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DMII Radar Final, version 22

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# Dental Materials II: Final Exam (version 22)

December 13, 2006

- 1. Zinc oxide eugenol cements possess which clinical performance characteristic(s):
  - a) Act as an obtundent to the pulp; 🖌
  - b) Have extremely low solubility;
  - c) Inhibit the polymerization of resin restorative materials, resulting in softening and discoloration;
  - d) A and b
  - e) A and c

Which one of the following statements concerning calcium hydroxide cements is false?

- \_a) major form is classified as a phenolate cement; T
- \_b) "off-label" use by some practitioners as a temporary luting cement; r
- (c) can be formulated as a resin cement;
- \_d) primarily "on-label" indication for use is vital pulp capping; +
- e) none of the above
- 3. What are the advantages of light curing glass ionomer cements?
  - a) sets by acid-base reaction and polymerization of monomer groups
  - b) higher early strength, improved physical properties v
  - c) early water resistance (solubility)
  - d) none of the above
  - (e) all of the above
- 4. What is a major caution when using RGMIs as adhesive luting cements with all-ceramic restorations?

a) potential setting expansion that can lead to cracking of some lower-strength all ceramic indirect restorations.

- b) insufficient early strength
- c) low bond strength to dentin
- d) poor esthetic qualities
- e) long, prolonged setting behavior

## 5. Resin Modified Glass lonomers (RGMIs) are currently indicated for cementation of:

- a) high-strength, polycrystalline, all-ceramic restorative materials; \*
- b) high strength, sintered alumina or zirconia sub-structures.
- c) porcelain fused to metal restorations -
- d) all metal restorations
- (é)) all of the above

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- 6. The types of resins used in polymer-based cements include:
  - a) acrylic resins cements (based on poly(methyl methacrylate) and methylmethacrylate monomer); ~
  - b) Bis-GMA dimethacrylate 🗸
  - c) Urethane dimethacrylate
  - (d) All of the above
  - e) None of the above
- 7. An accelerator, in the free-radial polymerization reaction, has which of the following properties or characteristics?
  - a) facilitates decomposition of an initiator;
  - b) can be a self-curing amine;
  - c) can be a light-curing amine;
  - (d) all of the above
  - e) none of the above.
- 8. True or false: Based on the definitions we have discussed and listed in O'Brien; It is possible and clinical acceptable to seat a restoration containing a dental cement after the end of the cement's working time but before the completion of its setting time?
  - a) True
  - b) False
- 9. According to O'Brien, the minimum compressive strength required of dental cement for adequate cement strength and retention of restorations, is:
  - a) About 10 MPa
    b) About 20 MPa
    c) About 30 MPa
    d) About 40 MPa
    (e) About 60 MPa

10. Glass ionomer cements are included in which major class of dental cements?

- a) Phosphate
- b) Phenolate
- (c) Polycarboxylate
- d) Resin
- e) None of the above
- 11. True or false: water, zinc acetate, zinc sulfate, and other acidic substances accelerate the setting of zinc oxide eugenol cements.
  - a) True
  - b) False

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12. A material which is not added to strengthen zinc oxide – eugenol cements, is:

a) mineral fillers, such as silica or alumina;

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- b) natural resins, such as pine rosin;
  - (c) resin monomers and polymerization initiators-accelerators;
- dy synthetic polymers, such as poly(methyl methacrylate), polystyrene, or polycarbonate:
  - e) EBA (ethoxybenzoic acid)
- 13. The purpose of using flux in soldering is:
  - (a) promotes the flow of solder by cleaning the surfaces and removing oxides;  $\checkmark$
  - b) eliminates the need to pre-clean the surfaces to be soldered;
  - c) confines the flow of solder away from its area of application;
  - d) cleans the surface and promotes the formation of metallic oxides were it is applied:
  - e) none of the above.
- 14. In investment soldering of two segments of a four unit fixed partial denture, the critical "gap" distance for minimizing defective soldering is:
  - less than 0.1 mm; a)
  - b) at least 0.1 mm, but no more than the thickness of a business card
    - (0.20-0.34 mm);
  - c) more than 0.5 mm;
  - d) between 0.05 and 0.1 mm;
  - e) none of the above.
- 15. Characteristics of a preceramic solder used for PFM restoratives include:
  - a) a high-fusing, precious metal solder;
  - b) contain more noble metals and less tin and zinc than all-gold restoration solders;
  - contain similar levels of copper and silver as all-gold restoration solders;
  - (d)) a and b
  - a and c
- 16. Which technique listed below has grown significantly in the uniting and fabrication of titanium prosthetic frameworks?
  - a) spot welding
  - b) investment soldering
  - c) pressure welding
  - (d) laser welding
  - e) electroplating

