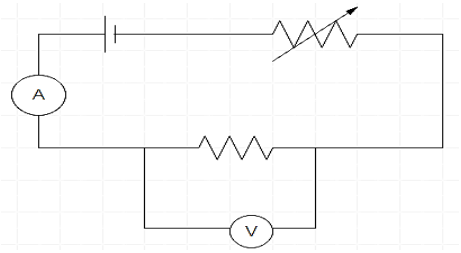
Physics G-11 Unit 6 Worksheet 2

1. Two charges $5\,x\,10^{-8}\,C$ and $-3\,x\,10^{-8}\,C$ are located 16 cm apart. At what point(s) on the line joining the two charges is the electric potential zero?
   A. The potential is zero at a distance of 20 cm from the positive charge between the charges.
   B. The potential is zero at a distance of 50 cm from the positive charge between the charges.
   C. The potential is zero at a distance of 40 cm from the positive charge between the charges.
   D. The potential is zero at a distance of 40 cm from the positive charge outside the system of charges.
2. A regular hexagon of side 10 cm has a charge $10\mu C$ at each of its vertices. Calculate the potential at the centre of the hexagon.
   A. $2.3x10^3V$ B. $4.6x10^6V$ C. $5.4x10^6V$ D. $5.8x10^3V$
3. The electric potential at a point in space is the:
   A. Force per unit charge to brought a charge at a point.
   B. Potential energy and a unit charge at that point.
   C. Potential energy of a charge brought to that point.
   D. Potential energy per unit charge to brought a charge at that point.
4. What is the absolute potential at a point which is 20cm from an isolated point charge $-3nC$ in vacuum?
   A. 135 V B. -135 V C. 13.5 V D. -13.5 V
5. A constant electric current of 16 A flows through a resistor in 4 minutes. What is the number of electrons that pass through a point? (An electron charge is $1.6x10^{-19}C$)
   A. $4x10^{22}$ B. $2.4x10^{22}$ C. $4x10^{-22}$ D. $6.8x10^{-22}$
6. Which of the following is TRUE about an absolute electric potential? It is
   A. An electric potential at position in an electric field relative to that at infinity from the field source
   B. An electric potential at position in an electric field relative to that at another position in the field
   C. The work done to move a unit charge from an infinity to a position in an electric field
   D. The work done per unit charge to move it from one point to another in an electric field
7. Calculate the electric potential energy of two protons separated by a typical proton-proton intranuclear distance of $2x10^{-15}\,m$.
   A. $1.152x10^{-14}J$ B. $11.52x10^{-14}J$ C. $1.152x10^{-13}J$ D. $11.52x10^{-13}J$
8. Calculate the potential difference between two points which 20cm and 50cm from an isolated point charge of $3x10^{-8}C$ in vacuum.
   A. $240V$ B. $400V$ C. $810V$ D. $300V$
9. Which of the following is NOT the property of equipotential surface?
   A. They do not cross each other.
   B. The rate of change of potential with distance on them is zero.
   C. For a uniform electric field they are concentric spheres.
   D. They can be imaginary spheres.
10. A charge $q_1 = -3x10^{-8}C$ is located 40cm from another charge $q_2 = 2x10^{-8}C$ in vacuum. How much work is required to move q_2 so that it is 60cm from q_1?
    A. $225x10^3V$ B. $2.25x10^{-6}V$ C. $225x10^6V$ D. $-2.25x10^{-6}V$
11. How much work is needed to move a charge of 5C from A to B, if the potential of A is 100V and the potential of B is 110V?
    A. $50J$ B. $40J$ C. $100J$ D. $10J$
12. A group of grade 11 students at ODA SB in physics laboratory connected a battery, voltmeter, resistor rheostat, and an ammeter in a circuit to demonstrate Ohm's law as shown in the figure below.



