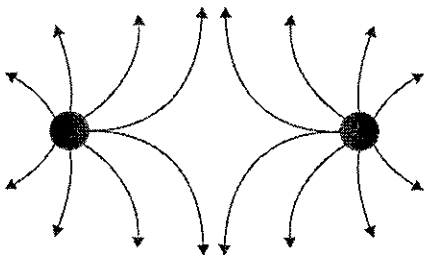
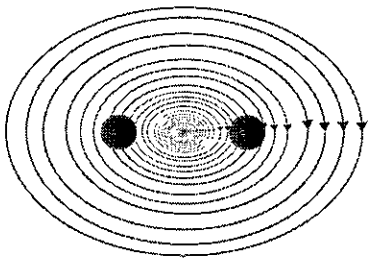
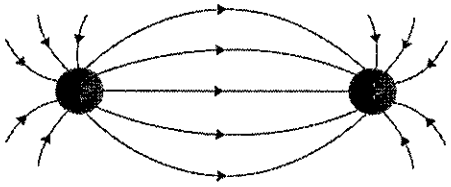
UCONN Physics 1202Q: **Copy#:** _____
Unit 12: Electrostatics - Pre-Test

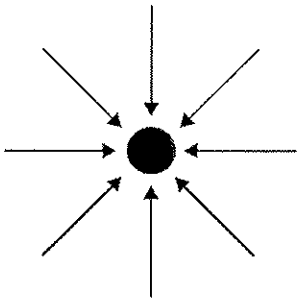
Directions: Use provided formula and conversion sheets provided. DO NOT write on this Pre-Test. Writing on the Pre-Test hurts your ability to study. Note that values may be rounded or approximations therefore choose only the best answer.

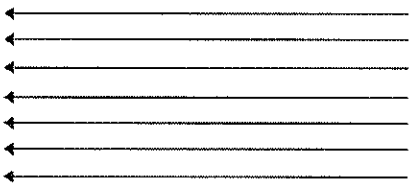
1. Which of the following is a uniform electric field?

A. 

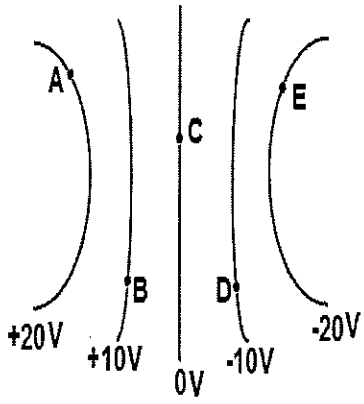
B. 

C. 

D. 

E. 

2. A non-uniform electric field is represented by equipotential lines. How much work is done by the electric field when a positive charge of magnitude 1 μC moves from point A to point E?



A. 0 μ J
B. 20 μ J
C. 40 μ J
D. 60 μ J
E. 80 μ J

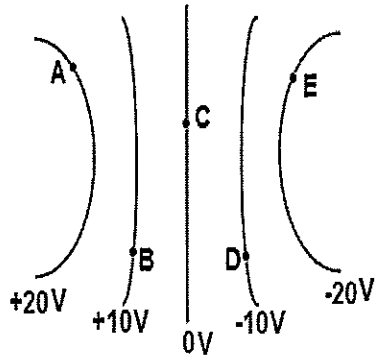
3) Materials in which the electrons are bound very tightly to the nuclei are referred to as
A) insulators.
B) conductors.
C) semiconductors.
D) superconductors.

4) A negatively charged rod is brought near one end of an uncharged metal bar. The end of the metal bar farthest from the charged rod will be charged
A) positive.
B) negative.
C) neutral.
D) none of the given answers

5) Sphere A carries a net positive charge, and sphere B is neutral. They are placed near each other on an insulated table. Sphere B is briefly touched with a wire that is grounded. Which statement is correct?
A) Sphere B remains neutral.
B) Sphere B is now positively charged.
C) Sphere B is now negatively charged,
D) The charge on sphere B cannot be determined without additional information.

6) How can a negatively charged rod charge an electroscope positively?
A) by conduction
B) by induction
C) by deduction
D) It cannot.

7. A non-uniform electric field is represented by equipotential lines. A positive charge with a magnitude of 1 μC moves in the following path: A→B→C→D→E→A. How much work is done by the electric field?
   A. 0 μ J
   B. 20 μ J
   C. 40 μ J
   D. 60 μ J
   E. 80 μ J



8) An originally neutral electroscope is grounded briefly while a positively charged glass rod is held near it. After the glass rod is removed, the electroscope
A) remains neutral.
B) is negatively charged.
C) is positively charged.
D) could be either positively or negatively charged, depending on how long the contact with ground lasted.

