TEMPLE UNIVERSITY
School of Dentistry

Department of Restorative Dentistry

RESTORATIVE DENTISTRY V
D553

Mid-Term Examination
October 15, 2003

PROPERTY of XI PSI PHI

TEST CODE NUMBER: 03

INSTRUCTIONS:

- Verify that you have a question booklet with nine pages and fifty questions.
- Write your name on the computer answer sheet as well as a nine-digit personal identification number of your choosing (in the field labeled "Social Security Number") and blacken the appropriate circles with a #2 pencil. *Note: Test scores will be posted using PINs.*
- ***IMPORTANT!!***
  Write the Test Code Number (above) on the computer answer sheet in the "Test Code" field under "Optional Codes", and blacken the appropriate circles.
- Sign the back of the computer answer sheet.
- For each question answered, blacken the appropriate circle on the computer answer sheet corresponding to the letter of your choice.
- Students are not permitted to ask questions of the proctors during the examination. Do your best to answer each question with the information provided.
- When you have completed the examination, turn in your computer answer sheet. You may keep the question booklet.

1. Which one of the following expressions is correct?

   a. epithelial attachment = gingival attachment + connective tissue attachment
   b. periodontal attachment = epithelial attachment + gingival attachment
   c. periodontal attachment = epithelial attachment + connective tissue attachment
   d. gingival attachment = connective tissue attachment + epithelial attachment
   e. biologic width = gingival attachment + epithelial attachment

2. The best way to compensate for molar crown preparations that are short occlusogingivally, and therefore offer little resistance to dislodgment of the restoration, is to

   a. increase the total occlusal convergence
   b. use resin modified glass ionomer luting cement
   c. use a beveled shoulder finish line instead of a chamfer
   d. prepare vertical grooves in opposing axial surfaces

3. Which of the following rotary instruments may be used to create satisfactory finish lines for cast metal margins?

   a. round-end tapered diamond
   b. torpedo diamond
   c. flame-shaped diamond
   d. *two* of the above
   e. a, b and c above

4. The optimal occlusal reduction for a posterior tooth prepared for a PFM crown that is to have a ceramic occlusal surface is ___ mm.

   a. 2.5
   b. 2.0
   c. 1.5
   d. 1.0

5. Which of the following are possible consequences of *not* replacing tooth #19 in an otherwise intact dentition?

   a. extrusion of one or more opposing teeth in the maxillary left quadrant
   b. mesial tipping of the remaining mandibular left molars
   c. distal migration of the premolars in the mandibular left quadrant
   d. *two* of the above
   e. a, b and c above

6. The ideal total occlusal convergence (TOC) of the axial walls of a crown preparation has been cited by some authors as 2-5°, yet Goodacre and others (Tooth preparations for complete crowns: an art form based on scientific principles, J. Prosth. Dent., 2001) propose 10-20° as the norm. Why?

   a. there is no significant difference in resistance and retention between crowns that have 5° TOC and those with 20° TOC
   b. TOC has nothing to do with resistance to dislodgment of the restoration
   c. 2-5° is not routinely achievable, even by experienced dentists
   d. it is easy to compensate for higher TOC by using coarse diamonds that produce rough surfaces

According to Goodacre and others (Tooth preparations for complete crowns: an art form based on scientific principles, J. Prosth. Dent., 2001), the axial walls of molars prepared for crowns with total occlusal convergence of 10-20° should be at least ___ mm long occlusogingivally for adequate resistance and retention.

a. 3
b. 4
c. 5
d. 6

8. A "pick-up" impression may be used to

a. re-align multiple crown castings fabricated on different master casts
b. record inter-occlusal jaw relations to relate maxillary and mandibular master casts
c. provide information needed to produce a custom incisal guide table
d. design the framework for a new removable partial denture

9. After making the necessary post space, the first step in the process of making a burnout pattern for a cast post and core is to

a. prepare the remaining tooth structure for crown coverage, removing weak dentin walls as needed
b. remove or block out undercuts in the pulp chamber
c. apply a water soluble lubricant to the dentin walls surrounding the post space
d. create a positive replica of the post space using cold cure acrylic and a rigid plastic post former