What are the data taken in that demonstration? The value of

A. Current in the circuit and that of rheostat
B. Current in the circuit and the potential difference across the rheostat
C. Both the current and the potential difference across R for different values of rheostat
D. the potential difference across R and that of rheostat

13. The resistance of an Ohmic is independent of: **(EUEE:2003)**
    A. The size of the material.
    B. The nature of the material.
    C. The temperature.
    D. The voltage applied.
14. When does a light bulb carry more current?
    A. Just when it is turned on during which the filament has low temperature and high resistance
    B. Long after it is turned on as the filament warms and has high resistance
    C. Just when it is turned on during which the filament has low resistance
    D. Long after it is turned on as the filament warms and has low resistance
15. A galvanometer may be used as an ammeter by **(EUEE: 2004)**
    A. Shunting the galvanometer with a high resistance
    B. Connecting a low resistance in parallel with the galvanometer
    C. Connecting a low resistance in series
    D. Connecting a high resistance in series
16. Which of the following is not true for an equipotential surface?
    A. The potential difference between any two points on the surface is zero
    B. The electric field is always perpendicular to the surface
    C. No work is done in moving the charge along the surface
    D. Equipotential surfaces are always spherical
17. A moving coil galvanometer has resistance of 20 Ω allows a full scale current of $10^{-4}A$. A series resistance required to convert the above galvanometer into a voltmeter of range 0−5V is:
    A. 44890 Ω B. 49980 Ω C. 500000 Ω D. 2000997 Ω
18. A parallel plate capacitor with a plate separation d has a capacitance C in the absence of a dielectric. What is the capacitance when a slab of dielectric material of dielectric constant k and thickness 1/3 d is inserted between the plates? **(EUEE:2003)**
    A. $\frac{3k}{2k+1}k$ B. $\frac{2k+1}{3k}C$ C. $\frac{3k}{2k-1}C$ D. $\frac{2k-1}{3k}C$
19. What is the SI unit of Electric field? **(EUEE: 2004)**
    A. Am^{-1} B. Vm^{-1} C. NC^{-1} D. Cm
20. An ion accelerated through a potential difference of 115 V experiences an increase in kinetic energy of $7.37\ x\ 10^{-17}J$. What is the charge on the ion? **(EUEE:2004)**
    A. 6.41 x 10^{-19} C
    B. 2.32 x 10^{-15} C
    C. 4.51 x 10^{-15} C
    D. 2 x 10^{-21} C
21. When a potential difference of 150 V is applied to the plate of a parallel-plate capacitor, the plates carry a surface charge density of 30 n C/cm^2. What is the spacing between the plates? **(EUEE: 2004)**
    A. 2.24μm B. 5.32μm C. 12.24μm D. 4.42μm
22. A small object of mass *m* carries a *q* and is suspended by a thread between the vertical plates of a parallel-plate capacitor. The plate separation is d. If the thread makes an angle Θ with the vertical, what is the

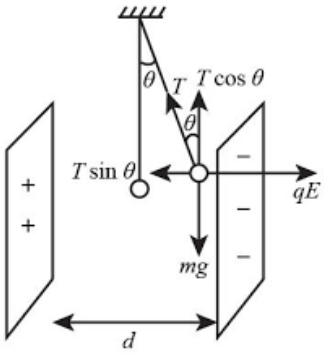
potential difference between the plates? **(EUEE: 2004)**

A. $\frac{mgd\tan\theta}{q}$

B. $\frac{mg\tan\theta}{q}$

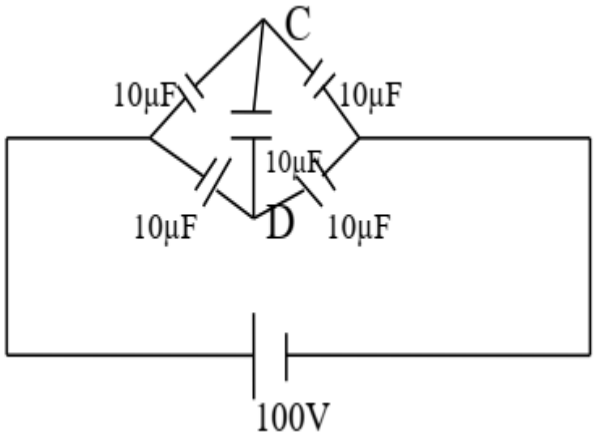
C. $\frac{mgd\sin\theta}{q}$

D. $\frac{md\sin\theta}{q}$



23. Five capacitors 10μF capacity each is connected to A, D, and C potential of 100 volt asshown in the next figure. What is the equivalent capacitance between A and B? **(EUEE: 2004)**

