College of Sciences
Department of
Physics and Astronomy

كلية العلوم
قسم الفيزياء والفلك

جامعة الملك سعود
King Saud University

Second Midterm Exam

Tuesday, November 20/2018	PHYS 109	Academic year 2017-2018
8:15 – 9:45 am	General Physics	First Semester

Student's Name		اسم الطالبة
ID number		الرقم الجامعي
Section No.	54601	رقم الشعبة
Classroom No.	2C09	رقم قاعة الاختبار
Teacher's Name	أ. نوف سعد الخضران	اسم أستاذة المقرر
Roll Number		رقم التحضير

15

Instructions:

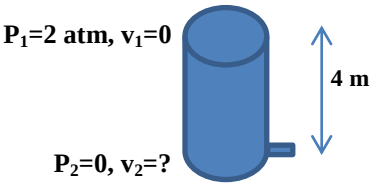
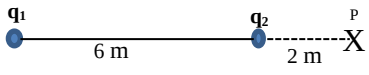
- **Switch off your mobile and place it under your seat.**
- **Please do not forget to write your name in this page.**
- **Write the answers at the right of each question.**

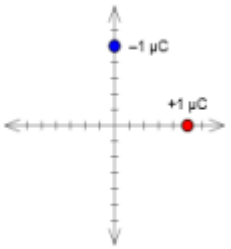
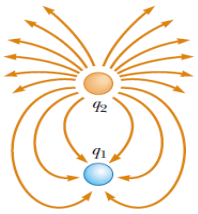
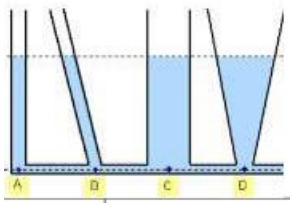
Assume:

$\rho_{water} = 1000\ kg/m^3$, $\varepsilon_0 = 8.85\times10^{-12}\ C^2/N.m^2$

$P_{atm} = 1.013\times10^5\ Pa$, $e = -1.6x10^{-19}\ C$,

$k = 9x10^{9m}\ N.m^2/C^2$

No.	Question	Answer
1	A 60 kg man runs up a flight of stairs 4 m in 5 s. The average power output is: A) 270 W B) 470 W C) 320 W D) 370 W E) 410 W	B
2	A cart of mass 3.0 kg pulled at constant speed along an inclined plane to height of 10 m. The potential energy of the cart at the top height is: A) 190 J B) 220 J C) 294 J D) 320 J E) 350 J	C
3	At constant temperature, a balloon contains 7.2 L of Helium gas at a pressure of 7 atm. If the pressure is reduced to 2 atm, the balloon will occupy a volume of : A) 3.5 m^3 B) 1.2 m^3 C) 25.2 L D) 30.5 L E) 60.1 L	C
4	Which of the following statements is false? A) An ideal gas is one that completely obeys the gas laws B) The universal gas constant R has units of J/(mol. K) C) The volume of a gas increases when the temperature increases at constant pressure D) The volume of a gas decreases when the pressure increases at constant temperature E) Boyle's law applies at constant pressure.	E
5	An object is thrown into seawater. If the weight of the object is larger than weight of displaced water, the object A) sinks B) floats at the surface C) floats at specific depth D) sinks and then floats E) floats and then sinks	A
6	A ball has a 2 cm radius submerged in water. The buoyant force is: A) 20 N B) 6.5 N C) 1.2 N D) 0.5 N E) 0.33 N	E
7	A big closed water tank has a constant pressure of 2 atm at its top. A small hole is made at a distance of 4 m below the water tank level. The velocity (in m.s-1) of the water through the hole is :(neglect velocity of water at the top level, and the pressure at the hole)  A) 16. 7 B) 22.0 C) 11.1 D) 38.7 E) 275.5	B
8	A liquid flows through a pipe with a radius of 5 cm at a velocity of 9 cm/s. If the radius of the pipe then decreases to 3 cm, the new velocity of the liquid is: A) 21 cm/s B) 25 cm/s C) 12 cm/s D) 18 cm/s E) 15 cm/s	B
9	Two positive charges $q_1 = 2 \times 10^{-6}$ C and $q_2 = 5 \times 10^{-6}$ C are placed at 6 m apart on x-axis, the electric field in N/C at point P locates 2 m to the right of q_2 is: A) 3.5×10^3 B) 4.5×10^3 C) 9.5×10^3 D) 11.5×10^3 E) 18.5×10^3 	D

10	Tow point charges attract each other with an electric force of magnitude F_{el}. If We double both charges and double the distance between them, the magnitude of the force between the point charges becomes:					D
	A) $\frac{1}{4} F_{el}$	B) $\frac{1}{2} F_{el}$	C) 0	D) *the same,* F_{el}	E) 2 F_{el}	
11	A charge of -1.0 μC is located on the y-axis 1.0 m from the origin while a second charge of +1.0 μC is located on the x-axis 1.0 m from the origin. (Assuming V = 0 at infinity), the electric potential at the origin is: 					**C**
	A) 2 V B) 1 V C) zero D) -3 V E) -6 V					
12	A parallel plate capacitor has a plate area of 5.0 cm^2 and plate separation of 1.0 mm is filled with a paper whose dielectric constant k= 3.5. The capacitance of this capacitor in pF is:					**C**
	A) 8.2	B) 11.7	C) 15.5	D) 7.5	E) 4.7	
13	A parallel plate capacitor connected to a 16.0 V battery. If the magnitude of charge on the capacitor plates is 4 μC, the energy stored in the capacitor in J is:					A
	A) 3.2×10^{-5}	B) 61×10^{-6}	C) 53×10^{-6}	D) 28×10^{-5}	E) 1.5×10^{-5}	
14	The Figure shows the electric field lines for two close point charges. The signs of the charges: 					B
	A) q_1 and q_2 are positive B) q_1 is negative and q_2 is positive C) q_1 is positive and q_2 is negative D) q_1 and q_2 are negative E) need more information to determine					
15	The point that has greater pressure is: 					**E**
	A) A	B) B	C) C	D) D	E) All the same	