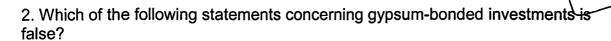
## **Dental Materials II: Mid-Term Exam**

October 18, 2006

1. The term "MRT", as it refers to the behavior of elastic impression materials, means:

- a. Minimum Removal Time
- ♠ Mouth Removal Time ✓
- č. Marginal Retention Time
- d. Minimum Reaction Temperature
- e. Mean Removal Time

B



- (a) Can be safely heated well above 700 degrees C.
- b. Contains calcium sulfate hemihydrate as a binder.
- c. Contains quartz or cristobalite as refractory components.
- d. Can be used in hygroscopic and thermal techniques.
- e. Is a suitable investment for Type III gold high-noble alloy.
- 3. Which statement concerning the particles of the refractory filler of an investment material is false?
  - a. The refractory particle size should be uniform.
  - b. The refractory particle size should not be greater than 75 microns.
  - (c) The refractory particles always react chemically with the refractory
  - d. The refractory particles have a major effect on the smoothness of the mold surface.
  - e. Increasing the proportion of refractory filler increases thermal expansion.
- 4. An advantage of phosphate-bonded investments is high "green" strength, which means:
  - a. The investment changes color to a green tint at a critical strength.
  - b. The investment has a high strength at the precise end of working time.
  - c. The pre-fired strength of the investment acquired by chemical reaction at room temperature.
  - d. The strength of the investment after the wax burn-out process.
    - e. None of the above.

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	— 5. According to O'Brien, the desired accuracy of a cast dental restoration is:
E	a. 10% b. 5% c. 1% d. 0.5% (e) 0.1% <
	6. Expansion of an investment material is intended to compensate for:
A	<ul> <li>Wax and Alloy Shrinkage</li> <li>Only Wax Shrinkage</li> <li>Casting Ring Shrinkage</li> <li>Flow Behavior of Molden Alloy</li> <li>None of the Above</li> </ul>
	7. Gypsum bonded investments can be used with both hygroscopic and thermal (i.e. "high-heat") techniques: True or False?
t	<ul><li>a True </li><li>b. False</li></ul>
	6. Which of the following statements concerning phosphate-bonded investments is not correct (i.e., incorrect):
V	<ul> <li>a. Contains ammonium phosphate</li> <li>b. Contains Silica</li> <li>c. Contains Magnesium Oxide</li> <li>d. Contains Calcium Sulfate Hemi-Hydrate</li> <li>e. Commonly used as an investment for casting PFM ceramic gold and crown and bridge alloys.</li> </ul>
	— 9. True or False: High strength stone gives the √lowest linear setting expansion of any of the gypsum-based plaster or dental stone materials.
A	<ul><li>True</li><li>b. False</li></ul>
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46. In a gold-based alloy, palladium does which of the following?

- a. increases tarnish
- b. increases melting temperature
- c. produces darkening
- d. reduces hardness
- e) none of the above
- 11. According to hardness, the Type IV dental alloys can be described as:
- a. soft
- b. medium
- c. medium-hard
- d) extra-hard
- e. none of the above
- 12. By definition, high-noble alloys:
- a. contain a minimum of 50 wt% tin F
- (b) must have a noble metal content of at least 60 wt%, of which at least 40 wt% is gold
- c. must have a noble metal content of at least 60 wt%, of which at least 35 wt% is platinum
- d. consist of 10 wt% gold, 10 wt% silver, and 80 wt% copper
- e. none of the above
- 13. Noble alloys:
  - have to contain (by definition) at least 35 wt% noble metal f
  - b. are generally hard and ductile F
  - € are weak
  - ್. do not contain palladium [
  - e. none of the above

Best applications of phosphate-bonded investments include:

- a. Alloys based on gold, platinum, and palladium for PFM restorations; T
- b. Type II and Type III gold castings;
- c. Alloys based on cobalt-chromium or nickel chromium for PFMs;
- d. a and c
- (e, a,b, and c.

15. Ethyl silicate-bonded investments are used primarily for certain base-metal removable partial denture alloys, as well as casting of nickel-based alloys:True or False?

A

- a. True
- b. False
- 16. Analyze the following two statements concerning ethyl silicate-bonded investments:

Statement 1: Low setting expansion (contraction) renders refractory partial denture models that may be articulated against stone models.

Statement 2: The investment is more refractory, which results in a smoother casting.

- a. Statements 1 & 2 are both false.
- ⑤ Statements 1 & 2 are both true.
- c. Statement 1 is true; statement 2 is false.
- d. Statement 1 is false; statement 2 is true.
- 17. The current ADA approach to the classification of <u>dental</u> casting alloys involves which criteria?
- a. color & composition
- ⑤ composition & physical properties √
- c. cost & color
- d. physical properties & color
- e. none of the above
- 18. Which one of the following statements is characteristic of a high strength die stone?
- a. The set material contains a high percentage of uncombined water (i.e., ~20%) after setting.
- (b) Powder is produced by a wet calcination process.
- c. The set material has a lower density than plaster.
- d. The materials has a higher water/powder ratio than regular stone.
- e. None of the above.





