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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

**FINAL EXAMINATION
SEMESTER II
SESSION 2017/2018**

COURSE NAME : CASTING TECHNOLOGY
COURSE CODE : BNM 30303
PROGRAMME CODE : BNM
EXAMINATION DATE : JUNE / JULY 2018
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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

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- Q1** (a) Define “Metal Casting” in the context of manufacturing process. (3 marks)
- (b) 500 pieces of mini turbine blade with complex shape is to be manufactured by Non-Permanent Mold Casting process. By aid of sketches, outline which process would be suitable to make the turbine blade. (7 marks)
- (c) **Figure Q1(c)** shows a schematic illustration of a sand mold. Describe the function of all the features in sand mold for Sand Casting process. (10 marks)
- Q2** (a) Explain the use of “Cores” and “Chaplets” in metal casting process. (3 marks)
- (b) Special binders are introduced into core sands to add strength. Construct the outline of the following binder process in core making:
- (i) Hot-Box process. (4 marks)
- (ii) Cold-Box process. (4 marks)
- (iii) Air-Set process. (4 marks)
- (c) Referring to **Figure Q2(c)**, outline the Permanent Mold Casting process commonly employed in metal casting industries. (5 marks)
- Q3** (a) Describe **FOUR (4)** important characteristics of molding sands in metal casting process. (8 marks)
- (b) Sand Rammer and Universal Sand Strength Machine are used in the laboratory for testing to determine the properties of foundry sands. Prepare the **SEVEN (7)** steps of testing procedure to evaluate the Green Compression Strength of green sand specimens in Sand Casting process. (7 marks)
- (c) To compensate any dimensional and structural changes during metal casting process, allowances are usually integrated in the pattern. List all the allowances applied in the process of patternmaking. (5 marks)

- Q4** (a) Illustrate the sequence of the following Permanent Mold Casting process, using the aid of sketches:
- (i) Hot-Chamber Die Casting. (8 marks)
 - (ii) Cold-Chamber Die Casting. (8 marks)
- (b) Distinguish the advantages and limitations of Sand Casting and Die Casting processes in term of tooling cost, part size, dimensional accuracy and surface finish. (4 marks)
- Q5** (a) Different types of electrical furnace have been used in metal casting to produce molten metal. Discuss the differences and advantages of “Induction Furnace” and “Electric Arc Furnace”. (5 marks)
- (b) Defects can be categorized into a number of categories. List all the main categories of casting defects in metal casting process. (5 marks)
- (c) Aluminium Alloy Casting Sdn. Bhd. is having high reject rates due to the “Gas Porosity” defects in their alloy wheel products. As a new appointed technologist engineer, you have been assigned to reduce the reject rates by minimizing the defects.
- (i) Describe the defect. (2 marks)
 - (ii) Knowing that the defect has contributed high reject rates to the company, prepare and discuss **TWO (2)** possible causes of the defect. (3 marks)
 - (iii) Propose **FIVE (5)** countermeasures that can be implemented by the company to overcome the defect. (5 marks)



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- END OF QUESTIONS -

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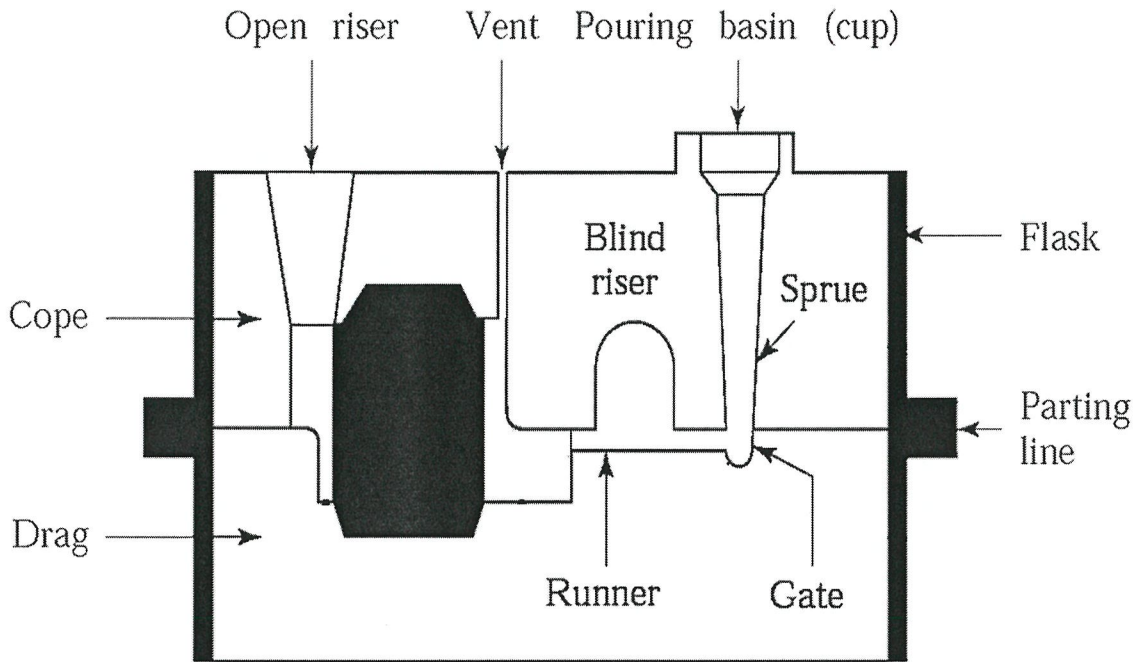


Figure Q1(c)

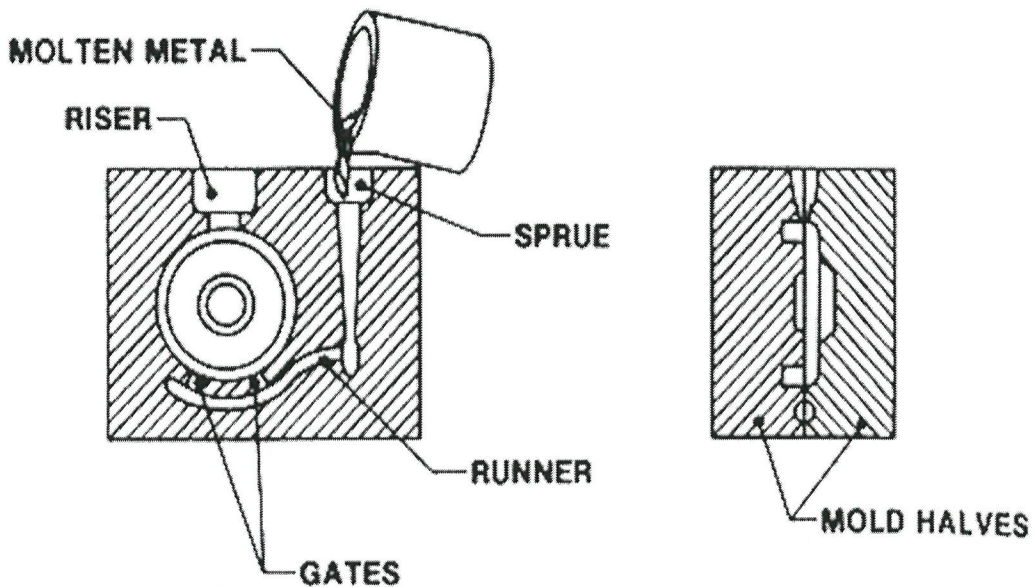


Figure Q2(c)

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