1. A dentist adjusts the supporting cusp tip on a gold crown so that the occlusal contacting area on that cusp is decreased to half its original area. Assuming that the biting force remains constant, what is the change in stress within the occlusal contacting area of that cusp tip?
2. There is no stress
3. **Doubled**
4. Remains the same
5. Halved
6. Which of the following pairs of materials exhibits the smallest contact angle?
7. **Etched enamel and occlusal sealants**
8. Gold casting alloys and dental porcelain
9. Teflon and water
10. Acrylic and water
11. Amalgam and water
12. How does microcrystalline wax differ from paraffin wax?
13. Microcrystalline wax has a lower melting point
14. Microcrystalline wax is petroleum-based
15. Microcrystalline wax is polymerized polyethylene
16. **Microcrystalline wax shrinks less upon solidification**
17. Microcrystalline wax cannot be used in casting wax formulas
18. According to best management practices for handling amalgam waste, which of the following should be placed in biohazard waste receptacles for incineration?
19. Amalgam debris collected from chairside traps
20. Contact amalgam scrap
21. Bloody extracted teeth containing amalgam restorations
22. All of the above
23. **None of the above**
24. Compared to reversible hydrocolloid, alginate
25. Contains the same chemical mechanism to retard the setting reaction
26. Contains the same filler component to provide bulk for impression-taking
27. Has greater recovery upon removal
28. **Captures less detail**
29. Contains less air
30. Acceleration of free radicals from benzoyl peroxide in dental acrylic polymerization systems is usually accomplished by
31. Heat
32. Light
33. Organic amines
34. a and b
35. **a and c**
36. Which of the following bonding system schemes is a “two-bottle, self-etch” system?
37. E+P+B
38. EPB
39. E+[PB]
40. **[EP]+B**
41. None of the above; all use a separate phosphoric acid etching gel
42. Which of the following is/are thermosetting polymer(s)?
43. Polystyrene
44. Heat-cured, cross-linked PMMA
45. Cured epoxy used for dies
46. **Two of the above**
47. All of the above
48. Which of the following is/are primer coupling agent(s) in dental bonding systems?
49. **HEMA**
50. bisGMA
51. UDMA
52. Bis-GMA and UDMA
53. The margins of a cast gold alloy restoration are rounded unlike the sharp margins that were present in the invested wax pattern. Which of the following is the most likely cause?
54. Heating the gold alloy with the tip of the reducing zone of the torch flame
55. **A button that is smaller than required**
56. Too much centrifugal casting force
57. A sprue diameter that is too large
58. Two of the above
59. Which of the following entities regulates dental materials and devices in the United States?
60. OSHA
61. ANSI
62. ISO
63. **FDA**
64. ADA
65. When a metal alloy partial denture clasp is stressed below its proportional limit, which of the following statements must be true?
66. The fracture toughness of the clasp is at least slightly exceeded
67. The ultimate tensile strength of the clasp is exceeded
68. The clasp is stressed below its modulus of elasticity
69. The clasp is permanently deformed
70. **The clasp exhibits strain**
71. Based upon thermal diffusivity, which of the following materials would be expected to cause the most thermal shock to a tooth upon application of a hot liquid?

**Material Conductivity Specific Heat Density**

A Low Low Low

B Low High High

C High Low High

D High Low Low

E High High Low

1. A
2. B
3. C
4. **D**
5. E
6. What is the purpose of the “P” in an “E+P+B” dental bonding system?
7. To partially demineralize the dentin surface layer
8. To provide an air-inhibited layer for bonding to composite resin
9. To provide a resin coat for adhesion to composite resin continuous phase
10. **To infiltrate demineralized dentin and create a “hybrid” layer**
11. To perform a finite element stress analysis of a dental implant restoration you would need
12. Samples of the actual dental implant restoration after use intraorally
13. Samples of the actual restoration materials after use intraorally
14. **Knowledge of the properties of the materials involved**
15. Two of the above
16. None of the above
17. To improve the flow of a dental die stone mix, a lab technician adds more water than recommended by the manufacturer. Which of the following is an effect of this change?
18. Decreases setting time required to reach the “friable” stage
19. **Decreases compressive strength of the set and dried die**
20. Decreases porosity in the set and dried die
21. Increases the proportion of terra alba in the fluid mix
22. Increases reproduction of detail in the set and dried die
23. Compared to high-copper dental amalgams, conventional dental amalgams exhibit
24. **Higher creep**
25. Improved strength
26. Better marginal integrity
27. Increased clinical longevity
28. Better resistance to corrosion
29. Regular set alginate powder has more of which of the following compounds compared to fast set alginate powder for the purpose of retarding the setting reaction?
30. Calcium sulphate
31. **Sodium phosphate**
32. Calcium alginate
33. Guluronan
34. None of the above
35. The powder in a powder/liquid kit of cold-cure dental acrylic is mostly composed of
36. bisGMA or UDMA polymer
37. bisGMA or UDMA monomer
38. free radicals
39. PMMA monomer
40. **PMMA polymer**
41. For which of the following would a gypsum-based casting investment not be appropriate?
42. Cast post and core under a full crown restoration
43. **Porcelain-fused-to-metal crown undercasting**
44. Full gold crown restoration
45. Cast gold onlay
46. All of the above can be cast using a gypsum-based casting investment
47. According to the manufacturer, which of the following etching step times are correct when using the Prime and Bond NT system?