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- 17. Osseointegration is <u>not</u> characterized by:
  - a a direct structural and functional connection to ordered living bone;  $\checkmark$
  - (b) intimate contact predominantly with fibrous soft tissue and fibroblasts;  $\checkmark$
  - an organized structure of living bone with the ability to support a load-carrying implant;
    - d) a dynamic interface which matures within time;
    - e) occurs with high predictability, at the stable oxide interface of titanium.
- 18. An abutment screw is used to:
  - (a) connect an abutment directly to the implant fixture;
  - b) to connect the prosthesis to abutment; \*
  - c) to permit the healing of soft tissue directly over the implant fixture;
  - d) all of the above
  - e) none of the above

Resin cements, in contrast to other cement types, possess:

- a) high strength and toughness;
- b) can not be used with high-leucite, pressed ceramic indirect restorations;
- c) have low solubility;
- d) a and c
- (e)∕ b and c

20. An adhesive resin cement:

- a) can contain monomers with phosphate or carboxyl groups;
- b) can utilize a separate dentin bonding primer-adhesive system before application of the cement;
- c) can contain the adhesion promoter, 4-META;
- d hone of the above
- e)all of the above
- 21. According to the international dental standard for water-based cements (ISO 9917), what is the minimum compressive strength for a permanent water-based cement?
  - (a) 50 MPa
  - Ď) 100 МРа
  - c) 10 MPa
  - d) 1000 MPa
  - e) 5 MPa

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22. Examples of dental materials which cure by free-radical, addition polymerization:

- (a) Poly methyl methacrylate, composite resin, poly vinylsiloxane elastomers, resin-modified glass ionomer;
- b) Zinc phosphate cement, calcium hydroxide chelate cement, zinc polycarboxylate;
- Conventional glass ionomer, Irreversible alginate, reversible hydrocolloid;
- d) A and C
- e) None of the above

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- 23. Clinical dental uses of soldering do not include:
  - a) uniting segments of fixed partial dentures (FPDs);  $\checkmark$
  - b) attachment of wrought-wire clasps to removal partial dentures;
  - (c)) uniting adjacent amalgam restorations;
  - d) orthodontic wires and bands;
  - e) adding metal to some casting defects (i.e.; deficient contacts).
- 24. True or false: The two basic soldering techniques used in dentistry are 1) investment soldering, and 2) <u>four</u>-handed soldering.
  - a) True (b) False
- 25. Osseous crestal changes (at the level of the implant coronal threads) considered within normal limits are:
  - a) 1.0 to 2.0 millimeters marginal bone loss in the first year,  $\checkmark$
  - b) 2.0 to 4.0 millimeters marginal bone loss in the first year;
  - c) 0.1 to 0.2 millimeters marginal bone loss per year after the first year,
  - d) a and b
  - (e), a and c

26. Diagnostic tools and criteria for accurate placement of multiple dental implants include:

- a) Use of a CT scan (or some form of 3-D tomography), Panoramic and periapical xrays; ⊀
- b) Use of a surgical stent; 1
- c) Assessment of osseous density and quantity
- (d)) All of the above
- e) None of the above
- 27. Acceptable hygiene aids for the maintenance of dental implants, do not include:
  - a) dental floss;
  - b) manual or electric toothbrush;
  - c), plastic scalers and perio probes;
  - (d) metal manual or ultrasonic scalers;
  - e) chlorhexidine.

