MATERIAL SCIENCE TEST

Answer the following questions about quartz.

1) The predominant type of bonding or attraction that holds quartz in a solid state is....
a. Metallic bonding
b. Covalent network bonding
c. Hydrogen bonding
d. London dispersion forces
e. Ionic bonding
f. None of the above

2) Circle all that apply.
Quartz would be expected to be soluble in ...
a. Water
b. Hexane
c. Ethanol
d. All of the above
e. None of the above

3) Based on its bonding or attraction the melting point of quartz would be expected to be...
a. Extremely high (over $1,000^0$C)
b. High(500^0C to $1,000^0$C)
c. Moderate (200^0C to 500^0C)
d. Low (50^0C to 200^0C)
e. Bonding or attraction has no effect on melting point.

4) True or False
Quartz will conduct electricity when dissolved in distilled water.

5) True or False Quartz will have an extremely low volatility.

6) The most likely packing structure for quartz is
a. FCC
b. BCC
c. HCP
d. Commonly demonstrates all of the above
e. The material does not not demonstrate a packing structure.

7) The predominant type of bonding or attraction that holds sodium choride in a solid state is....
g. Metallic bonding
h. Covalent network bonding
i. Hydrogen bonding
j. London dispersion forces
k. Ionic bonding
l. None of the above

8) Circle all that apply.
Sodium chloride would be expected to be soluble in ...
f. Water
g. Hexane
h. Ethanol

i. All of the above
j. None of the above

9)
Based on the bonding or attraction the melting point of sodium chloride would be expected to be...
f. Extremely high (over 1,000^{0}C)
g. High(500^{0}C to 1,000^{0}C)
h. Moderate (200^{0}C to 500^{0}C)
i. Low (50^{0}C to 200^{0}C)
j. Bonding or attraction has no effect on melting point.

10) True or False
sodium chloride will conduct electricity when dissolved in distilled water.
11) True or False
sodium chloride will have an extremely low volatility.

12) The most likely packing structure for sodium chloride is
f. FCC
g. BCC
h. HCP
i. Commonly demonstrates all of the above
j. The material is more likely to be an amorphous material.

13) The predominant type of bonding or attraction that holds aluminum in a solid state is....
m. Metallic bonding
n. Covalent network bonding
o. Hydrogen bonding
p. London dispersion forces
q. Ionic bonding
r. None of the above

14)
Circle all that apply.
Aluminum would be expected to be soluble in ...
k. Water
l. Hexane
m. Ethanol
n. All of the above
o. None of the above
15) Based on the bonding or attraction the melting point of aluminum would be expected to be...
k. Extremely high (over 1,000^{0}C)
l. High(500^{0}C to 1,000^{0}C)
m. Moderate (200^{0}C to 500^{0}C)
n. Low (50^{0}C to 200^{0}C)
o. Bonding or attraction has no effect on melting point.

16) True or False
Aluminum will conduct electricity when dissolved in distilled water.
17) True or False
Aluminum will have an extremely low volatility.

18) The most likely packing structure for aluminum is
k. FCC
l. BCC
m. HCP
n. Commonly demonstrates all of the above
o. The material is more likely to be an amorphous material.

19) The predominant type of bonding or attraction that holds sugar in a solid state is....
s. Metallic bonding
t. Covalent network bonding
u. Hydrogen bonding
v. London dispersion forces
w. Ionic bonding
x. None of the above

20) Circle all that apply.
Sugar would be expected to be soluble in ...
p. Water
q. Hexane
r. Ethanol
s. All of the above
t. None of the above

21) Based on the bonding or attraction the melting point of sugar would be expected to be...
p. Extremely high (over $1{,}000^0$C)
q. High(500^0C to $1{,}000^0$C)
r. Moderate (200^0C to 500^0C)
s. Low (50^0C to 200^0C)
t. Bonding or attraction has no effect on melting point.

22) True or False
Sugar will conduct electricity when dissolved in distilled water.

23) True or False
Sugar will have an extremely low volatility.

24) The predominant type of bonding or attraction that holds stearic acid in a solid state is....
y. Metallic bonding
z. Covalent network bonding
aa. Hydrogen bonding
bb. London dispersion forces
cc. Ionic bonding
dd. None of the above

25)Circle all that apply.
Stearic acid would be expected to be soluble in ...
u. Water
v. Hexane
w. Ethanol
x. All of the above

y. None of the above

26) Based on the bonding or attraction the melting point of stearic acid would be expected to be...
u. Extremely high (over 1,000^{0}C)
v. High(500^{0}C to 1,000^{0}C)
w. Moderate (200^{0}C to 500^{0}C)
x. Low (50^{0}C to 200^{0}C)
y. Bonding or attraction has no effect
on melting point.

27)
True or False
Stearic acid will conduct electricity when dissolved in distilled water.

28)
True or False
Stearic acid will have a high volatility.

29)
The most likely packing structure for aluminum is
p. FCC
q.BCC
r.HCP
s. Commonly demonstrates all of the above
t. The material is more likely to be an amorphous material

30) The main types of materials are metals, ceramics, polymers, and composites. For each of the materials listed below, indicate the type to which it belongs.

a. Aluminum reinforced with silicon carbide particles.
b. Polytetrafluoroethylene (“Teflon”)
c. Silicon dioxide
d. Carbon fiber reinforced epoxy
e. Copper
f. Polyvinyl chloride

MATERIAL SCIENCE ANSWERS

1. B

2. E

3. A

4. False

5. True

6. C

7. K

8. F

9. G

10. True

11. True

12. F

13. M

14. O

15. L

16. False

17. True

18. K

19. U

20. P, R (needs both answers)

21. S

22. False

23. True

24. BB

25. V, W (needs both)

26. X

27. False

28. True

29. P

30.

a. Composite

b. Polymer

(Tie Breaker) c. Ceramic

d. Composite

e. Metal

f . Polymer