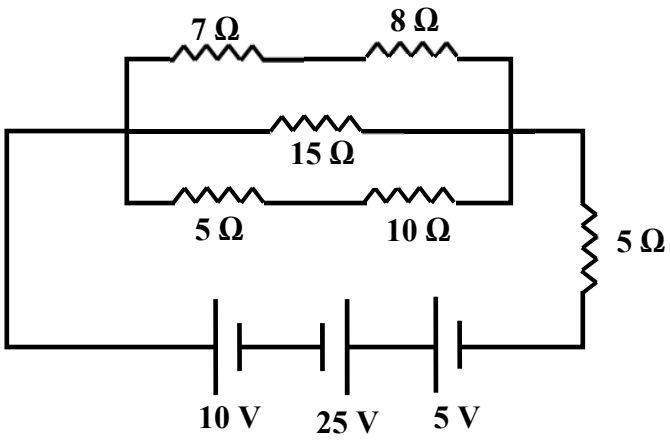
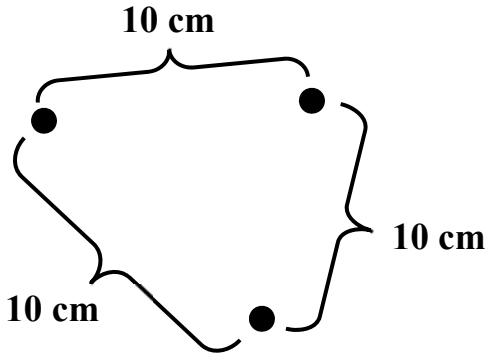
Physics 2212
Final exam (practice problems)

1. Find the power delivered to 8 ohm resistor.



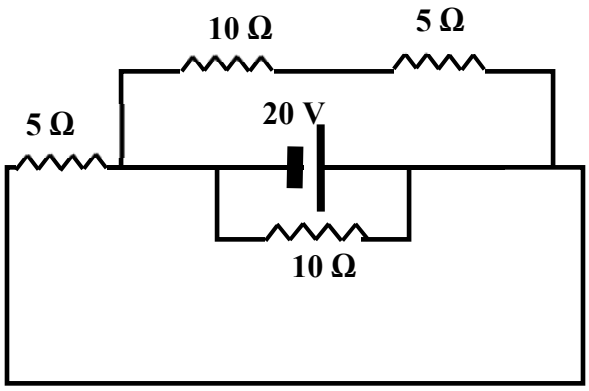
0.89 W

2. Three identical particles with charge 10 μC each are placed at the vertices of a triangle as shown in the figure. All three particles are released from the rest. Find the maximum speeds of the particles. The mass of each particle is 100 g.



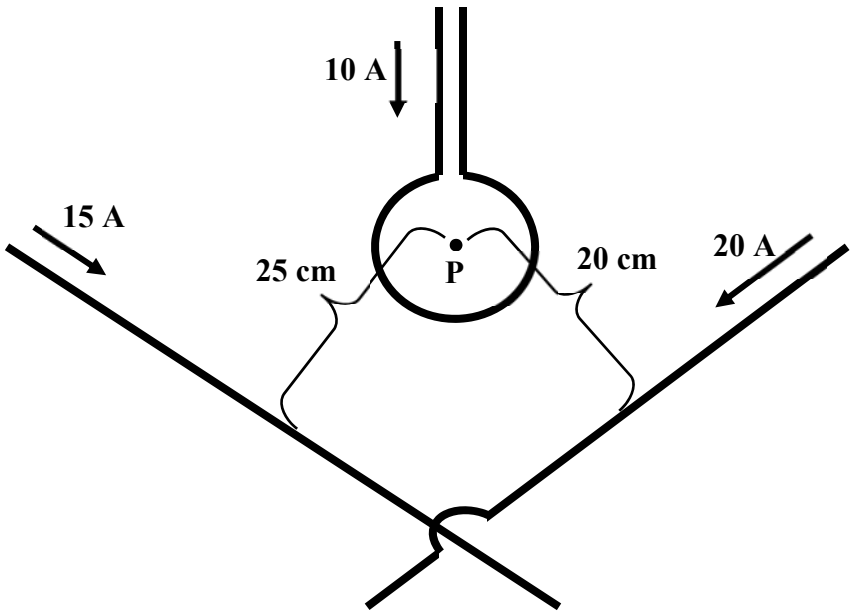
13.4 m/s

3. Find the current through the battery.



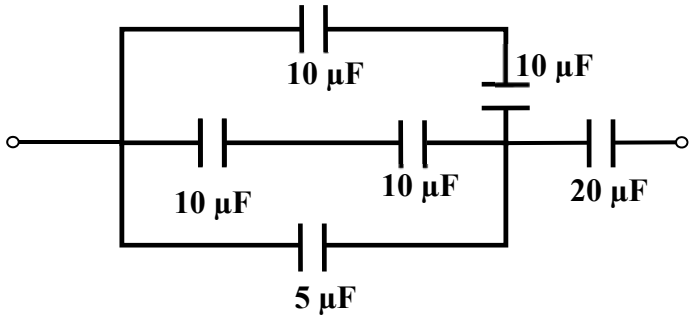
7.33 A

4. Find the magnitude of the magnetic field at point P. Point P is the center of the circular loop. The radius of the loop is 10 cm.



