v2018A

PHYS218/208 Grading Sheet – Physics & Astronomy, TAMU

Exam: ① ② ③ ④

Students: (only) fill out this section

Clearly write your 9-digit UIN in the square boxes to the right *and* completely fill in the numerical bubble below each digit. Also, enter your name (as it appears on your TAMU ID), your section number, and your instructor's name below.

0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9

First name: _____

Last name: _____

Section: _____ Instructor: _____

Graders: (only) fill out this section

Completed: A B C D E 1 2 3 4 5

1. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	26. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	51. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
2. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	27. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	52. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
3. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	28. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	53. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
4. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	29. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	54. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
5. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	30. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	55. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
6. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	31. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	56. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
7. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	32. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	57. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
8. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	33. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	58. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
9. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	34. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	59. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
10. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	35. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	60. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
11. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	36. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	61. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
12. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	37. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	62. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
13. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	38. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	63. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
14. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	39. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	64. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
15. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	40. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	65. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
16. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	41. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	66. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
17. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	42. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	67. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
18. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	43. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	68. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
19. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	44. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	69. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
20. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	45. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	70. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
21. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	46. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	71. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
22. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	47. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	72. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
23. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	48. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	73. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
24. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	49. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	74. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧
25. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	50. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧	75. ① ② ③ ④ ⑤ ⑥ ⑦ ⑧

Correction indicator(s): ① ② ③ ④ ⑤

Grading correction explanation:

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Physics 208 - Exam I

Fall 2018 (525-528; 531-535; 561-565) September 24, 2018.

Please fill out the information and read the instructions below, but
do not open the exam until told to do so.

Rules of the exam:

1. You have 75 minutes (1.25 hrs.) to complete the exam.
2. Formulae are provided to you with the exam on a separate sheet. Make sure you have one before the exam starts. You may not use any other formula sheet.
3. Check to see that there are 6 numbered (3 double-sided) pages plus a blank page for additional work if needed, in addition to the scantron-like cover page. Do not remove any pages.
4. If you run out of space for a given problem, the last page has been left blank and may be used for extra space. Be sure to indicate at the problem under consideration that the extra space is being utilized so the graders know to look at it!
5. You will be allowed to use only non-programmable calculators on this exam.
6. **NOTE** that you **must** show your work clearly to receive full credit.
7. Cell phone use during the exam is strictly prohibited. Please turn off all ringers as calls during an exam can be quite distracting.
8. Be sure to put a box around your final answer(s) and clearly indicate your work. Credit can be given only if your work is legible, clearly explained, and labelled.
9. All of the questions require you show your work and reasoning.
10. Have your TAMU ID ready when submitting your exam to the proctor.

Fill out the information below and sign to indicate your understanding of the above rules

Name:_____ UIN:_____
(printed legibly)

Signature:_____ Section Number: _____

Instructor: Webb Kocharovskaya
(circle one)

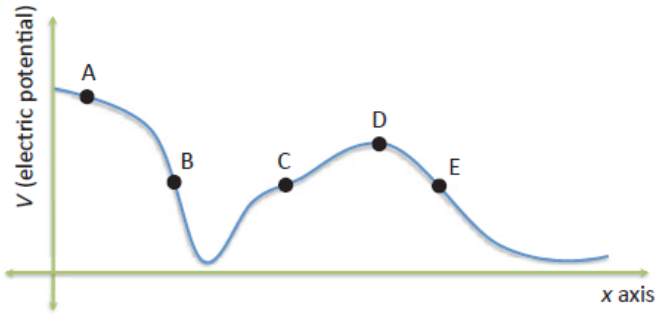
A.

The electric potential as a function of coordinate x is plotted below. Answer the following making sure to give a reason for your choice.

(i) At which point is the magnitude of the electric field the greatest?

(ii) At which point(s) is the electric field directed along positive x axis?

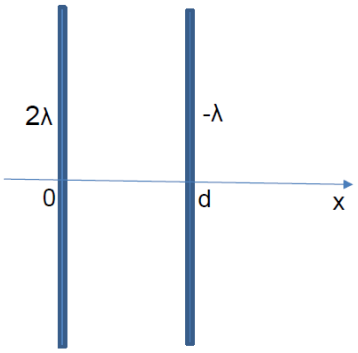
(iii) At which point(s) is the electric field directed along the negative x axis?



LO	P	F
5.1		
7.1		
25.1		
5.2		
7.2		
25.2		
5.3		
7.3		
25.3		

B.

Two infinite lines have the linear charge densities 2λ and – λ as shown in a figure. They are separated by a distance d. At which position along x axis is the net electric field produced by these line charges equal to zero?



