جامعة الملك سعود
King Saud University

College of Sciences
Department of Physics & Astronomy

كلية العلوم
قسم الفيزياء والفلك

Second Midterm Exam Academic Year 1445 H – 1st Semester	الامتحان الفصلي الثاني 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 16/11/2023 G	الخميس ٠٢ /٠٥/ 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

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

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
C	A	C	B	D	B	A	A	C	A

11	12	13	14	15
D	C	B	D	B

#	Questions (1 mark for each)

01. An electron beam has a flow rate of 5×10^{16} electrons/s. The current of the beam in (mA) unit is:

A. 2.0 B. 3.1 C. 8.0 D. 9.3

02. A 1-meter-long Aluminum wire has resistance R. If the wire's diameter is doubled then its resistance becomes:

A. $\frac{R}{4}$ B. $\frac{R}{2}$ C. $2R$ D. $4R$

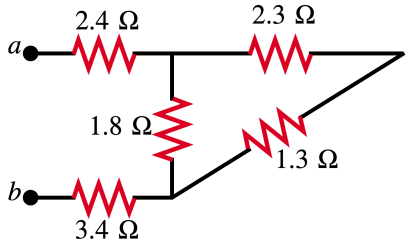
03. A coil of platinum wire has a resistance of 12 Ω at 22 °C. If the coil's resistance triples after it was placed in a furnace, then the temperature of the furnace in (°C) unit is: [Assuming the platinum temperature coefficient of resistivity is 3.6×10^{-3} $(°C)^{-1}$]

A. 532 B. 556 C. 578 D. 592

04. An electric heater draws a steady current of 8 A on a 120-V line. If the heater operates 4 h per day and the electric company charges 0.18 SAR/kWh, the cost of operating this heater in one month in (SAR) is:

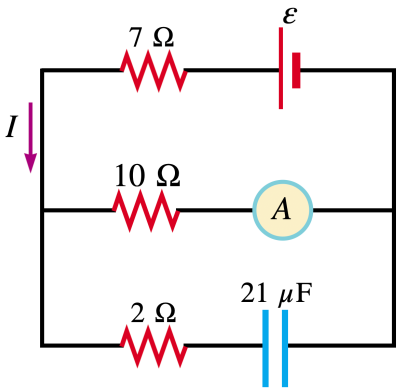
A. 15.5 B. 20.7 C. 70.2 D. 96.3

05. The equivalent resistance between points a and b in (Ω) unit is:



A. 4 B. 5 C. 6 D. 7

06. If the ammeter shown in the figure reads 3 A, then the unknown emf, $\mathcal{E}$, in (V) unit is: [Assuming that the circuit is in a steady state condition]



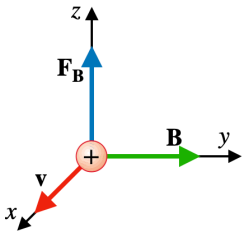
A. 42 B. 51 C. 63 D. 85

07. In the ***previous question*** **(Q.06)**, the voltage across the capacitor in (V) unit is:

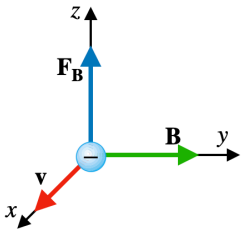
A. 30 B. 40 C. 50 D. 60

08. The figures below show four different configurations of the magnetic force, $\mathbf{F}_B$, acting on a charged particle moving with velocity, **v**, in a uniform magnetic field, **B**. The configuration that has the correct directions is:

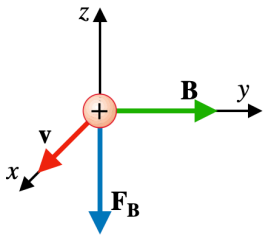
A.



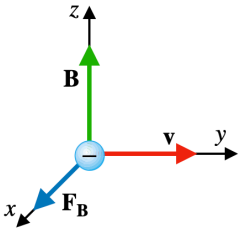
B.



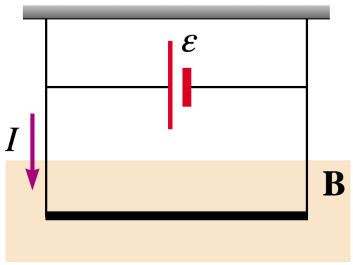
C.



D.



09. A conductor suspended by two flexible wires, as shown in the figure, has a mass per unit length of 0.05 kg/m. If the conductor carries a current $I = 2$ A, then the magnetic field needed in order for the tension in the supporting wires to be zero in (mT) unit is:

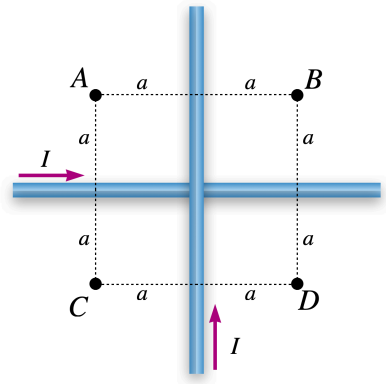


A. 123 into the page B. 123 out of the page C. 245 into the page D. 245 out of the page

10. A uniform magnetic field of 8×10^{-4} T is maintained in a chamber. An electron enters the chamber with a speed of 4×10^{6} m/s normal to the field. The radius of the path of the electron in (cm) unit is:

A. 2.84 B. 4.68 C. 6.24 D. 8.42

11. Consider two wires carrying the same current (I) are arranged cross each other at a right angle without actually making electrical contact. The point which has the total magnetic field pointing into the page is:



A. A B. B C. C D. D

12. A horizontal overhead power line carries a current of 75 A in an east to west direction. The magnitude of the magnetic field due to the current 1.5 m below the line in (μT) unit is:

A. 5 B. 7.5 C. 10 D. 12.5

13.	If a solenoid carries a current of 5 A in order to obtain a magnetic field of 2 mT at the center of the solenoid, then the number of its turns per unit length should be:			
	A. 123	B. 318	C. 531	D. 642

14.	A conducting wire of radius 18 mm carries a total current of 10 A uniformly distributed throughout its cross sectional area. The magnitude of the magnetic field at a distance of 5 mm from the center of the wire in (μT) unit is:			
	A. 11.7	B. 19.2	C. 26.3	D. 30.9

15.	The unit Weber (Wb) is equivalent to:			
	A. $N \cdot m^2$	B. $N \cdot m/A$	C. $T \cdot m/A$	D. $N \cdot A/m$

(End of Questions)
Best wishes..