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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER I
SESSION 2015/2016**

COURSE NAME : MANUFACTURING PROCESS
COURSE CODE : BEH 41303
PROGRAMME : BACHELOR OF ELECTRONIC
ENGINEERING WITH HONOURS
EXAMINATION DATE : DECEMBER 2015 / JANUARY 2016
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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

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- Q1**
- (a) Material removal processes such as machining/traditional machining are desirable and necessary in manufacturing operation. List out **THREE (3)** advantages of machining/traditional machining. (3 marks)
- (b) In Merchant theory, there are specific assumptions for orthogonal cutting and oblique cutting. Differentiate **FOUR (4)** properties of orthogonal and oblique cutting. (6 marks)
- (c) A 150mm long with 12.5mm in diameter of a stainless steel rod is being reduced in diameter to 12.0mm using a lathe machine. The machine spindle rotates at $N=400$ rpm, and tool is traveling at an axial speed of 200 mm/min. Point out the cutting speed, material removal rate, and cutting time. (8 marks)
- (d) Dry machining is being considered by machine shop because of certain problems inherent in the use of cutting fluids. Identify the problems associated with the use of cutting fluids. (3 marks)
- Q2**
- (a) The mold in casting process contains a cavity whose geometry determines the shape of cast part.
- (i) With the help of sketches, differentiate between open molds and closed molds. (4 marks)
- (ii) Explain the function of a core in casting process and how to implement it. (2 marks)
- (b) Discuss the casting process required to produce the casting component shown in **Figure Q2(b)** with high accuracy of dimension and quantity. (6 marks)
- (c)
- (i) A steel rectangular plate with a dimension of 650mm length x 105mm width x 15mm thick, will be produced using sand casting. If the mold constant is 3.26 min/cm^2 , calculate the total solidification time required for the casting to solidify after pouring. (4 marks)
- (ii) After the plate was solidified, it was found that the plate has defects. By the aid of a sketch, distinguish **FOUR (4)** common types of defects that might occurred in sand casting with the cause of each defect. (4 marks)

- Q3** (a) Impression die forging and flashless forging are among two important process in metal forming practice. With the aid of diagram, compare these two process. (7 marks)
- (b) **Figure Q3(b)** shows a metal forming product that crucial to get a uniform wall thickness on the side wall.
- (i) Choose the suitable metal tooling forming process for the product. (2 marks)
- (ii) Sketch and label the process with explanation. (6 marks)
- (c) Springback is a phenomenon happened in sheet metal bending operation. Identify the phenomenon. (3 marks)
- (d) Differentiate bulk deformation processes and sheet metal processes. (2 marks)
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- Q4** (a) Construct the working principle of blown extrusion with the aids of diagram. (6 marks)
- (b) (i) Identify the characteristics and limitations of an injection moulding product. (3 marks)
- (ii) List **TWO (2)** examples of products that is normally made by such technique. (2 marks)
- (c) Compare the differences between the mold for injection molding and the mold for compression molding process. (4 marks)
- (d) Define the die swell phenomenon in extrusion. (3 marks)
- (e) Explain the functions of the screen pack and breaker plate at the die end of the extruder barrel. (2 marks)

- Q5** (a) Distinguish **FOUR (4)** differences between thermite welding and resistance welding in terms of principle and applications with the aid of sketches
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- (b) If you are designing a joint that needs to be strong and yet needs to be disassembled a few times during the product life, propose and explain the kind of joint would you choose. (5 marks)
- (c) Point out the circumstances where brazing or soldering be preferred over welding. (4 marks)
- (d) The molten filler metal in Brazing is distributed throughout the joint by capillary action. Define capillary action. (2 marks)
- (e) Explain weldability of steel change as its carbon content increases. (3 marks)

- END OF QUESTION -

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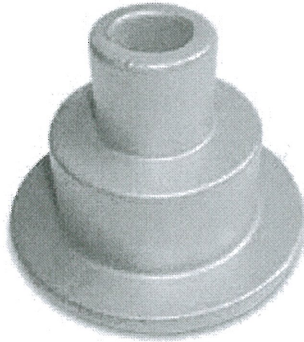
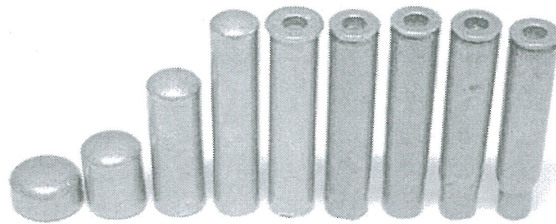


FIGURE Q2(b)



Parts courtesy of RemingtonArms.



FIGURE Q3 (b)