

St John Baptist De La Salle Catholic School, Addis Ababa  
Solutions for the Final Examination Preparation Questions  
2nd Quarter

January, 2022

**Exam Preparation Questions & Study Guide**

1. What are the factors that affect the capacitance of capacitors? What about the factors that affect the energy storage capability in a capacitor?
2. What special property do RC circuits have? How can I relate charge with time? What is time constant? What is the difference of the time change of the charge when the capacitor is charging vs. when it is discharging?
3. What is an electric field? How can I relate field to charges & forces?
4. What is gravitational potential energy? What are the factors that affect gravitational potential energy? When is it positive? When is it negative? When is it 0? What factors affect the acceleration due to gravity in a system?
5. What is moment of inertia? What factors affect the moment of inertia of a system?
6. A point charge  $Q_1$  is at  $y = 2$  and another point charge  $Q_2$  is at  $y = 4$ . What is the relationship between these charges if the potential  $y = 5$  is 0?
7. What is internal resistance? What is the difference between terminal voltage and electromotive force? When I use a voltmeter which one do I measure and why?
8. A simple circuit consists of a load resistor of  $20\Omega$  connected to a battery of 8V EMF. If the current through the circuit is 2A, what is the internal resistance of the battery?
9. What is escape speed? What factors affect the escape speed of objects?
10. What are the common & uncommon units of energy? What energy units do we use daily? What about units that we use in niche areas?
11. How can I calculate the effective resistances and capacitances when devices are connected in series and parallel? When is the effective capacitance largest? What about the effective resistance? When is the energy stored largest? What about the power stored in resistive circuits?
12. What is potential? How is it related to potential energy? What is work done in relation to potential energy? What are conservative and dissipative forces? When do I need to do work? What are equipotential surfaces? How is the orientation of electric field related to potential?
13. What are conductors and insulators? What is the relationship between resistivity and conductivity?
14. What is current? How is it related to electric field? What is the SI unit of current? What is the SI unit defined as? What is drift speed? How is it related to current?
15. What is Newton's Second Law for rotational motion? How does it relate angular momentum and net torque? What about angular momentum and angular impulse?
16. What is Ohm's Law? What forms does it have? What is the difference between the two forms? What do the two forms of the law tell us? When is Ohm's Law true (and when is it not obeyed)? What are the factors that affect the resistance of a conductor?
17. What is Coulomb's law? What does it tell us about the force between two charges? What about when we have multiple charges? Why is superposition principle important?

**Some questions for extra credit problem**

18. What are black holes and why did the idea of black holes originate before we even got to see one?
19. What is the smallest possible temperature? What about the smallest amount of charge? The smallest amount of mass? The smallest amount of energy?