A. 10μF
B. 20μF
C. 30μF
D. 60μF



24. An air-filled parallel-plate capacitor has a capacitance of 1pF.The plate separation is then doubled and a wax dielectric is inserted, completely filling the space between the plates. As a result, the capacitance becomes 2pF. What is the dielectric constant of the wax? **(EUEE: 2005)**

A. 8 B. 4 C. 2 D. 0.5

25. What is the capacitance of a capacitor that should be connected with 2 other capacitors having capacitance of 4μF and 8μF all in series to produce an effective capacitance of 24/11μF? **(EUEE: 2005)**

A. 12μF B. 10μF C. 8μF D. 4μF

26. Which one of the following changes to parallel plate capacitor would not increase energy stored in the capacitor at a fixed voltage across the plates? **(EUEE: 2005)**

A. Increasing the area of the plates
B. Increasing the dielectric constant
C. Decreasing the charges on the plates
D. D. increasing the distance b/n the plates

27. Moving 2.5×10^{-6} coulomb of charge from point A to point B in an electric field requires 6.3×10^{-4}J of work. The potential difference between points A and B is approximately **(EUEE: 2006)**

A. 4×10^{-3} V B. 2.5×10^{-2} V C. 1.6×10^{-19} V D. 1×10^{-14} V

28. A capacitor made parallel plates is charged by connecting it to a battery. The distance between the plates is much less than the surface area of each plate. After fully charged if the plates are disconnected from the battery and then pulled apart a little, what will happen to the total stored energy, the electric field, and the potential difference between the plates? **(EUEE: 2006)**

A. The electric field between the plates increases.
B. The potential difference between the plates decreases.
C. The total energy stored in the capacitor increases.
D. The electric field, the potential difference and the stored energy remain the same.

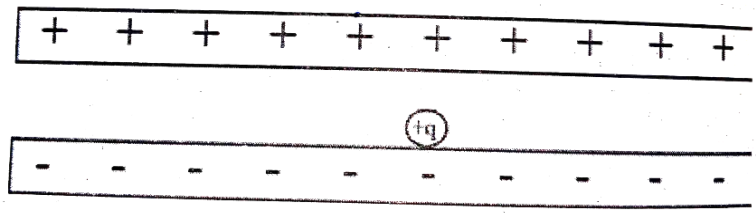
29. A small radio receiver uses a battery that delivers a constant current of 25mA for 3 hours. Calculatethe total charge delivered by the battery? **(EUEE: 2006)**
A. 1080000C B. 270000C C. 540C D. 270C

30. Two different capacitors of capacitance C_1 = 2μF and C_2 = 3μF are connected in series across a 120 V supply line. The charged capacitors are disconnected from the line and from each other and reconnected with terminals of like sign together. What will be the final charge on C_1 and C_2, respectively? **(EUEE: 2006)**
A. 57.6 μC and 86.4 μC
B. 115.2 μC and 127.8 μC
C. 144 μC across each
D. 288 μC across each

31. A parallel plate capacitor has a capacitance of 10μF.If the distance between the plates is doubled, keeping all other quantities constant, what is the new capacitance of the capacitor? **(EUEE: 2007)**
A. 0.2μF B. 5μF C.10μF D. 20μF

32. In a certain region of space, a uniform electric field is directed in the positive x direction. If a particle with negative charge carried from x = 20cm to x = 60cm, what can we conclude about the electric potential and the electric potential energy of the charge-field system?**(EUEE: 2007)**
A. The electric potential at x = 20cm is larger than that at x = 60cm.
B. The electric potential at x = 20cm is the same as that at x = 60cm.
C. The electric potential energy decrease.
D. The electric potential energy increases.

33. A positive charge of 1.0 x 10^{-4} C is on the negatively charge plate of a parallel plate capacitoras shown below.



If the potential (V) on the top plate is + 10,000 V and that of the bottom plate is – 10,000 V, how much work (W) is required to move charge from the bottom to the plate? **(EUEE: 2008)**
A. 2 J B. 1 J C. Zero D. 2 x 10^4 J

34. Two positive charges of magnitude 2.4 x 10^{-9} C and 1.6 x 10^{-9} C are separated in air by a distance of 2cm. how much electrostatic potential is produced by the two charges at midway between them? **(EUEE: 2009)**
A. 3.6 kV B. 0.72 kV C. 2.16 kV D. 1.44 kV