10. Which of the following are valid reasons for using a post in an endodontically treated tooth?

a. reinforce the root to reduce the risk of root fracture
b. strengthen the tooth to reduce the risk of crown fracture
c. help retain the core build-up
d. *two* of the above
e. a, b and c above

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11. The first consideration and primary focus of a minimally invasive management approach for a patient with caries lesions is to

a. use composite resin instead of amalgam wherever possible
b. preserve healthy tooth structure during cavity preparation
c. alter the microenvironment in order to promote remineralization
d. choose an instrumentation approach that permits controlled fissurotomy

12. Delaying surgical intervention for some Class II caries lesions discovered on bitewing radiographs may be justified because

a. caries lesions of enamel usually progress at a slow rate
b. a dental radiograph does not reveal whether a lesion is active or not
c. medical management may be effective in arresting and remineralizing some lesions
d. *two* of the above
e. a, b and c above

13. Fluoride is believed to inhibit which one of the following bacterial enzymes?

a. dextran sucrase
b. pyruvate kinase
c. ATPase
d. phosphoglyceryl lactase

14. The medical approach for managing a caries-active patient includes an effort to promote remineralization of lesions with fluoride. What is the mechanism of this action?

a. fluoride reacts directly with hydrogen ions, neutralizing them
b. fluoride ions inhibit bacterial enzymes, including dextran sucrase
c. fluoridated apatite (FAP) has a lower critical pH than dental apatite (HAP)
d. fluoride acts as a catalyst in the formation of FAP precursors from free calcium and phosphate

For the next five questions, respond to the given statement with one of the following answers:

a. the statement is false
b. the statement is true, and it may represent a reason for *supporting* community water fluoridation
c. the statement is true, and it may represent a reason for *opposing* community water fluoridation
d. the statement is true, but it has no relevance to the issue of community water fluoridation

15. The cariostatic benefits of fluoride are derived primarily from systemic exposures.

16. Fluoridating drinking water is an economical way to provide a daily source of topical fluoride

17. The prevalence of mild to moderate fluorosis in American children is significantly higher today than it was 10-20 years ago.

18. Epidemiological studies consistently show that terminating community water fluoridation programs inevitably results in higher caries rates within several years.

19. American children from poor families exhibit a disproportionally high caries rate compared to children at higher socioeconomic levels.

20. The most conservative guidelines for the treatment of Class II caries lesions visible on bitewing radiographs (Minimal intervention dentistry - a review, International Dental Journal, 2000) are based on which one of the following principles?

a. less than half of all lesions visible in the outer third of dentin are likely to be cavitated
b. caries lesions that affect dentin cannot be arrested
c. caries lesions are more extensive than they appear on radiographs
d. caries lesions that penetrate the dentin spread laterally at the DEJ

21. Occlusal surfaces of posterior teeth are more problematic compared to the smooth axial surfaces when it comes to caries management because

a. Class I caries lesions progress at a much slower rate compared to Class II lesions
b. caries lesions in fissures -- even those that have progressed into dentin -- are often difficult to detect
c. there is presently no reliable way to remineralize progressive fissure lesions
d. *two* of the above
e. a, b and c above

22. The KaVo Diagnodent™ operates on which one of the following principles?

a. differential staining
b. electrical resistance
c. transillumination
d. laser fluorescence
e. progressive diffusion

23. In their 10 year study of Class I restorations (Ultraconservative and cariostatic sealed restorations, J.A.D.A., 1998), Mertz-Fairhurst and her coworkers found that

a. the traditional concept of removing all demineralized dentin prior to restoration is the only reliable way to prevent further loss of tooth structure from the caries process
b. conservative amalgam restorations sealed with a flowable resin exhibited the fewest failures
c. the traditional concept of extending cavity preparations into all fissures is still the most effective way to prevent the development of new caries lesions
d. residual caries dentin lesions sealed inside teeth with superficial composite resin restorations tended to remain active and grow larger over time

24. If a decision is made to restore a mandibular molar with a D1 caries lesion in the mesial surface and a beginning dentin lesion at the base of the distal occlusal pit, what is the most appropriate plan?

a. Class II amalgam restoration with traditional extension for prevention (after G.V. Black)
b. Class II composite resin restoration with traditional extension for prevention (after G.V. Black)
c. Class II amalgam restoration with traditional extension for prevention, sealed with a flowable resin
d. Class II proximal slot (occlusal access) restored with amalgam or composite resin, and a Class I PRR