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28. In two stage implant surgery:

- a)<sup>\*</sup> At stage two, the dental implant is placed and buried beneath the mucosa for a specific time period;
- b) At stage one, the dental implant is placed and buried beneath the mucosa for a specific time period;
- c) At stage two, the dental implant is uncovered and left exposed to the oral via a healing,transmucosal abutment; <
- d) A and C
- e) B and C

29. A "healing screw" is initially placed in the implant fixture:

- a) After completion of placement of an implant in Stage one implant surgery; •
- b) After uncovering an osseointegrated implant in Stage two implant surgery;•
- c) At the time of placement of the transmucoal abutment fixture; .
- d) When the final abutment is placed;
- e) None of the above

30. Forms of titanium used in endosseous, root form, dental implants include:

- a) two grades of commercially pure (CP) titanium;
- b) four grades of commercial pure (CP) titanium;-
- c) two grades of titanium alloy (Ti-6AI-4V); -
- d) a and c
- (e) b and c
- 31. True or false: <u>Osteoconductive</u> materials do not induce the differentiation of new bone forming cells, but rather act as a scaffold for new bone formation.

(a)) True bí False

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32. True or false: <u>Osteoinductive</u> materials induce in-situ new bone formation via the conversion of mesenchymal cells preferentially to bone progenitor cells.

- a) True
- b) False

33. The variety of dental implant designs and dimensions include:

- a) Implants can have a threaded (screw) or press fit design; 1
- b) Diameters for std.implants ranging from 3.25 mms to 6-7 mms;  $\tau$
- c) Implant fixture lengths from 6 to 20 millimeters (most commonly 8-15 mms); 1
- d) Dental implant fixtures can have an internal or external "hex" abutment connection:
- e) All of the above.

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34. Surface modification of titanium implant surface does not include;

- a) machined titanium surfaces; </
- b) plasma sprayed surfaces;
- C tin-plated titanium surfaces;
- d) sandblasted and etched titanium surfaces;
- e) hydroxyapatite (HA) coated surfaces.

35. The oxide layer in an osseointegrated titanium implants:

(a)) is in immediate contact with a thin amorphous proteoglycan layer and continues to grow over time;

- b) remains stable in thickness over time;
- c) decreases in thickness over time;
- d) transforms to a silicon dioxide layer;
- e) none of the above.

39. From the group of materials:

- (2-1) Plasticized acrylics  $^{\nu}$
- (2-2) Room-temperature vulcanized (RTV) silicones
- (2-3) Polysulfide rubber
- (2-4) Heat-cured silicone
- (2-5) Heavy body alginate

Examples of materials used for permanent soft liners include:

- a) All of the above
- b) None of the above
- c) (2-2), (2-3), and (2-4)
- d) (2-3) and (2-5)
- e) (2-1), (2-2), and (2-4)

37. Nylon and polyamide are examples of which class of denture base material:

- a) Heat-cured acrylic resin denture base material
- b) Auto-cured acrylic resin denture base material
- c) Dimethylacrylate light-activated denture base material
- D Thermoplastic, injection-mold denture base material
- e) None of the above
- 38. Plasticizers incorporated into denture base polymers will:
  - a) increase rigidity and impact strength
  - b) raise the Glass-Transition Temperature (Tg)
  - (c) lower the Glass-Transition Temperature (Tg)
  - d) improve color stability
  - e) decrease the rate at which water or solvents penetrate the denture base polymer

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35. A logical choice of denture base material for the rare patient with a known and established allergy to methyl methacrylate monomer would be:

- a) Light-activated denture base resin;
- b) Heat-cured denture base resin;
- c) Heat-cured, rubber reinforced denture base resin;
- d) Auto-cured denture base resin;
- e) Heat-cured, fiber reinforced denture base resin
- 40. True or False: High levels of cross-linking agent in heat-cured acrylic denture base resins can result in increased brittleness in the polymerized denture base.