35. The capacitance of a parallel plate capacitor is 10μF. if the distance between the plates is halved, keeping all other quantities constant, and then what is the new capacitance of the capacitor? **(EUEE: 2009)**
A. 0.2μF. B. 5μF C. 10μF D. 20μF

36. A capacitor of 12μF capacitance can be fully charged after it is connected between potentialdifferences of 9 V. How much electrical energy is used in charging the capacitor? **(EUEE: 2010)**

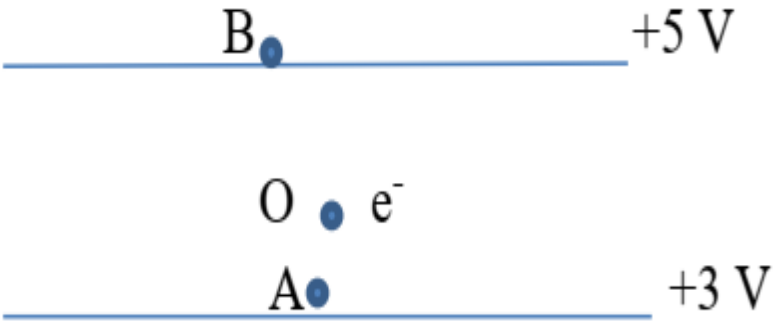
A. 4.86×10^{-4} J B. 54×10^{-4} J C. 1×10^{-3} J D. 9.72×10^{-4} J

37. A sheet of polythene ($\varepsilon_r = 2.3$) and 0.25 mm thick is to be used in a capacitor by sandwichingit between two sheets of aluminum foil. What area must the sheets have if the capacitor is to have a capacitance of 0.5 µF? **(UEE: 2011)**

A. 12 m^2 B. 6.14 m^2 C. 0.6 m^2 D. 0.12 m^2

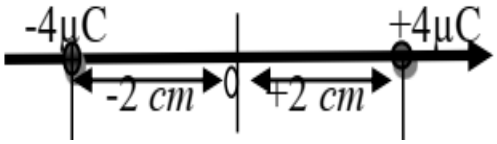
38. Two parallel plates are kept at 3 V as shown in the diagram below. If the electron is releasedat O, then which way will the electron move? **(EUEE: 2010)**

A. Towards A
B. Towards B
C. Remains at O
D. Parallel to the plates



39. Two equal and opposite charges are located along x-axis at -20 *cm* and +20 *cm* as shown in the figure below. How much would be the electric potential at the origin? **(EUEE: 2011)**

A. Zero
B. 1.8 MV
C. 3.6 MV
D. 4.5 MV



40. A sheet of polythene ($\varepsilon_r = 2.3$) and 0.25 mm thick is to be used in a capacitor by sandwichingit between two sheets of aluminum foil. What area must the sheets have if the capacitor is to have a capacitance of 0.5 µF? **(UEE: 2011)**

A. 12 m^2 B. 6.14 m^2 C. 0.6 m^2 D. 0.12 m^2

41. When a dielectric material placed between two parallel metal plates in the presence of electric fields they enable the plates to store **(UEE: 2013/14)**

A. Much more charge at different potential difference
B. Much more charge at the same potential difference
C. The same charge at the same potential difference
D. Much less charge at different potential difference

42. A parallel plate capacitor with plate area A and plates separation d stores a charge Q when a potential difference V is kept between the plates. Then the region between the plates is completely filled with a dielectric material of dielectric constant ε_r. If E denotes the electric field between the plates, the energy density stored by the capacitor is **(EUEE: 2013/14)**

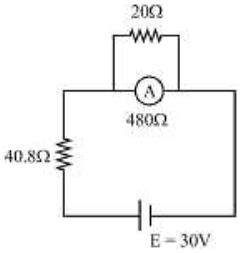
A. $u = \frac{\varepsilon_r \varepsilon_0 V^2 A}{2dE}$ C. $u = \frac{\varepsilon_r \varepsilon_0 Q V^2}{Ad}$