25. Caries risk assessment is based on which of the following fundamental principles?

a. the prevalence of the disease reflects a tendancy toward equal distribution within a population
b. the disease is present long before caries lesions appear in the mouth
c. patients who exhibit salivary mutans streptococci levels of 100,000 cfu/ml will inevitably develop caries lesions, even in the absence of other risk factors
d. *two* of the above
e. a, b and c above

26. The results of the study by Ouellet and others (Detection of occlusal carious lesions, General Dentistry 2002) suggest that the DiagnoDent™

a. exhibits greater sensitivity than conventional diagnostic techniques
b. may help reduce false negative diagnoses compared to conventional diagnostic techniques alone
c. is highly effective in predicting the depth of a caries lesion in dentin
d. *two* of the above
e. a, b and c above

27. When using a caries risk model to help manage a population of dental patients, a likely consequence of a false negative result is

a. failure to adequately treat the patient for disease
b. application of outdated restorative principles
c. unnecessary costs for preventive therapy
d. an overly aggresive treatment approach

28. If one were to use the presence or absence of teeth as the sole predictor in a caries risk model for a patient population (teeth present = high caries risk, teeth absent [edentulous] = low caries risk), it is likely that the model would exhibit

a. high sensitivity, but low specificity
b. low sensitivity, but high specificity
c. high sensitivity and high specificity
d. low sensitivity and low specificity

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29. Which of the following salivary proteins are thought to have an antimicrobial function?

a. lysozyme
b. lactoferrin
c. IgA
d. *two* of the above
e. a, b and c above

30. In the paper "Acquisition and transmission of mutans streptococci" (CDA Journal, 2003), Berkowitz argues that

a. MS cannot exist in the mouth of an edentulous infant
b. vertical transmission of MS typically occurs at age 4 or 5 years
c. early infection with MS is a major risk factor for caries experience later in life
d. *two* of the above
e. a, b and c above

31. Clinical studies reviewed in the paper by Berkowitz (Acquisition and transmission of mutans streptococci, CDA Journal, 2003) suggest that transmission of MS to young children may be prevented or delayed by

a. suppressing the growth of MS in their mothers
b. treating children with chlorhexidine oral swabs at the first sign of eruption
c. prescribing sodium fluoride drops when the first primary teeth appear
d. mixing infant formula with fluoridated water

32. According to Featherstone (The science and practice of caries prevention, J.A.D.A., 2000), the group of cariogenic bacteria known as mutans streptococci includes S. mutans and

a. S. salivarius
b. S. lactalis
c. S. sobrinus
d. S. conjunctans

33. Carbonic anhydrase VI is an isoenzyme in saliva that is thought to

a. catalyze a reaction between hydrogen ions (H) and bicarbonate (HCO_3), thereby raising plaque pH
b. cause aggregation and clearance of mutans streptococci
c. inhibit the adhesion of bacteria to enamel surfaces
d. interfere with bacterial glucose uptake and metabolism
e. promote the precipitation of calcium phosphate crystals on or in enamel surfaces

34. A significant disadvantage of chlorhexidine (CHX) when used to suppress oral mutans streptococci (MS) levels is that

a. CHX is cleared from the oral cavity within 30 minutes
b. MS often return to pretreatment levels after several months
c. oral MS are highly resistant to CHX therapy
d. CHX must be used continuously for periods in excess of 6 months in order to suppress MS below the risk threshold level (10^5 cfu/ml)

35. In their study (Maintaining mutans streptococci suppression with xylitol chewing gum, J.A.D.A., 2000), Hildebrandt and Sparks concluded that

a. xylitol is effective in prolonging the effects of chlorhexidine, but gum is not a practical or convenient vehicle for delivering xylitol
b. stimulation of saliva flow is the most likely mechanism by which xylitol gum had a cariostatic effect on test subjects
c. suppression of MS is more effective in subjects who have relatively few restored surfaces compared to those who have many restorations
d. xylitol gum was somewhat beneficial in maintaining MS suppression in test subjects, but the statistical significance was so minor as to offer no immediate clinical applicability

