

UNIVERSITY OF BOLTON

SCHOOL OF HEALTH AND HUMAN SCIENCES

BSc (HONS) DENTAL TECHNOLOGY

SEMESTER TWO EXAMINATION 2018/2019

INTRODUCTORY DENTAL BIOMATERIALS SCIENCE

MODULE NO: DNT4105

Date: Thursday 16 May 2019

Time: 2.00 pm – 4.00 pm

INSTRUCTIONS TO CANDIDATES:

There are 19 questions on this paper.

Answer ALL questions in Section A and 2 questions from 4 in Section B only.

Marks for parts of questions are shown in brackets.

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SECTION A - ANSWER ALL QUESTIONS

DENTAL ALLOY QUESTIONS

1. When selecting a non-precious alloy for a dental appliance what are the properties to consider?

6 marks
2. Draw and identify a typical metal alloy structure labelling grain boundaries and grains.

2 marks
3. From the following group of alloys, which is considered the best to use in the mouth?

Mercury amalgam, Cobalt Chromium, Stainless Steel, Steel

1 mark
4. Which of the following appliances requires sintering to maximise its mechanical properties?

Bonded Crown, Chrome Cobalt denture, Zirconia Oxide Bridge, Acrylic Denture

1 mark
5. Why would a chrome denture be selected in preference to an all acrylic denture?

3 marks
6. What are the consequences of not considering the properties of a bonding alloy when fusing ceramics to a subframe?

3 marks
7. With the aid of a diagram, describe how a molten alloy solidifies.

6 marks

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CERAMIC QUESTIONS

8. a) In terms of tensile strength reorder the following ceramic materials.
From highest to lowest value.

Feldspathic, Zirconia, Lithium Disilicate

(3 marks)

- b) Identify 3 constituents of ceramics and state the properties they add to the overall material.

(3 marks)

Total 6 marks

9. a) Describe ceramic sintering and the effects on the dimensions of fired restorations.

(4 marks)

- b) What are the properties associated with dental ceramics?

(8 marks)

Total 12 marks

10. Explain the 3 bonding mechanisms employed to fuse ceramics to metal?

6 marks

11. Ceramics are termed as brittle. Explain this statement?

1 mark

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POLYMER QUESTIONS

12. Name 4 different types of dental polymer curing process and state the most common use for each type.

8 marks

13. What are the disadvantages of using cold cure acrylics for denture repairs?

4 marks

14. What are the **mechanical** properties associated with dental polymers?

6 marks

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

(3 marks)

- b) What are the advantages of using light cured acrylic?

(2 marks)

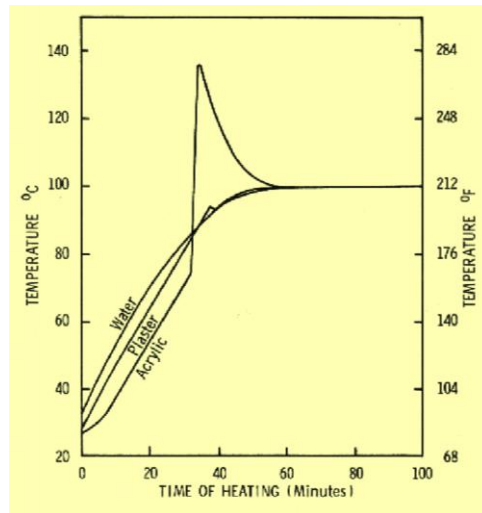
Total 5 marks

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SECTION B - ANSWER ONLY 2 QUESTIONS

16. Consider the chart below.



- a) Describe the chart and what it is demonstrating. (5 marks)
- b) What are the consequences to the material that results from this process? (5 marks)
- c) Draw an ideal process to produce a material with ideal properties. (5 marks)

Total 15 marks

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17. a) From the image below (Image A) discuss the possible causes and the effects on the soft tissue when using denture base materials. (7 marks)
- b) Identify patient management processes when selecting a new material for this case. (4 marks)
- c) Suggest a material that can be used and explain your reasons for selection. (4 marks)

Total 15 marks

Image A



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18. Consider the patient in the image (Image B)

Image B



- a) Identify all components of a galvanic cell from the image and justify your reason for component selection. (Include tooth notation). (7 marks)
- b) Discuss the issues that the patient may experience with the restorations present in their mouth. (6 marks)
- c) Present a solution to the problem and justify your choice. (2 marks)

Total 15 marks

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19. A prescription requests the construction of an orthodontic appliance made from acrylic.



- a) What are your material options? (4 marks)
- b) Select one material and describe how the appliance is manufactured to maximise the materials properties. (5 marks)
- c) Discuss the advantages and disadvantages of the material you have selected for 19 b. (6 marks)

Total 15 marks

END OF QUESTIONS