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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017**

TERBUKA

COURSE NAME : ENGINEERING POLYMER AND CERAMIC

COURSE CODE : BDB40603

PROGRAMME CODE : 4BDD

EXAMINATION DATE : DECEMBER 2016 / JANUARY 2017

DURATION : 3 HOURS

INSTRUCTION : ANSWERS **FIVE (5)** QUESTIONS ONLY

THIS QUESTION PAPER CONSISTS OF **FOUR (4)** PAGES

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- Q1** (a) Suggest TWO (2) methods that can be used to avoid any failure of ceramic component during its operation and usage. (4 marks)
- (b) Nigel has produced a product through extrusion process. After extrusion, the product is then sintered. However, after sintering, defects were observed on the product. Find the course of the problems and suggest the steps that should be taken to avoid it. (4 marks)
- (c) Surface coating is among the finishing process for advanced ceramic products. Explain in detail THREE (3) techniques of surface coating that can be used. (12 marks)
- Q2** (a) Differentiate between the function of calcination and sintering in the ceramic processing. (4 marks)
- (b) William found that ceramic particles in the produced slurry were agglomerated and not distributed uniformly. Therefore, he used an additive and lubricant to overcome this problem. Give your opinion whether the additive that has been applied by William is suitable or not? Suggest TWO (2) additives that can overcome that problem. (6 marks)
- (c) Vapor deposition process usually take place within a vacuum chamber to deposit ceramic thin films. Compare the different between Physical Vapor deposition (PVD) and Chemical Vapor deposition technique. (10 marks)
- Q3** (a) Sanitary ware in Figure Q3 (a) can be produced via slip casting process. Proposed a suitable forming process and explain it briefly. (6 marks)
- (b) Contamination is a problem in milling process. State TWO (2) methods that can be used to control or overcome contamination during milling. (4 marks)
- (c) Explain in detail with flow chart of sol gel method that can produce nano-particle ceramic or thin films. (10 marks)
- Q4** (a) Injection molding is one of the processing techniques for converting thermoplastics and thermosetting materials, from the pellet or powder form into a variety of useful products. Based on your knowledge, explain the key important in injection molding. (5 marks)

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DR. ROSMIZA BT. HUSAIN @ ISA
Penyerasan Kanan
Jabatan Kejuruteraan
Fakulti Kejuruteraan
Universiti Tun Hussein Onn Malaysia

- (b) Compare the advantages of casting and plastic molding operations in term of equipment size and cost. (5 marks)
- (c) Explain in detail THREE (3) method that have principally been used to determine the degree of crystallinity of polymer materials (10 marks)
- Q5** (a) Injection molding makes discrete parts that can have complex and variable cross-section as well as a range of surface texture and characteristic. Give your opinion why injection molding machine not effective for mixing additives. (6 marks)
- (b) Define packing the mold and explain in detail the importance in obtaining good injection molded parts. (8 marks)
- (c) Cold –well extensions is a small channel that are part of the runner system. Explain in detail the purpose of the cold-well extension. (6 marks)
- Q6** (a) Blow molding is widely used for producing hollow containers. Identify THREE (3) major variants of blow molding and explain in detail the common features of them. (8 marks)
- (b) Sketch and explain in detail FOUR (4) steps of extrusion –blow molding. (8 marks)
- (c) Describe how ultraviolet light degrades plastics and why uv-light does not generally degrade metals. (4 marks)

TERBUKA**-END OF QUESTIONS –**

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Figure Q3 (a)

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