**Choice Enamel etch time Dentin etch time**

A at least 30 sec no more than 30 sec

B at least 15 sec no more than 15 sec

C no more than 30 sec at least 30 sec

D no more than 15 sec at least 15 sec

E no more than 30 sec no more than 30 sec

1. Choice A
2. **Choice B**
3. Choice C
4. Choice D
5. Choice E
6. To provide the best visual match between an all-porcelain crown and an adjacent natural tooth in the widest range of lighting conditions, both the crown and the natural tooth should exhibit
7. Isomerism
8. Metamerism
9. Fluorescence
10. Metamerism and isomerism
11. **Isomerism and fluorescence**
12. An ideal elastic material with no viscous component has which of the following properties?
13. Strain is independent of modulus
14. **Strain will always be completely reversed**
15. Strain reversal after removal of stress will be time-dependent
16. Strain increases non-linearly upon removal of stress
17. Strain prevents return to original dimension
18. In high copper dental amalgams, gamma-2 is suppressed by the preferential formation of
19. Gamma
20. Gamma-1
21. Silver-tin
22. **Tin-copper**
23. Silver-copper
24. The inorganic component of enamel in a fully erupted permanent tooth is mostly
25. **Hydroxyapatite**
26. Collagen
27. Amelogenin
28. Non-collagenous proteins
29. Phosphophoryn
30. Which of the following properties would a material exhibit above its glass transition temperature but not below its glass transition temperature?
31. Brittle fracture
32. Decreased ductility
33. Decreased translucency
34. **Increased permanent deformation**
35. Increased resistance to indentation
36. Which of the following expansion mechanisms contributes to the overall expansion of gypsum-based casting investments, but not to expansion of gypsum used for producing dies?
37. **Hygroscopic**
38. Polymeric
39. **Thermal**
40. Setting
41. Natural teeth normally exhibit which of the following?
42. Value
43. Chroma
44. Fluorescence
45. Value and chroma
46. **Value, chroma and fluorescence**
47. Dehydration of gypsum under pressure in the presence of water vapor creates
48. Plaster
49. **Hydrocal**
50. Densite
51. Plaster and hydrocal
52. Plaster and densite
53. Which of the following is found in both fully-set conventional and fully-set high-copper dental amalgams?
54. Tin-mercury phase
55. Tin-copper phase
56. **Gamma-1 phase**
57. Gamma-2 phase
58. None of the above
59. Over-trituration of dental amalgam alloy and mercury results in
60. Less gamma-1 formation
61. Less gamma formation
62. Less heat generation
63. **Less working time**
64. Less creep
65. Why is dentin kept moist after etching during dental bonding procedures?
66. **To facilitate primer infiltration**
67. To promote demineralization
68. To reduce polymerization shrinkage
69. To maintain pulp vitality
70. To dilute dentinal tubule fluid
71. Which of the following has the lowest linear coefficient of thermal expansion?
72. **Coronal dentin**
73. Casting pattern wax
74. Cold-cure acrylic resin
75. Microfilled composite resin
76. All of the following are types of composite resin except one. Which one is the exception?
77. Hybrid
78. Flowable
79. Indirect
80. **Unfilled**
81. Packable
82. Which of the following is a component of the continuous phase of composite resins?
83. **bis-GMA**
84. HEMA
85. 4-META
86. solvent: acetone or alcohol
87. colloidal silica
88. According to Sturdevant, what is the mean size range of filler particles in typical microfilled composite resins?
89. .005 - .01 microns
90. **.01 - .1 microns**
91. .1 to 1 microns
92. 1 – 10 microns
93. The essential difference between homogeneous microfilled composites and heterogeneous microfilled composites is that heterogeneous microfilled composites contain
94. bisGMA or UDMA in the continuous phase
95. smaller inorganic filler particles
96. **pre-cured composite particles**
97. TEGMA diluent to decrease viscosity
98. nano-fillers
99. The “C-Factor” for a cavity preparation with two unbound surfaces and four bound surfaces is
100. 16
101. 8
102. 4
103. **2**
104. 0.5
105. A composite resin that considerably yellows with age is most likely
106. Laboratory cured
107. **Chemically cured**
108. Filled with nano-particles
109. Filled with two different sizes of particles
110. Filled with 0.1 – 1.0 micron, silane-coated particles
111. Within limits, which of the following will decrease wear of composite resin formulations?
112. **Increase filler volume**
113. Increase the percentage of uncured monomer
114. Use TEGMA in the dispersed phase
115. Use a chemically cured system
116. Use harder filler particles