

MCAS / FINAL REVIEW PART V

1. Give an example of a scalar quantity.
2. Give an example of a vector quantity.
3. What are the SI units for Length, Mass & Time ?
4. If a person travels at 10 meters/second for one half hour and 20 meters/second for one hour what is the person's average speed during the overall time period ?
5. If during the trip of Question 4 (*above*) the person was always traveling in a northerly direction, what was the person's average velocity ?
6. If a car accelerates (*at a constant rate*) from 10 meters/second to 20 meters/second in a period of 2 seconds what is the magnitude of that acceleration?
7. For the car of problem 6 above what is the magnitude of its average velocity during the two-second-time period ?
8. What force is required to accelerate a model car of mass = 1 kilogram at the rate of 1 meter/s^2 ?
9. What is the weight of a mass of 1 kilogram at sea level on the planet earth ?

10. If the force required to start to pull an object (*that weighs 10 Newtons*) laterally along a floor is 5 Newtons, what is the Coefficient of Friction for that floor?

11. If a spring with a characteristic “k” of 10 Newtons per meter, is stretched a distance of 0.25 meters, what is the resulting restoring force of that spring ?

12. If two objects are moved apart, does the gravitational force between those two objects increase or decrease ?

13. Under what condition can a person with a mass of 80 Kilograms have the same momentum of a Mack truck of mass 10,000 Kilograms ?

14. If a person hits a tennis ball with an average Force of 100 Newtons over a time period of 0.1 seconds, what is the resulting impulse imparted to the ball ?

15. If a Force is exerted on an object in a direction perpendicular to the object, what is the value of the Work done by that Force ?

16. Why is the efficiency of any real machine less than 100% ?

17. What is the definition of energy ?

18. What is the potential energy of a 1 Kilogram object relative to a position 100 Meters below it ?

19. If you do 500 Joules of Work on an object over a time period of 10 Seconds, what was your average Power level ?
20. If you utilize a simple pulley based machine which has a characteristic of multiplying the Input Force by a factor of “10”, what is the mechanical advantage of this machine ?
21. If your input lever is 10 meters long and you are able to apply a perpendicular force of 250 Newtons to it, how much weight can you move if your output lever is 1 meter long ?
22. How many Coulombs per Second is 1 Ampere ?
23. If a Voltage of 12 Volts is applied across a resistance load of 2.5 Ohms, what is the resulting current through the load ?
24. If an input Voltage of 12 Volts is applied to a (*two resistive element*) series circuit, and 2.5 Volts is dropped across the first resistor, how much Voltage will necessarily be dropped across the second resistor ?
25. If a circuit node consists of three possible current directions (*branches*), and the current into the node has been determined to be 25 Amps, and the current out of the node (*via one of the remaining branches*) is 7.5 Amps, what is the magnitude and direction of the current in the remaining branch ?

26. A hair dryer is rated at 1200 Watts. What current does the hair dryer draw if the source Voltage is 120 Volts AC?
27. What is the Turns Ratio of a 4160 Volt (*Primary*), 120 Volt (*Secondary*) residential pad mounted transformer ?
28. If the frequency of a pendulum's motion is one cycle per second, what is the frequency of the pendulum in Hertz ?
29. How many grams in a kilogram ?
30. How many millimeters in a meter ?