LO	P	F
2.1		
3.1		
5.4		
12.1		
18.1		

C.

A proton (charge +e) has an initial kinetic energy E very far from a stationary Krypton nucleus (charge +36e). If the proton approaches the Krypton nucleus head-on, how close does it come before reversing its direction of motion (answer in terms of E, the given charges and other known constants)? Assume that the Krypton nucleus remains stationary during the process.

LO	P	F
3.2		
5.5		
20.1		
21.1		

Problem 1

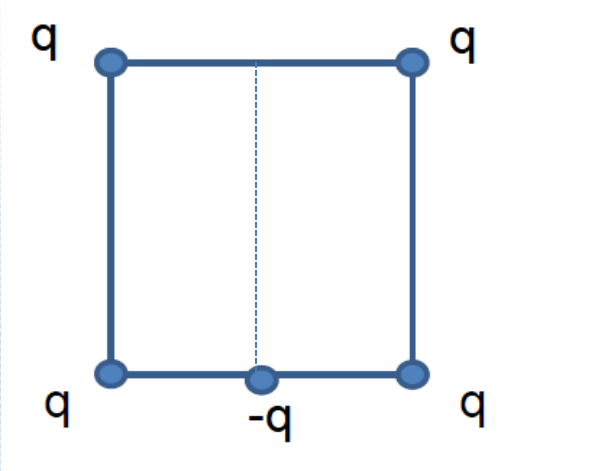
Four identical point charges, q, are fixed at each corner of a square insulating frame of side *a*. A charge –q is placed in the middle of the bottom side (see Figure).

A. Draw a free body diagram for the –q charge.

B. Find the magnitude and direction of the net electric force produced by the four positive charges on the charge –q.

C. Find the work done by the set of four positive charges when bringing the –q charge from infinity to its current position.

D. Find the work done by the set of four positive charges when moving the charge –q from the middle of the bottom side to the middle of the top side.



LO	P	F
1.1		
8.1		
1.2		
8.2		
1.3		
8.3		
1.4		
8.4		
2.2		
9.1		
20.2		
21.2		
20.3		
21.3		
23.1		

Problem 2

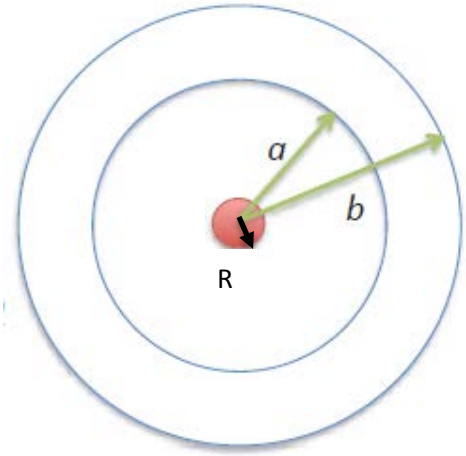
A total positive charge Q is distributed uniformly on a **solid conducting sphere** of radius R. A **conducting spherical shell** with net charge $+3Q$ has an inner radius $a > R$, outer radius b, and is concentric to the inner sphere.

A. How much charge is located on the inner and outer surfaces of the conducting spherical shell?

B. Find the electric field in the regions, $0 < r < R;\ R < r < a;\ a < r < b;\ b < r$.

C. Taking the potential at infinity to be 0, calculate the potential difference $V(b) - V(R)$.

D. Sketch the electric field lines for this configuration. On this same sketch, indicate 3-4 different equipotential surfaces.



LO	P	F
5.6		
16.1		
19.1		
16.2		
19.2		
18.2		
19.3		
18.3		
19.4		
26.1		
6.1		
13.1		
27.1		
24.1		

Problem 3

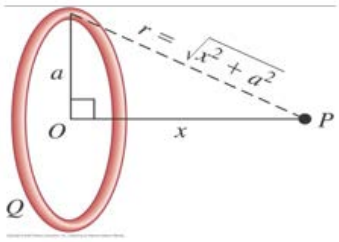
A positive electric charge Q is distributed uniformly around a thin ring of radius a. The ring is positioned with its center fixed at the origin of the coordinate system and with the x axis perpendicular to the plane of the ring. A point positive charge q of mass m is placed at a point P on the ring axis at a distance x from the center of the ring. Then it is released from rest.

A. Find the potential produced by the ring at a point P.

B. Find the electric field produced by the ring at a point P.

C. Find the electric potential energy stored in the ring-point charge system.

D. Find the maximum speed acquired by the charge q after its release from rest.



LO	P	F
5.7		
7.4		
24.2		
7.5		
25.4		
5.8		
20.4		
3.3		
21.4		