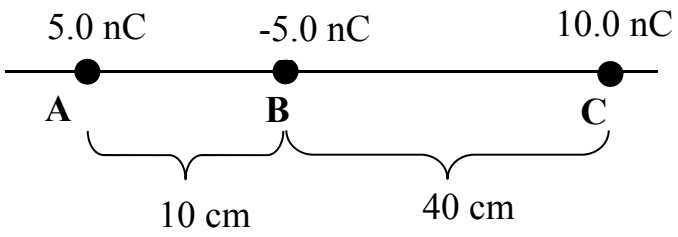
5.48×10^{-5} T

5. Find equivalent capacitance of the system of capacitors shown in the figure.



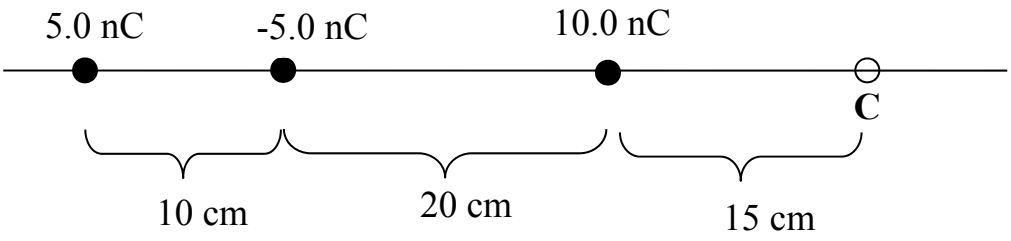
8.57 µF

6. What are the magnitude and direction of the electric force on charge C?



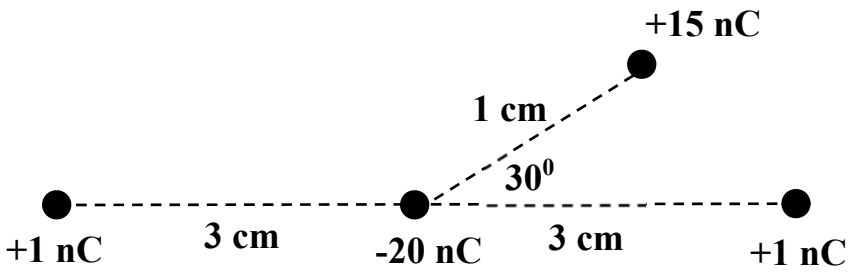
1.01×10^{-6} N

7. Find electric potential at point C.



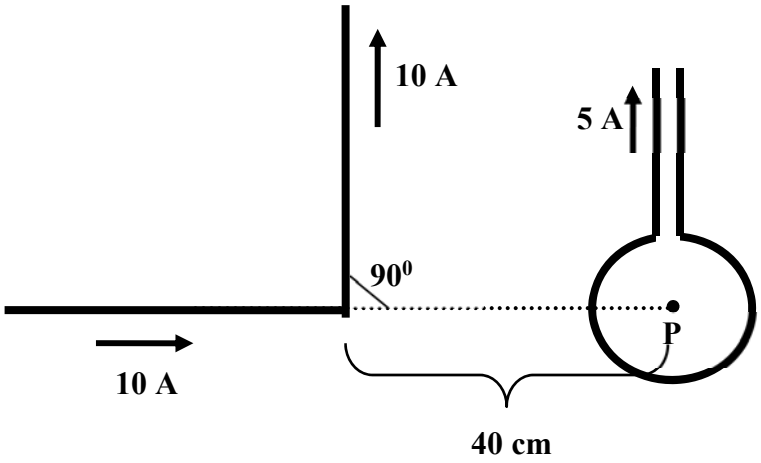
571 V

8. What is the magnitude of the force on the -20 nC charge?



0.027 N

9. Find the magnitude and the direction of the magnetic field at point P. Point P is the center point of the circular loop. The diameter of the loop is 10 cm.



6.53×10^{-5} T into the page

10. A parallel plate capacitor consists of two circular electrodes (diameter 10 cm), spaced by 0.2 mm apart. What is the capacitance of the capacitor?

0.35×10^{-9} F

11. Light with the wavelength 500 nm propagates through a medium with the index of refraction 2.5. Find the speed and the frequency of the light in the medium.

1.2×10^8 m/s
6×10^{14} 1/s

12. A double-slit experiment is performed with light of wavelength 600 nm. The interference pattern is observed on a screen 70 cm away from the plane of the slits. The slit separation is 0.2 mm. What is the distance between the second and the fifth maxima?

6.3 mm

13. A double-spit experiment is performed with light of wavelength 600 nm. A very wide viewing screen is 2 m behind the grating. What is the distance between the two m=2 bright fringes on the screen? The slit separation is 0.1 mm.

48 mm

14. A traveling wave is described by the following equation $E(x,t) = 7.2 \sin(6.4 x - 3.2 t)$. Find the speed of the wave.

0.5