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UNIVERSITY OF BOLTON

FACULTY OF HEALTH AND WELLBEING

BSc (HONS) DENTAL TECHNOLOGY

SEMESTER TWO EXAMINATION 2023/2024

INTRODUCTORY DENTAL BIOMATERIALS SCIENCE

MODULE NO: DNT4105

Date: Friday 17 May 2024 **Time: 10.00 am – 12.00 noon**

INSTRUCTIONS TO CANDIDATES:

There are 19 questions on this paper.

Answer ALL questions.

Marks for parts of questions are shown in brackets.

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SECTION A ANSWER ALL QUESTIONS

DENTAL ALLOYS Questions -

1. Explain why gold alloys are a good material to use in the oral environment.

6 marks

2. Why is the melting range important when selecting a bonding alloy?

2 marks

3. Why would a chrome denture be selected in preference to an all acrylic denture?

3 marks

4. State two advantages of using non-precious alloys.

2 marks

5. What is the role of the following metals in an alloy?

    a. Gold
    b. Platinum
    c. Chrome
    d. Copper
    e. Molybdenum

5 marks

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6. **Fixed Prosthodontics scenario**

a) Identify the type of restoration and discuss the issues with the appliance.

8 marks

b) Select 2 different biomaterials to construct a new restoration, include the advantages and disadvantages of each option.

7 marks

Ceramic Questions –

7. Zirconia and Lithium disilicate are ceramic materials manufactured using CAD/CAM techniques. Describe the advantages of these materials in comparison to feldspathic ceramics.

3 marks

8. What are the properties associated with dental ceramics?

8 marks

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9. Describe the following 3 ceramic to metal bonding mechanisms –

   a) Physical

   (2 marks)

   b) Mechanical

   (2 marks)

   c) Chemical

   (2 marks)

Total 6 marks

10. Name 3 methods of forming appliances using dental ceramics.

3 marks

11. With the use of a diagram, demonstrate how addition constituents can be used to prevent crack propagation.

4 marks

12. a) Identify 3 strength types associated with dental ceramics.

3 marks

   b) For each strength type state if the value is high or low.

3 marks

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Polymer Questions

13. Name 5 different types of dental polymer manufacturing and state one use for each material.

10 marks

14. A denture has been returned to the laboratory as there is porosity present in the acrylic.

    a) Highlight the manufacturing faults that may have caused this issue.

    6 marks

    b) How does this effect the properties of the material and performance of the appliance?

    6 marks

15. What are the advantages of using heat cured poly-methyl methacrylate?

6 marks

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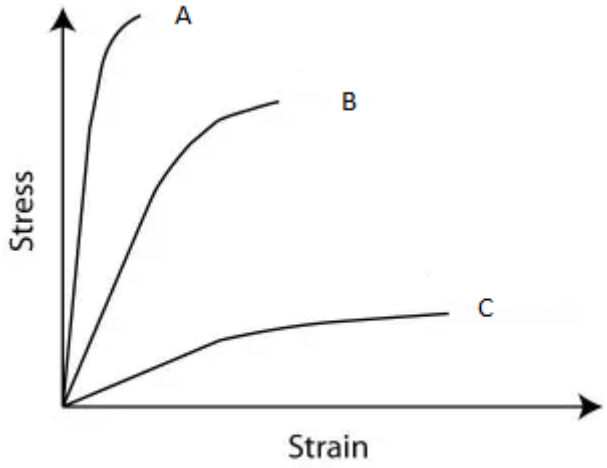
16. Identify the classification of dental biomaterials shown in the Stress Strain Curve Chart below for each letter.

3 marks



17. Define Modulus of Elasticity

1 mark

18. What is Ultimate Tensile Strength?

2 marks

19. How is elongation calculated?

3 marks

END OF QUESTIONS