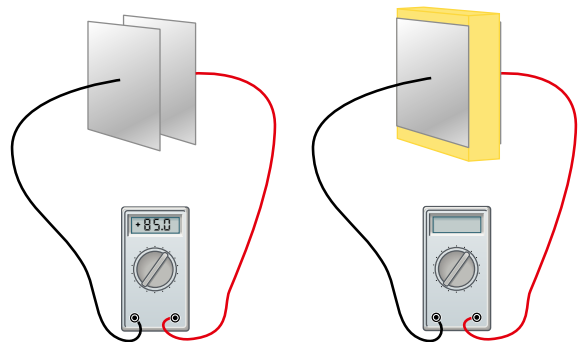
10. At a point located 5.0 cm away from a positive point charge $q = 10 \text{ nC}$, the electric potential in (kV) unit equals:

- A. 1.8 B. 3.6 C. 18 D. 36

11. The unit *Volt* (V) is equivalent to:

- A. C/J B. J · m/C C. N · C/m D. N · m/C

12. An air-filled parallel plate capacitor is fully charged and then disconnected from the battery. The voltage was measured and found to be 85 V between the plates as shown in the figure. If a dielectric is directly inserted and completely fills the space between the plates then:

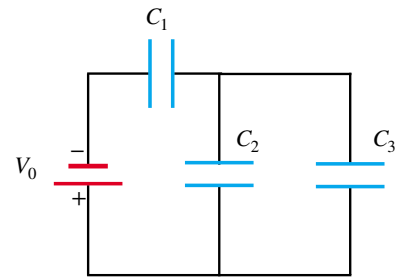


- A. the charge remains the same while the voltage increases.
B. the charge increases while the voltage drops.
C. both the charge and voltage decrease.
D. the charge remains the same while the voltage drops.

13. A potential difference of 150 V is applied to a parallel-plate capacitor. The plates become fully charged with a surface charge density $\sigma = 30 \text{ nC}/\text{cm}^2$. The spacing between the plates in (μm) should be:

- A. 2.1 B. 4.4 C. 9.7 D. 13.7

14. Three capacitors are connected as shown in the figure. If all of the three capacitors have the same capacitance ($C = 100 \text{ nF}$). Then the equivalent capacitance in (nF) unit equals:



- A. 33 B. 67 C. 150 D. 300

15. In the *previous question* (Q.14), which one of the following is true about the energy stored in each capacitor?

- A. $U_1 > U_2 > U_3$ B. $U_1 < U_2 < U_3$ C. $U_1 < U_2 = U_3$ D. $U_1 > U_2 = U_3$