9) A positive object touches a neutral electroscope, and the leaves separate. Then a negative object is brought near the electroscope, but does not touch it. What happens to the leaves?
A) They separate further.
B) They move closer together.
C) They are unaffected.
D) cannot be determined without further information

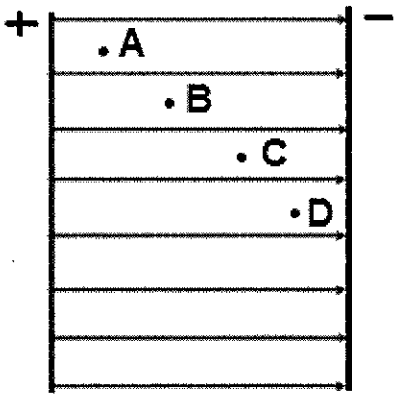
10) A large negatively charged object is placed on an insulated table. A neutral metallic ball rolls straight toward the object, but stops before it touches it. A second neutral metallic ball rolls along the path followed by the first ball, strikes the first ball, and stops. The first ball rolls forward, but does not touch the negative object. At no time does either ball touch the negative object. What is the final charge on each ball?
A) The first ball is positive, and the second ball is negative.
B) The first ball is negative, and the second ball is positive.
C) Both balls remain neutral.
D) Both balls are positive.

11) Sphere A carries a net charge and sphere B is neutral. They are placed near each other on an insulated table. Which statement best describes the electrostatic force between them?
A) There is no force between them since one is neutral.
B) There is a force of repulsion between them.
C) There is a force of attraction between them.
D) The force is attractive if A is charged positively and repulsive if A is charged negatively.

12) Two charged objects attract each other with a certain force. If the charges on both objects are doubled with no change in separation, the force between them
A) quadruples.
B) doubles.
C) halves.
D) increases, but we can't say how much without knowing the distance between them.

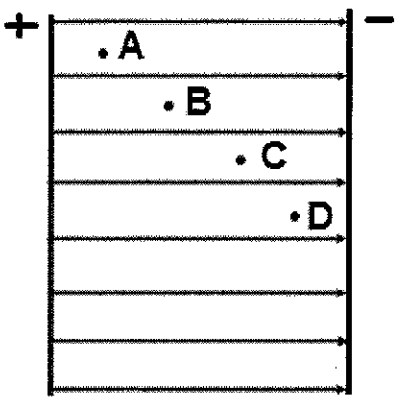
13) Two charges are separated by a distance d and exert mutual attractive forces of F on each other. If the charges are separated by a distance of d/3, what are the new mutual forces?
A) F/9
B) F/3
C) 3F
D) 9F

14. An electric field is created by two parallel plates. At which of the following points is the electric field the strongest?
A. A
B. B
C.C
D.D
E. The electric field is the same at all points



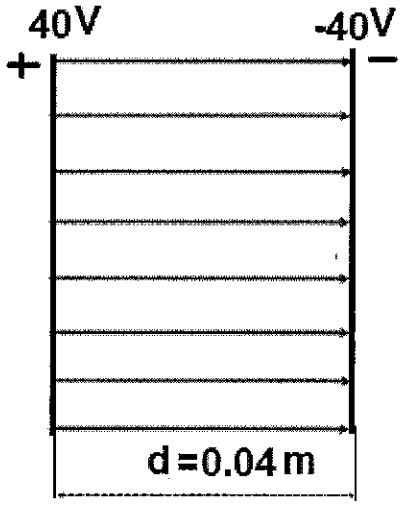
15. An electric field is created by two parallel plates. Which of the following points corresponds to the higher electric potential?

A. A
B. B
C.C
D.D
E. The electric potential is the same at all points



16. A uniform electric field is created by two parallel plates separated by a distance of 0.04 m. What is the magnitude of the electric field established between the plates?

