**Nature reinvented quiz**

Materials that change shape when electrified, liquids that get thicker and stickier in a magnetic field, and advanced mechanical and electrical devices that blend with human tissue, often outperforming their natural equivalents – it all sounds like science fiction.

In reality, this is the world of smart materials and prosthetic engineering.

Have a go at the quiz below. Hint: You may find it useful to watch our Nature reinvented video first!

Good luck.

1. **What do the letters ACL stand for?**
2. Auxiliary Cruciate Ligament
3. Anterior Cruciate Ligament
4. Additional Cruciate Ligament
5. Automatic Cruciate Ligament
6. **What is a smart material?**
7. A material that is used for decorative purposes because of its looks
8. A material used in the manufacture of computer chips
9. A material which can alter one or more of its properties when it receives some kind of external stimulus
10. A material used in clothing manufacture
11. **Which of these is an example of a biological polymer?**
12. Calcium carbonate
13. Protein
14. Polyvinylchloride
15. Acetic acid
16. **What is an alloy?**
17. A mixture made up of a metal and a gas
18. A mixture made up of two or more gases
19. A mixture made up of two or more non-metals
20. A mixture made up of two or more different metals
21. **What method of bonding is usually involved in joining metals and non-metals?**
22. Ionic bonding
23. Doric bonding
24. Covalent bonding
25. Hydrogen bonding
26. **What set of properties make the metal titanium particularly useful for medical applications?**
27. It’s strong, heavy, can be alloyed with other materials and is highly toxic
28. It’s strong, light, can be alloyed with other materials and is non-toxic
29. It’s shiny, valuable and doesn’t form alloys with other metals
30. It’s slightly radioactive so implants are easy to detect
31. **In normal circumstances, what does the body try to do at any alien objects which end up inside it?**
32. It tries to encapsulate them in order to protect itself
33. It tries to dissolve them
34. It tries to push them back out through the skin
35. It tries to push them into the intestines from where they can be expelled from the body
36. **Some patients require prosthetics because of bone cancer. This is a very rare disease and affects about…**
37. 7 in 1 million people
38. 1 in 7 million people
39. 7 in 1,000 people
40. 1 in 7,000 people
41. **A magnetorheological fluid…**
42. changes its properties in the presence of a gravitational field
43. changes its properties in the presence of a magnetic field
44. changes its properties in the presence of an electric field
45. is completely unaffected by the presence of a magnetic field
46. **A compound called lithium tantalate (LiTiO3) is an example of a piezoelectric material. This means that it can change its volume if a voltage is applied across it. If 1 mole of lithium atoms weighs 7g, 1 mole of titanium 48g and 1 mole of oxygen 16g, how much does half a mole of lithium tantalate weigh?**
47. 41.5g
48. 108.2g
49. 51.5g
50. 103.0g

**Answers**

1. b
2. c
3. b
4. d
5. a
6. b
7. a
8. a
9. b
10. c