

Portable Power Technology

1. Portable power can be found in all of the following except:
 - a. Cell phones
 - b. Desktop PC's
 - c. MP3's
 - d. PDA's
2. Due to recent advancements in IC technology
 - a. Battery usage has increased
 - b. New batteries have been developed
 - c. Batteries have become large in size
 - d. Both (a) and (b)
 - e. Both (a), (b) and (c)
3. A battery is
 - a. A specific type of cell
 - b. The basic building block of a cell
 - c. The housing of a cell
 - d. Two or more cells connected in series or parallel
4. Name the three basic parts which make up a cell.
5. When exposed to the electrolyte, the positive ions will move from the _____ to the _____.
6. What is the negative terminal of the cell called?
7. Name the two main types of cells.
8. Cells connected in parallel
 - a. Consume less power
 - b. Increase the battery life
 - c. Produce a higher current output
 - d. Produce a higher voltage output
9. Three 2 volt batteries connected in series produce an output voltage of
 - a. Two volts
 - b. Four volts
 - c. Six volts
 - d. No output voltage



10. Three 2 volt batteries are connected in series but one is backwards. The output voltage will be
 - a. Two volts
 - b. Four volts
 - c. Six volts
 - d. No output voltage

11. Three 2 volt batteries connected in parallel produce an output voltage of
 - a. Two volts
 - b. Four volts
 - c. Six volts
 - d. No output voltage

12. The open circuit voltage of a battery is
 - a. Much greater than the theoretical voltage
 - b. The output voltage at the end of a discharge cycle
 - c. The output voltage with a typical load
 - d. The output voltage without a load

13. Another name for nominal voltage is
 - a. Cutoff voltage
 - b. Endpoint voltage
 - c. Theoretical voltage
 - d. Working voltage

14. Once a battery falls below its _____ voltage, the battery is no longer useful.
 - a. Cutoff voltage
 - b. Nominal voltage
 - c. Theoretical voltage
 - d. Working voltage

15. A load draws two amps of current from a battery with an amp-hour rating of 20 Ah. How long will the battery last?
 - a. 10 hrs
 - b. 18 hrs
 - c. 22 hrs
 - d. 40 hrs

16. A battery has a capacity of 30 Ah. What is the current for a battery with a C/10 charge rate?
 - a. 3 amps
 - b. 3.3 amps
 - c. 10 amps
 - d. 30 amps



17. How is the internal resistance of a battery typically measured?
Ohms
18. The shelf life of a battery
- Is infinite until used
 - Is less than 1 year
 - Is the same for all batteries
 - Varies depending on the battery
19. Which battery type is the most widely used in our household devices?
- Alkaline
 - Lead-acid
 - NiCd
 - NiMH
20. The working voltage of AAA, AA, C, and D batteries is
- 1.0 volts
 - 1.5 volts
 - 2.1 volts
 - 3.0 volts
21. Which is the difference between primary and secondary batteries?
22. Which of the following battery types is non-rechargeable?
- Lead-acid
 - LiMnO_2
 - NiCd
 - NiMH
23. The type of battery that has a “memory” effect is the
- Alkaline
 - Li^+
 - NiCd
 - NiMH
24. Lead-acid batteries are commonly found in cars and have six cells totaling 12.6 volts. What is a lead-acid battery’s working voltage?
- 1.0 volt
 - 1.5 volts
 - 2.1 volts
 - 3.0 volts



25. The primary battery with the highest energy density is the
- Alkaline
 - Li+
 - LiMnO₂
 - NiCd
26. The batteries with the highest working voltage of 4 volts is the
- Li+
 - LiMnO₂
 - NiCd
 - NiMH
27. Why is the current 12 volt battery found in most automobiles being replaced?
28. What is the value of the new battery and why was that value selected?
29. A secondary cell is recharged by
- Adding more electrolyte to the cell
 - Applying a much larger voltage to the battery
 - Reducing the internal resistance of the battery
 - Reversing the flow of current through the battery
30. If a charging voltage of 1 volt is connected to a battery with 0.8 volts, what is the total effective circuit voltage?
- 0.2 volts
 - 0.8 volts
 - 1.0 volts
 - 1.8 volts
31. The current in a charging circuit is only limited by the _____ of the battery itself.
- Internal resistance
 - Shelf life
 - Size
 - Voltage
32. An important point in recharging batteries is
- Connect the battery in parallel
 - Set the charging voltage as high as possible
 - Use the correct battery charger
 - Watch for potential fire



33. To charge a NiCd or a NiMH battery, a constant _____ is needed.
- Current
 - Power
 - Resistance
 - Voltage
34. List three things that can result in improperly charging a battery.
35. Why are battery charger IC's referred to as "gas gauge" chips?
36. Name three things power management chips provide.
37. Power management systems include the following types of sensors
- Voltage
 - Voltage and current
 - Voltage, current, and temperature
 - Voltage current, temperature and moisture
38. The best way to test a battery is
- Across a large load resistor
 - To take an output current measurement
 - Under normal operating conditions
 - With no load (open circuit)
39. Name three safety precautions to be used when working with batteries.
40. Identify how to dispose of used primary batteries.
41. Identify how to dispose of used secondary batteries.



42. List three important things to remember when storing batteries.