The approximate expansion requirement of a full crown, in percentage expansion, during the casting process, is:
<b>a</b> 0.2% b. 1.0% c. 10% d. 2.00% e. 5%
20. The sum total of expansion due to the contribution of the investment materi includes:
<ul> <li>a) setting expansion;</li> <li>b) hygroscopic expansion, setting expansion, thermal expansion</li> <li>c) wax expansion;</li> <li>d) none of the above</li> <li>e) a &amp; c</li> </ul>
21. The basic components of a dental investment material include:
<ul> <li>a) a refractory √</li> <li>b) a binder √</li> <li>c) water</li> <li>d) all of the above</li> <li>e) none of the above</li> </ul>
22. By definition, base-metal alloys contain less than wt% noble metals.
a. 10 b. 15 c. 25 d. 30 e none of the above

E

	23. Which of the following element(s) is/are classified as noble?
	<ul> <li>a. Gold, and platinum ✓</li> <li>b. Silver</li> <li>c. Palladium ✓</li> <li>d. All of the above</li> <li>(e) (a) and (c)</li> </ul>
	24. Which element(s) generally serves/serve as hardening element(s) in alloys
	with high gold content?
•	a. Copper b. Silver c. Palladium d. Platinum e. All of the above
	25. Which element is added to gold casting alloys specifically as a grain refiner?
_	a. Zinc b. Copper c. Iridium d. Silver e. Kryptonite
	26. A significant and well-known difficulty with Palladium-Silver alloys is:
	a. low elastic modulus b. high sag tendency c "greenish" discoloration of porcelain d. poor clinical working characteristics e. poor tarnish and corrosion resistance

27. A transformation-toughened, yttrium-stabilized, zirconia (zirconium oxide) material is best characterized or classified as:

- (a) A polycrystalline ceramic;
- b. A particle filled glass;
- c. A predominantly glassy material;
- d. A porcelain glaze or enamel material;
- e. None of the above.

28. True or false: The feldspathic porcelains belong to a family called aluminosilicate glasses.



(a). True

b. False

29. The porcelain glass filler, leucite, has a refractive index close to that of the feldspathic glasses: True or false.



(a) True

b. False

30. The range of shrinkage that occurs during the firing of porcelain is approximately:



a. 30% - 40%

b. 5% - 10%

c.. 1% - 5%

d. 70% - 80%

e. 0.1% - 2%

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- 31. The leucite ceramic phase of a dental porcelain material offers which of the following property benefits?
  - a) It raises the coefficient of thermal expansion of the feldspar porcelain. \( \)
    - b) It produces a phase within the dental porcelain which can not be etched with hydrofluoric acid. ✓
    - c) It improves the strength of the porcelain.
    - d) a, b & c
  - (e) a&c
- 32. The first firing of the porcelain applied to a porcelain-fused-to-metal (PFM) crown is termed the:
  - a) glaze bake
  - b) sinter bake
  - bisque or biscuit bake
  - d) powder bake
  - e) none of the above
- 33. Dental porcelain enamels, which have a predominantly vitreous structure, are characterized by:
  - a physical property behavior typical of a glass;  $\checkmark$
  - -b) strength higher in tension than compression;
  - a high resistance to crack propagation;
  - d) presence of a definite melting point;
  - e) none of the above.

34. The major categories of dental ceramics, according to Kelly, are:

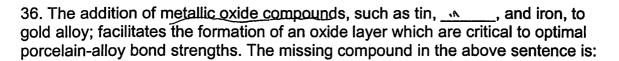
- a) Predominantly glassy materials;
- b) Particle filled glasses;
- c) Polycrystalline ceramics;
- d) All of the above;
- (e) a & c

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A

35.	The	process	which	increases	the densit	y of a	powdered	mass l	by bonding at
poi	nts of	contact	, and v	vhich ofter	n includes t	he intr	roduction of	of heat,	is:

- a. fusing
- b. condensing
- c. melting
- d sintering
- e. none of the above



- a. platinum
- b. iridium
- © indium
- d. criptonium
- e. none of the above

37. In comparing contemporary all-ceramic systems; injection-molded, high-leucite porcelain (i.e., Empress by Ivoclar) possesses one distinct advantage over the sintered alumina slip cast system (Vita In-Ceram):

(a), a significantly higher flexural strength

- b. ability to be etched and bonded to tooth structure
- c. superior marginal fit
- d. superior biocompatibility
- e. none of the above