(a) True b) False

- 41. According to Douglas, et.al. the estimated demand for complete dentures in the next ten years will:
  - (a) Increase by just over 10%
  - b) Increase slightly (5% or less)
  - c) Decrease by over 10%
  - d) Decrease slightly (less than 10%)
  - e) Remain flat

42. The "glass transition temperature" of a polymer is characterized as:

- a) the "softening temperature";
- b) the temperature below which the polymer is glass-like: showing brittle fracture;
- c) the temperature above which the polymer is rubbery or putty-like: showing deformation;
- (d) all of the above
- e) none of the above

A. The basic components of a heat-cured denture acrylic denture base system include:

- a) Powder component: PMMA Spherical Bead Polymer +
- b) Liquid component: Methyl methacrylate monomer -
- c) Liquid component: Urethane dimethacrylate monomer
- d) A and B
- (e) A and C
- 44. The initiator molecule of a heat-cured denture acrylic denture base system is:

- a) Camphoquinone (CQ)
- D Benzoyl Peroxide
- c) LC Amine
- d) Methyl methacrylate monomer
- e) 4-META

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45. An advantage of rubber-reinforced denture base materials, as compared to conventional heat-cured acrylic, would be:

- a) reduced stiffness a
- b) low impact strength
- c) higher or improved impact strength
- d) no methyl methacrylate monomer
- does not contain a rubber phase introduced into the polymer beads during fabrication
- 46. Sulfur from latex gloves and rubber dams can retard or inhibit the setting reaction of which of the following impression materials?
  - a) Polysulfide
  - b) Reversible (Agar) hydrocolloid
  - c) Polyether
  - d) Irreversible (Alginate) hydrocolloid
  - (e) Addition silicone (Vinyl Polysiloxane)\_
- 47. The term "MRT", as it refers to the behavior of elastic impression materials, means:
  - a) Minimum Removal Time
  - b) Mouth Removal Time
  - c) Marginal Retention Time
  - d) Minimum Reaction Temperature
  - e) Mean Removal Time
- 48. The current ADA approach to the classification of dental casting alloys involves which criteria?
- a) color & composition
- **(D)** composition & physical properties
- c) cost & color
  - d) physical properties & color
  - e) none of the above

49. In a gold-based alloy, palladium does which of the following?

- a) increases tamish
- (b) increases melting temperature
- c) produces darkening
- d) reduces hardness
- e) none of the above

50. 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

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51. 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

52. This material is used as reinforcing filler in alginate (irreversible) hydrocolloid:

- a) Barium alumino silicate glass filler
- b) Carbon fibers
- c) Quartz
- (d)<sup>7</sup> Diatomaceous earth
- e) None of the above

53. To reduce or eliminate the inhalation problem of alginate dust, the alginate powder can be coated by the manufacturer with:

- a) An iodophor
- b) Eugenol
- c) A giycol
- d) Zinc oxide
- (e)) All of the above
- 54. Due to a relatively low elastic recovery value of approximately 97 %, alginate (irreversible) hydrocolloid should <u>not</u> be used for which type of clinical impression(s)?
  - a) Fixed partial denture impressions 🗸
  - b) Preliminary impressions for complete dentures
  - c) Orthodontic and study models
  - d) Removable partial dentures with clasps
  - e) Items c and d above
- 55. Which of the following statement(s) is/are false?
  - a) The elastic recovery (resistance to permanent deformation) of addition silicone is superior to polyether impression material;
  - b) The stiffness and flexibility properties of polyether impression materials provides for easy removal from the mouth after setting.
  - c) Decreased water temperature increases the working and setting times of alginates. τ
  - d) Addition silicone impression materials are generally available in a wide range of viscosities (i.e., light, medium, and heavy body; monophase and putty viscosities). ۲
  - e) All of the above answers.

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56. Rapidly removing elastomeric impression materials will reduce:

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- (a) Permanent deformation
- b) Tear Strength
- c) Setting Time
- d) Syneresis
- e) Imbibition

57. Noble alloys:

(a) have to contain (by definition) at least 25 wt% noble metal b) have to contain (by definition) at least 10 wt% gold

- c) are weak
- d) do not contain palladium
- e) none of the above
- 58. Which element(s) generally serves/serve as hardening element(s) in alloys with high gold content?
  - a) Copper 🗸
  - b) Silver
  - c) Palladium
  - d) Platinum
  - All of the above