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UNIVERSITI TUN HUSSEIN ONN MALAYSIA

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

COURSE NAME : CASTING TECHNOLOGY
COURSE CODE : BNM 30303
PROGRAMME CODE : BNM
EXAMINATION DATE : JUNE / JULY 2016
DURATION : 3 HOURS
INSTRUCTION : ANSWER ALL QUESTIONS

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) Describe the 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 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)
- Q3** (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. Outline 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 Q3(c)**, outline the Permanent Mold Casting process commonly employed in metal casting industries. (5 marks)

- Q4** (a) With the aid of sketches, illustrate the sequence of the following Permanent Mold Casting process:
- (i) Hot-Chamber Die Casting. (8 marks)
 - (ii) Cold-Chamber Die Casting. (8 marks)
- (b) Compare the advantages and limitations of Sand Casting and Die Casting processes. (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 technology engineer, you have been assigned to reduce the reject rates by minimizing the defects.
- (i) Describe the defect. (2 marks)
 - (ii) Discuss the possible causes of the defect. (3 marks)
 - (iii) Propose the possible countermeasures that can be implemented by the company. (5 marks)

-END OF QUESTIONS –

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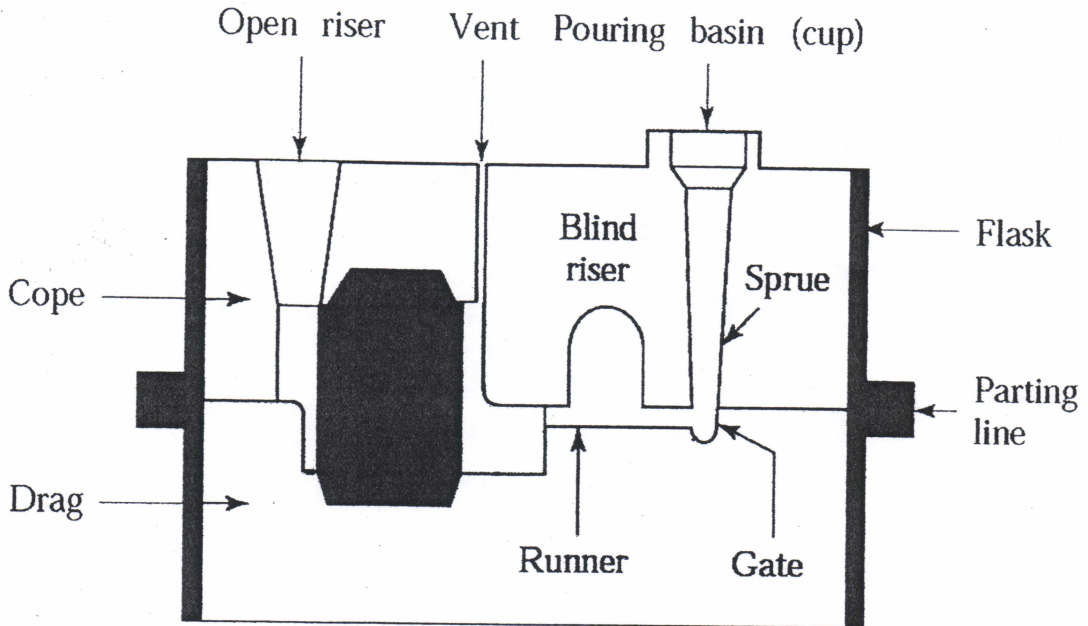


Figure Q1(c)

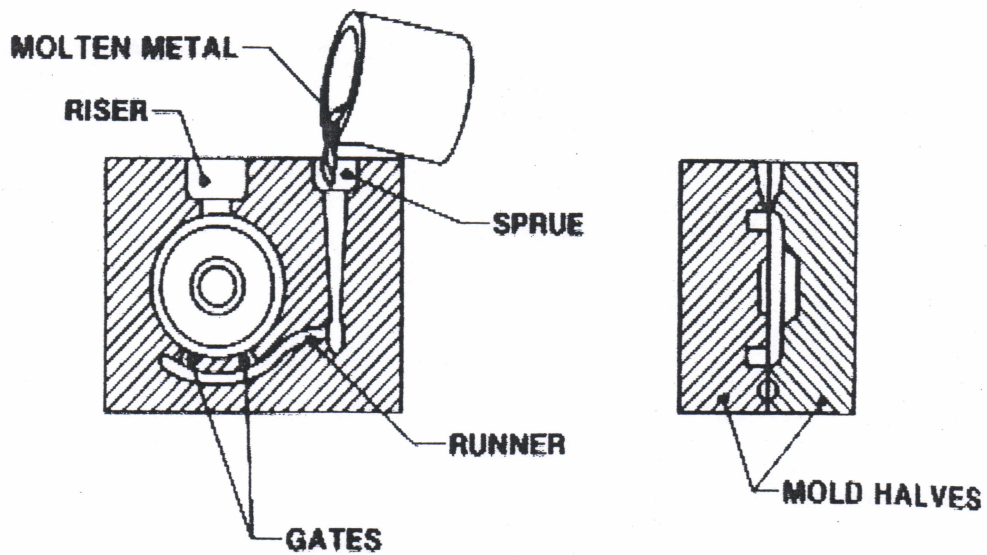


Figure Q3(c)