B. $u = \frac{1}{2}\varepsilon_r E Q^2 V$ D. $u = \frac{1}{2}\varepsilon_0 \varepsilon_r E^2$

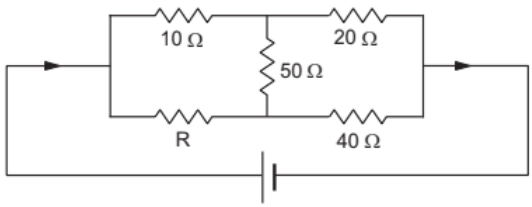
43. The electric potential at a distance of 2 cm from a $-1.6x10^{-9}C$ point charge is **(EUEE: 2014/15)**

A. 4.4 V B. -720 V C. -14.4 V D. 720 V

44. A parallel plate capacitor is charged with a battery. The battery is then disconnected, and a dielectric material is inserted between the plates of the capacitor. Which of the following is correct about the effect of the dielectric? **(EUEE: 2014/15)**
    A. The electric field between the plates and the energy stored decrease.
    B. The capacitance remains the same and the electric field between the plates increases.
    C. The potential difference between the plates remains the same and the charge increases.
    D. The charge on the plates decreases and the energy stored increases.
45. The capacitance of parallel-plate capacitor is $4\mu F$. If a dielectric material of dielectric constant 16 is placed between the plates then the new capacitance will be:
    A. $\frac{1}{64}\mu F$ B. $0.25\mu F$ C. $64\mu F$ D. $40\mu F$
46. Kirchhoff's junction rule state that
    A. Charge entering the junction equals the charge leaving that junction at a particular time.
    B. The sum of the voltage drop across any closed loop equals the sum of electromotive force.
    C. Current traversing any closed loop at particular time is zero.
    D. The potential drop at a given junction equals the electromotive force at that particular point.
47. A uniform conductor of length L and cross-sectional area A carries a current I when a potential difference V is applied across its ends. If the number of free electrons per unit volume of the conductor is n, and the electron charge is q, then the drift velocity of the electrons in the conductor is
    A. $v_d = \frac{I}{nqLA}$ B. $v_d = \frac{I}{nqL}$ C. $v_d = \frac{I}{qLA}$ D. $v_d = \frac{I}{nqA}$
48. If the potential of a capacitor having capacity 6 μF is increased from 10 V to 20 V, then increase in its energy will be
    A. $4x10^4J$ B. $4x10^{-4}J$ C. $9x10^{-4}J$ D. $12x10^{-6}J$
49. A circuit contains an ammeter, a battery of 30V and a resistance 40.8Ω all connected in series. If the ammeter has a coil of resistance 480Ω and a shunt of 20Ω, the reading in the ammeter will be:

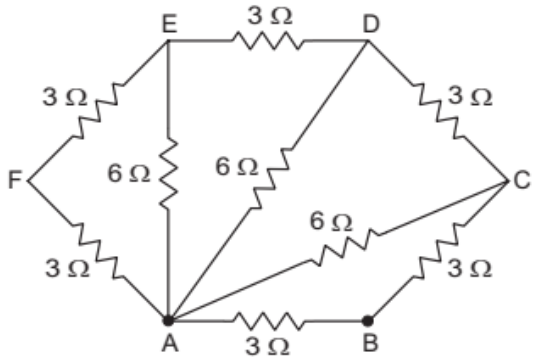


    A. 0.25 A
    B. 2A
    C. 1 A
    D. 0.5 A
50. A bullet of mass 2 g is having a charge of 2μC. Through what potential difference must it be accelerated, starting from rest, to acquire a speed of 10 m/s?
    A. 50kV B. 5k V C. 500k V D. 5 V
51. Kirchhoff's first and second laws for electrical circuits are consequences of
    A. Conservation of electric charge and energy respectively
    B. Conservation of electric charge
    C. Conservation of energy and electric charge respectively
    D. Conservation of energy
52. Find the value of R in figure below, so that there is no current in the 50 Ω resistor.



