UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2014/2015

COURSE NAME	:	INJECTION MOLD DESIGN
COURSE CODE	:	BDD 40903
PROGRAMME	:	4 BDD
EXAMINATION DATE	:	JUNE 2015/JULY 2015
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **FIVE (5) QUESTIONS FROM SIX (6)** QUESTIONS PROVIDED

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

Q1 (a) Construct the process flow of mould development process.

(12 marks)

(b) Based on **Table Q1 (a),** select the best rib design with proper arguments.

(8 marks)

Q2 (a) Based on the criterias that need to be considered when selecting a mold base, create a checklist that should be useful as a reference for a mold designer to select a mold base.

(12 marks)

(b) A mould designer was assigned to choose a runner that are comparatively cheaper to produce and maintain, able to accommodate a wide variety of polymers, both commodity and engineered, with fast cycle times if the systems include robotic in removing the runners. Make a proper argument why a hot runner is not a suitable choice for this design.

(8 marks)

Q3 (a) Compare TWO (2) types of gate design based on their application.

(8 marks)

(b) A bezel, molded of ABS and ejected with 20 ejector pins. The injection force of 4700 N was used in the injector system. As for the pins, the material used was steel, with 200 GPa of modulus, and the length of 0.2m.

(i) Define the minimum radius of the ejector pin.

(4 marks)

(ii) Appraise a decision that the standard pin size of 2 mm diameter is suitable or not.

(8 marks)

Q4 (a) Venting is normally a minor aspect of mold design. However, an understanding of the purpose and function of vent can assist the mold designer to prepare a good mold.

(i) Defend the statement that the use of vents shall minimize the mold maintenance.

(4 marks)

(ii) Compare the features between the vent on the parting line and the vent located around the ejector pins, in terms of dimension and advantages /disadvantages of the selected vents.

(8 marks)

(b) Describe the major factors that influence the cooling efficiency?

(8 marks)

Q5 (a) During injection molding process, the production quality assurance found that the product have a poor surface finish.

(i) As a mould design engineer , define the possible cause.

(4 marks)

(ii) Solve the problem without redesign or replacing the mold.

(6 marks)

(b) During an injection molding process, suddenly the molded parts starts to come out with a blackened area along the parting line, where the mold halves come together. The usual smells of material changed to "sour" and "burned". Then, you hear a "clunk" sound every time the mold closes.

(i) As a production engineer , judge the condition based on the statement given.

(4 marks)

(ii) You had performed visual inspection on the injection molding machine. Create a check list for the items that you need to inspect.

(6 marks)

Q6 (a) Based on the main factors that contributes towards a molded part, illustrate a diagram that provides a breakdown of primary mold cost drivers with their underlying components.

(10 marks)

(b) Minimization of total molded part cost is not a simple task since injection molds and molding process are optimally designed for different target production quantities. **Table Q6 (b),** shows the part cost data for low and high production quantities.

(i) Based on **Table Q6 (b)**, choose the suitable number of mold cavities and the runner system for each production type.

(4 marks)

(ii) Based on your answer in Q6 (b) (i) question, support your selection with proper reason.

(6 marks)

- END OF QUESTION -

FINAL EXAMINATION

SEMESTER/SESSION: SEM II/2014/2015 PROGRAMME : 4 BDD
COURSE NAME : INJECTION MOLD DESIGN COURSE CODE: BDD 40903

TABLE Q1(a) : Rib Design Criteria

Rib Design Criteria	Design A	Design B
Nominal wall thickness	100 mm	100 mm
Rib thickness	70 mm	30 mm
Number of ribs	10	5
Height of rib	100 mm	400 mm
Spacing	200 mm	300 mm

TABLE Q6(b): Part cost data for low and high production quantities.

Production Quantity	50,000 parts	5,000,000 parts
Mold cost	RM 10, 000	RM 250, 000
Cycle time	30 s	20 s
Effective cycle time/part	15 s	0.6 s
Processing cost/part	RM 0.40	RM 0.04
Mold cost /part	RM 0.20	RM 0.05
Material cost /part	RM 0.15	RM 0.12
Total cost/ part	RM 0.75	RM 0.21