Dental Materials II: Mid-Term Exam October 18, 2006

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

B

a. Minimum Removal Time
b. Mouth Removal Time ✓
c. Marginal Retention Time
d. Minimum Reaction Temperature
e. Mean Removal Time

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2. Which of the following statements concerning gypsum-bonded investments is false?

A

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?

C

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 binder. –
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:

C

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.

Version b

5. According to O'Brien, the desired accuracy of a cast dental restoration is:

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a. 10%
b. 5%
c. 1%
d. 0.5%
e. 0.1%

6. Expansion of an investment material is intended to compensate for:

A
a. Wax and Alloy Shrinkage
b. Only Wax Shrinkage
c. Casting Ring Shrinkage
d. Flow Behavior of Molden Alloy
e. None of the Above

7. Gypsum bonded investments can be used with both hygroscopic and thermal (i.e. "high-heat") techniques: True or False?

A
a. True
b. False

8. Which of the following statements concerning phosphate-bonded investments is not correct (i.e., incorrect):

D
a. Contains ammonium phosphate
b. Contains Silica
c. Contains Magnesium Oxide
d. Contains Calcium Sulfate Hemi-Hydrate
e. Commonly used as an investment for casting PFM ceramic gold and crown and bridge alloys.

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
a. True
b. False

10. 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
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:

a. have to contain (by definition) at least 35 wt% noble metal
b. are generally hard and ductile
c. are weak
d. do not contain palladium
e. none of the above

14. Best applications of phosphate-bonded investments include:

a. Alloys based on gold, platinum, and palladium for PFM restorations;
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.

B

a. Statements 1 & 2 are both false.
(b) 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 dental casting alloys involves which criteria?

a. color & composition
(b) composition & physical properties ✓
c. cost & color
d. physical properties & color
e. none of the above

B

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.

B

~~19.~~ The approximate expansion requirement of a full crown, in percentage expansion, during the casting process, is:

a) 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 material, includes:

a) setting expansion;
b) hygroscopic expansion, setting expansion, thermal expansion
c) wax expansion;
d) none of the above
e) a & c

21. The basic components of a dental investment material include:

a) a refractory ✓
b) a binder ✓
c) water
d) all of the above
e) none of the above

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

23. Which of the following element(s) is/are classified as noble?

a. Gold, and platinum ✓
b. Silver
c. Palladium ✓
d. All of the above
e. (a) and (c)

E

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

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25. Which element is added to gold casting alloys specifically as a grain refiner?

a. Zinc
b. Copper
c. Iridium
d. Silver
e. Kryptonite

C

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

C

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

A

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 alumino-silicate glasses.

A

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

a. True
b. False

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

A

a. 30% - 40%
b. 5% - 10%
c.. 1% - 5%
d. 70% - 80%
e. 0.1% - 2%

31. The leucite ceramic phase of a dental porcelain material offers which of the following property benefits?

E

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:

C

a) glaze bake
b) sinter bake
c) 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

a) physical property behavior typical of a glass; ✓
b) strength higher in tension than compression;
c) 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:

D

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

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35. The process which increases the density of a powdered mass by bonding at points of contact, and which often includes the introduction of heat, is:

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

36. The addition of metallic oxide compounds, such as tin, _____, and iron, to gold alloy; facilitates the formation of an oxide layer which are critical to optimal porcelain-alloy bond strengths. The missing compound in the above sentence is:

a. platinum
b. iridium
c. 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