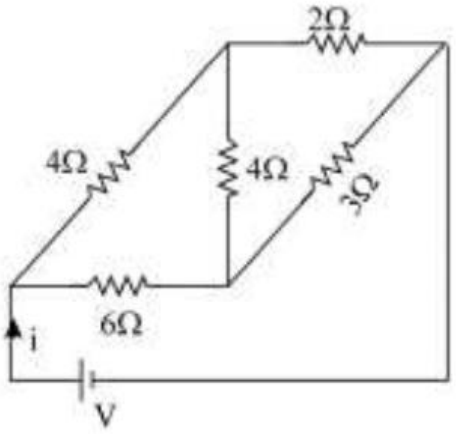
    A. 10Ω
    B. 50Ω
    C. 20Ω
    D. 40Ω

53. Which one of the following is true about galvanometer?
    A. To use a galvanometer as an ammeter that can read large voltages, we connect a small resistance in series with the galvanometer.
    B. A galvanometer can be converted to an ammeter that can be read large currents by connecting a small resistance in parallel with it and can be converted to voltmeter by connecting a large resistance in series with the galvanometer.
    C. Galvanometer can be converted to a voltmeter by connecting a small resistance in parallel with the galvanometer.
    D. To use galvanometer as an ammeter that can measure large currents, we need to increase its resistance by connecting a large resistance in series with the galvanometer.
54. Find the effective resistance between the points A and B in figure below.



A. 6Ω B. 2Ω C. 3Ω D. 1Ω

55. Which one of the following is not purpose of potential divider?
    A. To generate an adjustable potential difference
    B. To enable the selection of a specific potential difference
    C. To divide the potential difference from a power source between two or more components
    D. To provide the same current in the circuit since the resistance are always the same.
56. For the network shown in the Figure the value of the current i is

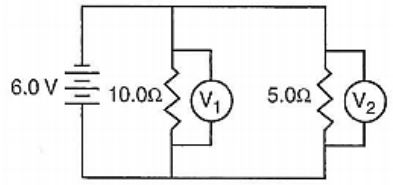


A. $\frac{9V}{35}$ B. $\frac{18V}{5}$ C. $\frac{5V}{9}$ D. $\frac{5V}{18}$

57. A student needs a 4-ohm resistor to complete a circuit. Only a large quantity of 1-ohm resistors is available. Which of the following should be done to complete the circuit?
    A. Connect four 1-ohm resistors in series.
    B. Connect four 1-ohm resistors in parallel.
    C. Connect two of the 1-ohm resistors in series and two in parallel.
    D. Connect only two 1-ohm resistors in parallel.

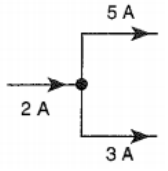
58. A 3-ohm resistor and a 6-ohm resistor are connected in parallel across a 9-volt battery. Which statement best compares the potential difference across each resistor?
    A. The potential difference across the 6-ohm resistor is the same as the potential difference across the 3-ohm resistor.
    B. The potential difference across the 6-ohm resistor is twice as great as the potential difference across the 3ohm resistor.
    C. The potential difference across the 6-ohm resistor is half as great as the potential difference across the 3-ohm resistor.
    D. The potential difference across the 6-ohm resistor is four times as great as the potential difference across the 3-ohm resistor.

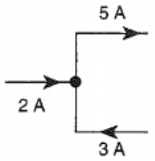
59. In the circuit diagram below, what are the correct readings of voltmeters V_1 and V_2?

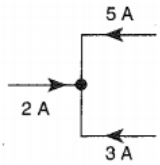


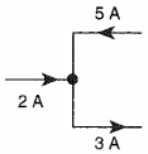
A. V_1 reads 2.0 V and V_2 reads 4.0 V
B. V_1 reads 4.0 V and V_2 reads 2.0 V
C. V_1 reads 3.0 V and V_2 reads 3.0 V
D. V_1 reads 6.0 V and V_2 reads 6.0 V

60. Which diagram shows correct current direction in a segment of an electric circuit?

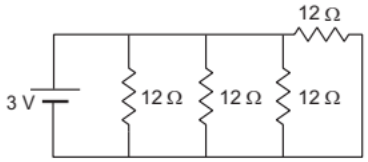
A. 

B. 

C. 

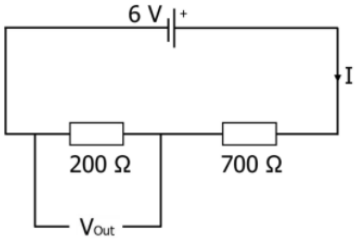
D. 

61. Find the **current** supplied by the battery in the circuit shown in figure below.



A. 1A B. 4A C. 6A D. 8A

62. Calculate the voltage output across the 200 Ω resistors.



A. 1.33 V B. 0.56 V C. 0.88 V D. 1.2 V

63. Calculate the current through each of the three resistors

