**DENTAL MATERIALS D150 MIDTERM EXAMINATION - Fall 2011**

**INSTRUCTIONS**

1. Place all materials except a #2 pencil and eraser in the back or side of the room, but NOT on the seat or floor next to you.
2. Sit in alternating seats, or as assigned by the exam proctor.
3. You are not permitted to have any materials except a pencil and eraser during the examination. This includes but is not limited to books, notes or papers of any kind, food or drink or containers, pagers, cell phones, computers, pagers, electronic devices of any kind, coats or jackets, or hats.
4. This examination is being conducted under the requirements of the Honor Code and the Academic Regulations, both of which will be fully enforced.
5. Mark your test code, either “11” or “22” in the upper right box of the answer sheet labeled “Optional Codes” in the two columns labeled “test code” and fill in the bubbles for the code printed at the bottom of your test pages.
6. Write in your name and TU identification number on the answer sheet and fill in the corresponding bubbles. DO NOT use your social security number.
7. Turn the answer sheet over and sign and date your answer sheet.
8. Check to make sure that your test booklet contains 30 questions.
9. Answer each question by providing the single BEST response, filling in the corresponding bubble on the answer sheet.
10. No questions are allowed during the examination. Do your best to answer the questions as presented.
11. The examination begins at 8:00 a.m. and ends at 9:15 a.m. at which time your answer sheet will be collected. The exam time includes completing the answer sheet. Additional time will not be provided.
12. When you are finished with the examination, turn in your completed answer sheet directly to one of the proctors. You may keep the examination booklet.
13. For security, answer sheets will be compared to the class roster immediately after the examination.
14. Students **Ahmed-Mehta should be in Lecture Room A and students Miller-Zielinski should be in the Preclinical Lab**. If you are in the wrong room, please go to the correct room before the exam begins.
15. Once you leave the examination room for any reason, you may not return and must hand in your answer sheet at that time.
16. Students arriving late for the examination will be admitted only until the first person leaves either examination room.
17. Which of the following entities regulates dental materials in the United States?
18. **OSHA**
19. **FDA**
20. ANSI
21. ISO
22. ADA
23. Compared to most dental materials, dental waxes have relatively high values of
24. Compressive strength
25. **Thermal expansion**
26. Proportional limit
27. Elastic modulus
28. Resilience
29. Consider these statements:

*Hydrocolloid sols can exhibit syneresis prior to gelling*

*Hydrocolloid sols become hydrocolloid gels by the process of imbibition*

Which of the following is true concerning these two statements?

1. The first statement is false and the second statement is true
2. The first statement is true and the second statement is false
3. **Both statements are false**
4. Both statements are true
5. A pulp irritation test of a dental cement is an example of which of the following types of biocompatibility tests?
6. **Usage**
7. Cell culture
8. Cytotoxicity
9. Mutagenesis
10. Non-specific toxicity
11. Consider this statement and reason:

*Dental plaster is weaker than hydrocal*

*BECAUSE*

*Hydrocal is produced by the process of dry calcination*

1. Both the statement and the reason are correct and related
2. Both the statement and the reason are correct but not related
3. The statement is not correct, but the reason is correct
4. **The statement is correct, but the reason is not**
5. Neither the statement nor the reason is correct
6. Thermal expansion is a required property for which of the following materials?
7. Fast-set mounting plaster
8. Improved stone for master models and crown dies
9. Improved stone for master models for implant cases
10. Gypsum products for study casts
11. **Gypsum-based casting investment**
12. Which of the following is found in set irreversible hydrocolloid as a by-product of the setting reaction?
13. Sodium phosphate
14. **Sodium sulfate**
15. Calcium phosphate
16. Calcium sulfate
17. Which of the following is true concerning permanent distortion of reversible versus irreversible hydrocolloid impression materials upon removal from the mouth ?
18. **Irreversible hydrocolloid has more permanent distortion than reversible**
19. Reversible hydrocolloid has more permanent distortion than irreversible
20. Both exhibit about the same degree of permanent distortion
21. If a material’s KHN is decreased, resistance to which of the following will be decreased?
22. Crack propagation
23. **Indentation**
24. Flexure
25. Flow
26. Which of these terms identifies the setting stage of densite in which there is not flow but the mix can be molded and the surface gloss of the mix is no longer present?
27. Activated
28. Carvable
29. Fluid
30. Friable
31. **Plastic**
32. The largest proportion of reversible hydrocolloid is
33. Agar
34. **Water**
35. Inorganic filler
36. Sodium alginate
37. Calcium alginate
38. A material that exhibits less elastic strain for a given amount of stress compared to another material subjected to the same amount of stress is
39. **Less flexible**
40. **Less resilient**
41. Less ductile
42. Tougher
43. Weaker
44. Compared to enamel, dentin has a higher value of which of the following properties?
45. Hardness
46. Elastic modulus
47. **Tensile strength**
48. Compressive strength
49. None of the above
50. What property is in the numerator of the expression used to calculate Poisson’s ratio?
51. Ultimate tensile strength
52. Young’s modulus
53. Percent
54. **Lateral strain**
55. When an orthodontic wire is stressed below its proportional limit, which of the following statements must be true?
56. Resilience is exceeded
57. **Young’s modulus is not exceeded**
58. The wire is permanently deformed
59. The wire exhibits ductility
60. Complex stresses can be resolved into combinations of which of the following groups of basic stresses?
61. Tensile and/or shear
62. Axial and/or bending
63. Tensile and /or compressive
64. **Axial and/or shear**
65. Axial and/or compressive
66. How does microcrystalline wax differ from paraffin wax?
67. Microcrystalline wax is made from petroleum; paraffin wax is not
68. Microcrystalline wax has a lower melting range than paraffin wax
69. Microcrystalline wax contains synthetic additives; paraffin wax does not
70. **Microcrystalline wax has less volumetric shrinkage upon solidification**
71. The inorganic component of coronal dentin is mostly
72. Intertubular dentin
73. Peritubular dentin
74. Collagen
75. **Hydroxyapatite**
76. Water
77. If your gypsum casts do not have the surface hardness that they usually have, which of the following are likely causes?
78. Change in water/powder ratio
79. Use of hydrocal rather than densite
80. New use of a spray disinfectant on the set casts
81. Two of the above
82. **a, b, and c, above**
83. Which of the following would cause a drop in temperature differential on a thermogram of a dental wax product?
84. **A phase transition**
85. Release of residual stress
86. Incorporation of residual stress
87. Volatilization of one or more wax components
88. Colloidal systems can be
89. A hydrosol
90. An emulsion
91. A gas dispersed in another gas
92. **a and b**
93. a,b,and c
94. In the assigned Journal of Prosthetic Dentistry article by RJ Kelly, a scheme is presented for classification of dental materials according to which of the following criteria?
95. Clinical versus laboratory use
96. Direct versus indirect restoration
97. Biocompatibility and complexity
98. **Duration and type of function**
99. Physical and mechanical properties
100. The temporomandibular joint represents which of the following components of a Class III lever system?
101. **Fulcrum**
102. Effort
103. Load
104. Lever
105. Which of the following requires the least amount of mixing water to obtain the same completeness of reaction and the same consistency of mix, assuming equal weights of each powder?
106. Hydrocal
107. Plaster
108. **Densite**
109. They all require the same amount of mixing water per powder weight
110. Assuming same temperature, which of the following waxes has the highest elastic modulus?
111. **Carnauba**
112. Inlay
113. Paraffin
114. Beeswax
115. An MSDS should include each of the following topics except one. Which one is the exception?
116. Composition
117. Hazards
118. Reactivity
119. **Directions for use**
120. Toxicology information
121. Good penetration of a liquid into a substrate depends upon
122. **High surface tension**
123. Low surface energy
124. High contact angle
125. High viscosity
126. How many errors are there in the following comparative summary chart of the properties of enamel versus dentin?
127. **None**
128. Two
129. Four
130. Six
131. Eight

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| --- | --- | --- | --- | --- |
|  | **Compressive**  **Strength** | **Tensile**  **Strength** | **Modulus of Elasticity** | **Hardness** |
| **Enamel** | HIGHER | LOWER | HIGHER | HIGHER |
| **Dentin** | LOWER | HIGHER | LOWER | LOWER |



1. Referring to the diagram above, which material is the least ductile?
2. **A**
3. B
4. C
5. D
6. I can’t tell because I need to know the area under each curve to answer
7. Referring to the diagram above, which material is the most flexible?
8. A
9. B
10. **C**
11. D