Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2018/2019

COURSE NAME	:	MANUFACTURING TECHNOLOGY
COURSE CODE	:	BDA 30502
PROGRAMME	:	3 BDD
EXAMINATION DATE	:	JUNE/JULY 2019
DURATION	:	2 HOURS
INSTRUCTION	:	1. ANSWER **ALL** QUESTION FROM **SECTION A** 2. ANSWER **TWO (2)** QUESTIONS FROM **SECTION B**

THIS QUESTION PAPER CONSISTS OF **FIVE (5)** PAGES

SECTION A

Q1 (a) **Figure Q1 (a)** shows a metals powder compaction process, the arrangement changes as the pressure is increased. Illusturate the arrangements with relation to the compaction pressure and density.

(8 marks)

(b) Compare the fundemental difference between transient liquid phase sintering and permenent liquid phase sintering process.

(7 marks)

(c) In powder metallurgy, it is impossible to completely eliminate the porosity by compaction process. Examine the best method to obtain greater density, hardness and strength of solid-state sintered parts. Give reasons to your suggestion.

(4 marks)

(d) However, this propsity could be an advantage in certain application. Give one example of application and argument stating that the material produced by powder metallurgy (PM) process is better than casting.

(6 marks)

Q2 (a) Some types of welding processes can be classified into both fusion and the solid-state categories. Distinguish the fundamental process for both categories

(6 marks)

(b) Shielded metal-arc welding (SMAW) is one of the oldest, simplest, and most versatile joining processes. About 50% of construction, shipbuilding, pipelines, and maintenance work industrial currently performed by this process. Illustrate and use a schematic diagram to show the equipment and the shielded metal-arc welding process.

(10 marks)

(c) Distortion (warping) is a serious problem in Fusion Welding, particularly Arc Welding. Discuss **FOUR (4)** of the counter measures that can be taken to reduce the incidence and extent of distortion.

(6 marks)

(d) Explain **THREE (3)** ways in which a threaded fastener can fail during tightening.

(3 marks)

SECTION B

Q3 (a) Metal casting process can be devided into several types which need to be selected based on design specifications. List out the advantage and disadvantage of sand casting and investment casting. Examine the example of products that can be produced using these proceses.

(5 marks)

(b) As an engineer, you are required to design a production line to produce comparatively large quantity of precision parts. The parts need to be made from high performance alloy for machine tools application such as gears and fixture. Distinguish the type of suitable casting process and give your reasons.

(6 marks)

(c) Using diagram, explain the process and parts involved in centrifugal casting process. List **TWO (2)** advantages and disadvantages of centrifugal casting and explain with sketch the characteristics of parts produced using this process from the point of material properties and how it happens.

(8 marks)

(d) A manufacturer of jewellery faces critical problem in production cost. To overcome the problem, suggest other casting method which can substitute the existing method. Justify your reasons and explain the process limitation.

(6 marks)

Q4 (a) Please discuss the advantages of extrusion prosess and give **THREE (3)** product/part using the technique.

(7 marks)

(b) In Merchant theory, there are specific assumptions for orthogonal cutting and oblique cutting. Differentiate **FOUR (4)** properties of orthogonal and oblique cutting?

(8 marks)

(c) A 150 mm long with 12.5 mm in diameter of a stainless steel rod is being reduced in diameter to 12.0 mm using a lathe machine. The machine spindle rotates at N=400 rpm, and tool is traveling at an axial speed of 200 mm/min. Calculate the.

i. cutting speed,
ii. material removal rate (MRR), and
iii. cutting time.

(10 marks)

Q5 (a) There are two types of plastics namely Thermoplastics and Thermosets. Distinguish the differences between them in an appropriate table

(4 marks)

(b) Describe the characteristics and limitations of plastic injection moulding process and give **THREE (3)** examples of products that is normally made by such technique.

(8 marks)

(c) With the aid of appropriate diagram, illustrate in details the plastic extrusion process.

(8 marks)

(d) Define the die swell phenomenon in extrusion.

(3 marks)

(e) Explain the function of screen pack and breaker plate at the die end of the extruder barrel.

(2 marks)

- END OF QUESTIONS -

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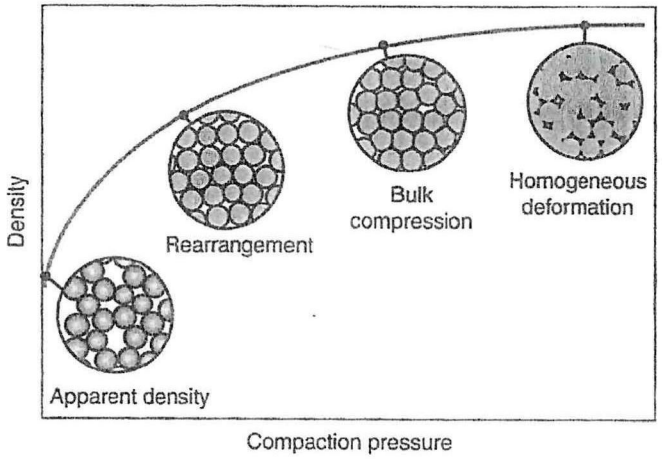

Figure Q1(a)