National University of Computer and Emerging Sciences, Lahore Campus				
	Course:	**Applied Physics**	**Course Code:**	**EE117**
	Program:	**BS (CS)**	**Semester:**	**Fall 2019**
	Duration:	**30 minutes**	**Total Marks:**	**20**
	Paper Date:	**16-12-2019**	**Type**	**Objective**
	Section:	**All**	**Page(s):**	**2**
	Exam:	**Final**	**Roll No:**	
	Name		**Section:**	
Instruction/Notes:	Constants: g=9.8 m/s^2; $\varepsilon_0 = 8.85\times10^{-12}$ C^2·N^{-1}·m^{-2} ; e = charge of electron/proton=1.60×10^{-19} C; mass of electron=9.11×10^{-31} kg; $\mu_{0=4\pi}\times10^{-7}$ T.m/A			

Question 1: Mention only one correction option.

i) The coordinate of an object is given as a function of time by $x = 7t - 3t^2$, where x is in meters and t is in seconds. Its average velocity over the interval from $t = 0$ to $t = 2$ s is:

A) 5 m/s
B) –5 m/s
C) –11 m/s
D) 1 m/s

ii) A car moving with an initial velocity of 25 m/s north has a constant acceleration of 3 m/s^2 south. After 6 seconds its velocity will be:

A) 7 m/s north
B) 7 m/s south
C) 43 m/s north
D) 20 m/s north

iii) A vector has a component of 10 m in the +x direction, a component of 10 m in the +y direction, and a component of 5 m in the +z direction. The magnitude of this vector is:

A) 0 m
B) 15 m
C) 20 m
D) 25 m

iv) A vector in the xy plane has a magnitude of 25 and an x component of 12. The angle it makes with the positive x axis is:

A) 26°
B) 29°
C) 61°
D) 64°

v) The standard 1-kg mass is attached to a compressed spring and the spring is released. If the mass initially has an acceleration of 5.6 m/s^2, the force of the spring has a magnitude of:

A) 2.8 N
B) 5.6 N
C) 11.2 N
D) 0 N

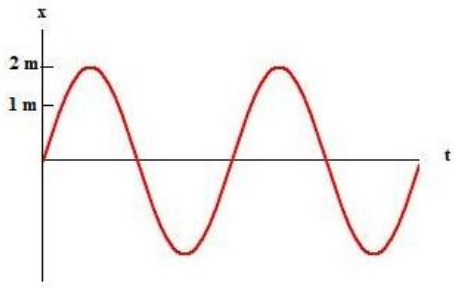
vi) An object attached to one end of a spring makes 20 complete vibrations in 10s. Its period is:

A) 2 Hz
B) 10 s
C) 0.5 Hz
D) 2 s
E) 0.50 s

vii) A wave is described by $y(x,t) = 0.1 \sin(3x - 10t)$, where x is in meters, y is in centimeters and t is in seconds. The angular frequency is:

A) 0.10 rad/s
B) 3.0 rad/s
C) 10π rad/s
D) 20π rad/s
E) 10 rad/s

viii) The plot on right side shows a mass oscillating as $x = x_m \cos(\omega t + \varphi)$. What are x_m and φ?



A) 1 m, 0°
B) 2 m, 0°
C) 4 m, 90°
D) 2 m, 90°
E) 4 m, 0°

ix) The displacement of a string is given by $y(x,t)=y_m \sin(kx+\omega t)$, The wavelength of the wave is:

A) $2\pi k/\omega$
C) ωk
B) k/ω
D) $2\pi/k$

x) A 5.0-C charge is 10 m from a –2.0-C charge. The electrostatic force is on the positive charge is:

A) 9.0×10^8 N toward the negative charge
B) 9.0×10^8 N away from the negative charge
C) 9.0×10^9 N toward the negative charge

xi) Two identical charges, 2.0 m apart, exert forces of magnitude 4.0 N on each other. The value of either charge is:

A) 1.8×10^{-9} C
C) 4.2×10^{-5} C
B) 2.1×10^{-5} C
D) 1.9×10^5 C

xii) The electric field at a distance of 10 cm from an isolated point particle with a charge of 2×10^{-9} C is:

A) 1.8 N/C
C) 180 N/C
B) 18 N/C
D) 1800 N/C

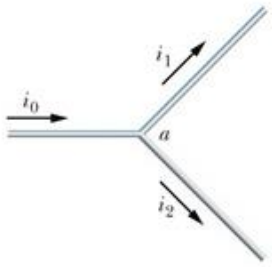
xiii) An electric dipole consists of a particle with a charge of $+6 \times 10^{-6}$ C at the origin and a particle with a charge of -6×10^{-6} C on the x axis at $x = 3 \times 10^{-3}$ m. Its dipole moment is:

A) 1.8×10^{-8} C·m, in the positive x direction
C) 0 C·m, because the net charge is 0
B) 1.8×10^{-8} C·m, in the negative x direction

xiv) A 10-ohm resistor has a constant current. If 1200 C of charge flow through it in 4 minutes what is the value of the current?

A) 3.0 A
C) 20 A
B) 5.0 A
D) 120 A

xv) The figure on right side shows a junction. What is true of the currents?



A) $i_1 = i_0 + i_2$
C) $i_1 = i_0 - i_2$
B) $i_2 = i_0 + i_1$

xvi) A wire has an electric field of 6.2 V/m and carries a current density of 2.4×10^8 A/m^2. What is its resistivity?

A) 6.7×10^{-10} Ω·m
C) 2.6×10^{-8} Ω·m
B) 1.5×10^{-8} Ω·m

xvii) An electron (charge = -1.6×10^{-19} C) is moving at 3.0×10^5 m/s in the positive x direction. A magnetic field of 0.80 T is in the positive z direction. The magnetic force on the electron is:

A) 0 N
C) 4.5×10^{-14} N in the negative z direction
B) 4.5×10^{-14} N in the positive z direction
D) 4.5×10^{-14} N in the positive y direction

xviii) The direction of magnetic field in a certain region of space is determined by firing a test charge into the region with its velocity in various directions in different trials. The field direction is:

A) one of the directions of the velocity when the magnetic force is zero
B) the direction of the velocity when the magnetic force is a maximum
C) the direction of the magnetic force

xix) Lines of the magnetic field produced by a long straight wire carrying a current are:

A) in the direction of the current
C) leave the wire radially
B) opposite to the direction of the current
D) circles concentric with the wire

xx) Which one of the following parameters is not used to determine the magnetic force on a current-carrying wire in a magnetic field?

a) length of the wire
b) radius of the wire