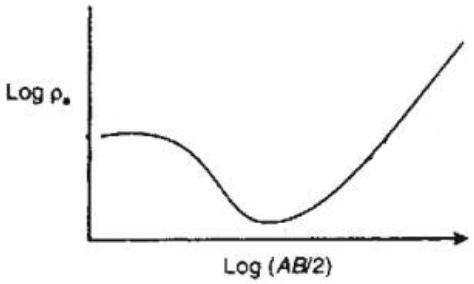
Name:_____, **Team:**_____

1. What is the primary reason for using a gradient array?
   (a) It can be used to infer vertical changes in resistivity
   (b) The conversion from raw data measurements to apparent resistivity is easier
   (c) Rapid acquisition of data that can infer horizontal position of targets
   (d) Off-line measurements are always better than along-line measurements

2. What are the raw data measured during a DC resistivity survey?
   (a) The apparent resistivity
   (b) The difference in secondary potential between two points
   (c) The difference in total potential between two points
   (d) The total potential

3. Think about the following applications for using DC resistivity. Which situation would be the most challenging?
   (a) Locating a buried resistor within a more conductive medium
   (b) Locating a buried conductor within a more resistive medium
   (c) Locating a target which lies under a conductive overburden
   (d) Recovering a dyke-like structure

4. Here, we see a sounding curve over a layered Earth with 3 layers. What can we say about the resistivities for the 3 layers? (let ρ_1 denote the top layer)



   (a) $\rho_1 < \rho_2 < \rho_3$
   (b) $\rho_2 < \rho_1 < \rho_3$
   (c) $\rho_3 < \rho_2 < \rho_1$
   (d) $\rho_3 < \rho_1 < \rho_2$

5. The equation for charge build-up on an interface is given by

$$(\rho_2 - \rho_1)J_n = \frac{\tau}{\varepsilon_0}$$

   where ρ is resistiviey, J_n is the current density flowing accross the interface and τ is the density of electric charges. Which of the following statements is false?
   (a) A larger difference in resistivity results in a larger build-up of charges
   (b) If $\rho_2 > \rho_1$, there is a build-up of negative charges
   (c) A larger current density results in a larger build-up of charges
   (d) None of the above

6. You are taking DC resistivity measurements over a homogeneous Earth (half-space). Which of the following **does not** happen when you increase the electrode spacing?
   (a) Your apparent resistivity increases
   (b) Your measured voltage increases
   (c) The apparent resistivity is plotted at a deeper pseudo-depth
   (d) Currents penetrate deeper into the Earth

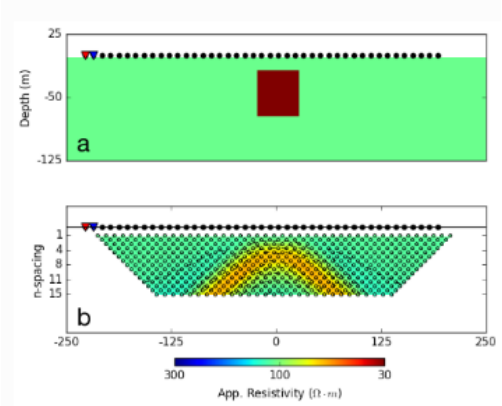
7. Conductivities of earth materials are often expressed in mS/m. A value of 100 mS/m corresponds to what resistivity.
   (a) 100 ohm-m
   (b) 1 ohm-m
   (c) 10 ohm-m
   (d) 0.01 ohm-m

8. When considering the fundamental physics of DC resistivity, which of the following is **false**?
   (a) According to $\mathbf{E} = -\nabla \mathbf{V}$, electric field lines go from positive potential to negative potential
   (b) Electric charges build up on interfaces where there is a discontinuity in electrical conductivity
   (c) Current converge on conductors and diverge around resistors
   (d) The electric poential (V) for a current electrode falls off as $1/r^3$

9. Let us consider the results of a DC resistivity inversion.
   - If my recovered model explains the data but does not make sense geologically, is the recovered model acceptable? (Yes / No)
   - If my recovered model is geologically reasonable by does not explain the observed data, is the recovered model acceptable? (Yes / No)

   (a) No. No.
   (b) Yes. No.
   (c) No. Yes
   (d) Yes. Yes.

10. Here, we see the pseudo-section produced from a dipole-dipole survey. For this simple example, what information **cannot** be extracted from the 'arc' signature?



   (a) Horizontal position of the structure
   (b) Whether or not the top of the structure extends to Earth's surface
   (c) Whether the signature is caused by a dyke or a block
   (d) True conductivity of the structure