A. 20 V/m
B. 200 V/m
C. 2,000 V/m
D. 20,000 V/m
E. 0 V/m

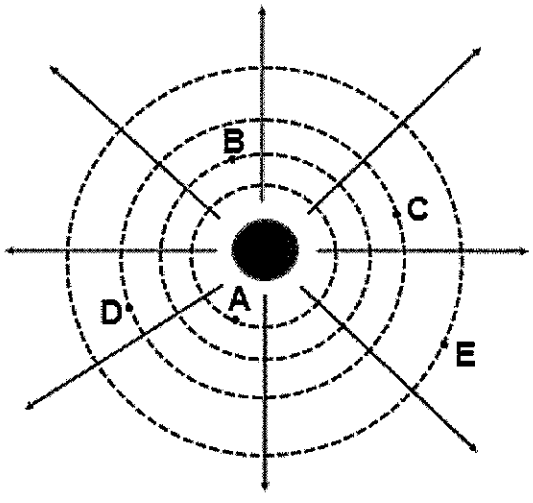


17) Is it possible to have a zero electric field value between two positive charges along the line joining the two charges?

A) Yes, if the two charges are equal in magnitude.
B) Yes, regardless of the magnitude of the two charges.
C) No, a zero electric field cannot exist between the two charges.
D) cannot be determined without knowing the separation between the two charges

18. An electric field due to a positive charge is represented by the diagram. Which of the following points has higher potential?

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



19) The electric field shown

A) increases to the right.
B) increases down.
C) decreases to the right.
D) decreases down.
E) is uniform.

20) Can electric field lines intersect in free space?
A) Yes, but only at the midpoint between two equal like charges.
B) Yes, but only at the midpoint between a positive and a negative charge.
C) Yes, but only at the centroid of an equilateral triangle with like charges at each corner.
D) No.

21) If a solid metal sphere and a hollow metal sphere of equal diameters are each given the same charge, the electric field (E) midway between the center and the surface is
A) greater for the solid sphere than for the hollow sphere.
B) greater for the hollow sphere than for the solid sphere.
C) zero for both.
D) equal in magnitude for both, but one is opposite in direction from the other.

22) A cubic block of aluminum rests on a wooden table in a region where a uniform electric field is directed straight upward. What can be said concerning the charge on the block's top surface?
A) The top surface is charged positively.
B) The top surface is charged negatively.
C) The top surface is neutral.
D) The top surface's charge cannot be determined without further information.

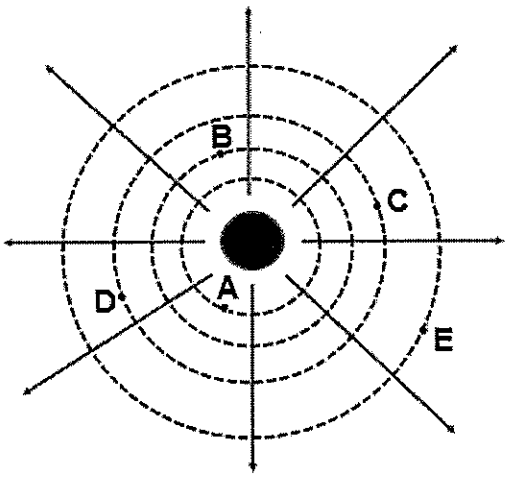
23) The charge carried by one electron is $e = -1.6 \times 10^{-19}$ C. The number of electrons necessary to produce a charge of -1.0 C is
A) 6.25×10^{18}.
B) 6.25×10^{9}.
C) 1.6×10^{19}.
D) none of the given answers

24) A piece of plastic has a net charge of +2.00 μC. How many more protons than electrons does this piece of plastic have?
A) 1.25×10^{13}
B) 1.25×10^{19}
C) 2.50×10^{13}
D) 2.50×10^{19}

25) What is the charge on 1 kg of protons?
A) 1.0 C
B) 1000 C
C) 9.6×10^{7} C
D) 6.0×10^{26} C

26. An electric field due to a positive charge is represented by the diagram. At which of the following points is the electric field strongest in magnitude?

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



27) A 1.0-C charge is 15 m from a second charge, and the force between them is 1.0 N. What is the magnitude of the second charge?

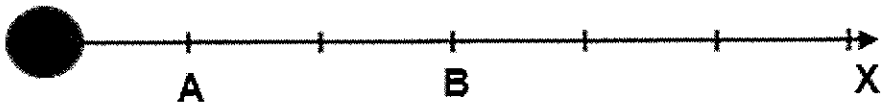
A) 25 C
B) 1.0 C
C) 0.025 C
D) 25 nC

28) Two point charges, initially 2.0 cm apart, experience a 1.0-N force. If they are moved to a new separation of 8.0 cm, what is the electric force between them?