36. The apatite impurity that is believed to be most significant in rendering enamel crystallites susceptible to acid dissolution is

a. OH^-
b. Mg^{2+}
c. F^-
d. CO_3^{2-}
e. PO_4^{3-}

37. Which of the following represent sound reasons for replacing (as opposed to repairing) an existing amalgam restoration?

a. narrow ditching of margins that stain with a caries indicator dye
b. a beginning caries lesion at an accessible margin of a very large restoration
c. a fracture through the occlusal isthmus without loss of any portion of the restoration
d. *two* of the above
e. a, b and c above

38. Replacement of restorations due to a diagnosis of secondary caries should decrease if

a. better adhesives are developed that enhance the marginal seal of restorations
b. the prevalence of dental caries continues to decrease
c. better diagnostic methods are developed that reduce false positive diagnoses
d. *two* of the above
e. a, b and c above

39. Significant improvement in adhesive bond strengths to dentin using a total-etch technique were acheived with the introduction of

a. maleic acid etchants
b. acidic monomers
c. sodium hypochlorite conditioning gels
d. hydrophilic primers

40. A potential advantage of ~~self-etching primer adhesive~~ systems (compared to total-etch systems) is they

a. eliminate the error-prone rinsing and blotting step after acid etching
b. produce significantly higher long-term bond strengths to dentin
c. produce significantly higher initial bond strengths to enamel
d. bond to the smear layer, so there is no need to condition dentin

41. Shear bond strengths of composite resin to etched enamel, dentin, porcelain or non-precious metal alloys are typically in the range of

a. 5-10 MPa
b. 20-30 Mpa
c. 85-95 MPa
d. 120-150 MPa

42. In general, as bond strength of a composite resin restoraton increases, the potential for

a. post-operative sensitivity increases
b. polymerization shrinkage decreases
c. cusp fracture increases
d. microleakage decreases

43. A possible disadvantage of incorporating filler particles in a total-etch adhesive system is

a. lower adhesive bond strengths to enamel
b. lower viscosity
c. loss of the hybrid layer
d. an inferior etching pattern in enamel
e. low mechanical strengths

44. After etching enamel and dentin in preparation for the use of a "total-etch" adhesive system, the operator must dry the prepared surfaces very thoroughly before applying the primer or single-step adhesive. This statement is

a. true, because all dentin primers are hydrophobic
b. false, because excessive drying will lower the bond strength to dentin
c. true, because dental adhesives cannot bond to enamel in the presence of any moisture
d. false, because adhesion to enamel is traditionally a "moist bonding" technique

45. Which one of the following statements comparing resin-modified glass ionomers (RMGIs) to compomers (CMPs) is true?

a. both materials set, in part, by an acid-base reaction
b. CMPs require the use of a separate adhesive, RMGIs do not
c. RMGIs release fluoride, CMPs do not
d. RMGIs can be used for Class V restorations, CMPs cannot

46. Which one of the following may be a benefit of using a glass ionomer or resin-modified glass ionomer for a molar that requires an occlusal restoration?

a. glass ionomer materials offer greater retention to enamel than resin restorative systems
b. glass ionomer materials are more resistant to fracture than resin materials when used to restore occlusal surfaces or seal occlusal fissures
c. using a glass ionomer material instead of a resin restorative material allows for greater conservation of tooth structure
d. glass ionomer materials provide a degree of cariostasis when used as a liner under composite resin or amalgam restorations

47. Which of the following are characteristics of the resin modified glass ionomers?

a. set by visible light initiated polymerization and an acid-base reaction
b. adhesion to tooth structure requires the use of a separate resin adhesive
c. capable of taking up fluoride from exogenous sources and re-releasing it ("rechargeable")
d. *two* of the above
e. a, b and c above

48. After many previous uneventful uses, a dental hygienist complains of redness and soreness of the hands after wearing latex gloves. The most likely diagnosis is

a. Type IV hypersensitivity reaction
b. irritant dermatitis
c. Type I hypersensitivity reaction
d. allergic contact dermatitis

49. An allergy to natural rubber latex is manifested as a (an)

a. immediate hypersensitivity reaction
b. delayed hypersensitivity reaction
c. non-immunological reaction
d. irritant dermatitis

50. The most reliable method for diagnosing hypersensitivity to natural rubber latex protein is the

a. skin prick test
b. skin patch test
c. radioallergosorbent tests
d. mucosal rapid reagent test