A) 4.0 N
B) 16 N
C) 1/4 N
D) 1/16 N

29. In the above diagram, the electric potential at point A is V. What is the electric potential at point B in terms of V?

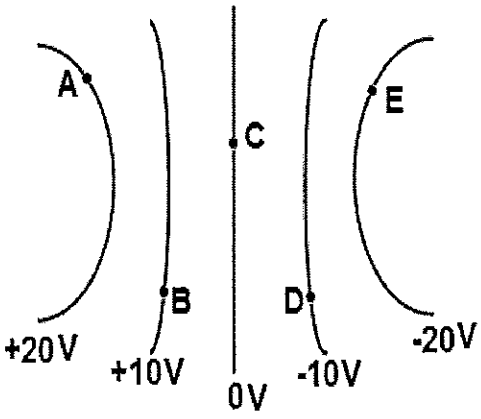
A. 2 V B. 4 V C. V D. $\frac{1}{2}$ V E. $\frac{1}{4}$ V



30. In the above diagram, the magnitude of the electric field at point A is E. What is the electric field at point B in terms of E?

A. 3 E B. 9 E C. E D. $\frac{1}{9}$ E E. $\frac{1}{3}$ E

31. A non-uniform electric field is represented by equipotential lines. What is the direction of the electric field at point A?



A. 

B. 

C. 

D. 

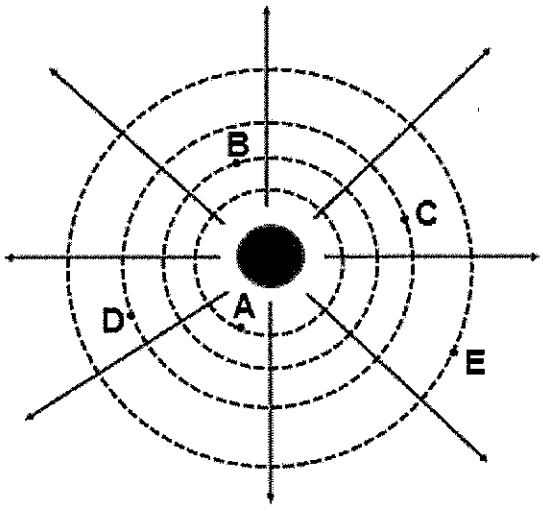
E. 

32) Consider point charges of +Q and +4Q, which are separated by 3.0 m. At what point, on a line between the two charges, would it be possible to place a charge of -Q such that the electrostatic force acting on it would be zero?
A) There is no such point possible.
B) 1.0 m from the +Q charge
C) 1.0 m from the +4Q charge
D) 0.60 m from the +Q charge

33) A +3.0-C charge is at the origin and a +9.0-C charge is at x = 4.0 m. Where on the x-axis can a third charge be placed so the net force on it is zero?
A) x = 0.50 m
B) x = 0.60 m
C) x = 1.5 m
D) x = 2.4 m

34) A particle with a charge of 4.0 μC has a mass of 5.0×10^{-3} kg. What electric field directed upward will exactly balance the weight of the particle?
A) 4.1×10^{2} N/C
B) 8.2×10^{2} N/C
C) 1.2×10^{4} N/C
D) 5.1×10^{6} N/C

35. An electric field due to a positive charge is represented by the diagram. Between which of the following two points does the electric field do zero work on a moving charge?
A. A and B
B. B and C
C. C and D
D. D and E
E. E and A



CHAPTER / UNIT # 12 ANSWER SHEET NAME: KEY

COPY # _____ PERIOD: _____

FORM PRE-TEST ELECTROSTATICS/ DATE: _____

DIRECTIONS: Use the back side for any Bonus problems and be sure to identify the bonus area. The "Work Area" is to be used like scrap paper. If you need additional paper, raise your hand and I will provide you additional paper. Any extra scrap paper needs to be stapled to this answer sheet. GOOD LUCK!!

E	1.	A	26.
C	2.	D	27.
A	3.	D	28.
B	4.	E	29.
C	5.	D	30.
B	6.	E	31.
A	7.	B	32.
B	8.	C	33.
B	9.	C	34.
A	10.	C	35.
C	11.		36.
A	12.		37.
D	13.		38.
E	14.		39.
A	15.		40.
C	16.		41.
B	17.		42.
A	18.		43.
A	19.		44.
D	20.		45.
C	21.		46.
A	22.		47.
A	23.		48.
A	24.		49.
C	25		50.

WORK AREA

BONUS WORK ON BACK