UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR
SEMESTER I
SESI 2009/2010

NAMA MATA PELAJARAN	:	REKABENTUK UNTUK PEMBUATAN & PEMASANGAN
KOD MATA PELAJARAN	:	BDD 4013
KURSUS	:	4BDD
TARIKH PEPERIKSAAN	:	NOVEMBER 2009
JANGKA MASA	:	2 JAM 30 MINIT
ARAHAN	:	JAWAB SEMUA SOALAN DI BAHAGIAN A DAN MANA MANA 3 SOALAN DI BAHAGIAN B.

KERTAS SOALAN INI MENGANDUNGI SEBELAS (11) MUKA SURAT BERCETAK

SECTION A

S1 (a) Name all the label/value **A – K** in **Table 1** and calculate the design efficiency for Pneumatic Piston in **Figure S1 .** Given that costing is RM15.00 per hour.

(12 marks)

(b) Based on initial design in **Figure S1**, you want to make some modifications to improve the design, what part you want to eliminate or modify and why?

(8 marks)

S2 (a) With refer to **Figure S2**, explain how to machine the designed component on a single turn/mill centre with counter spindle and dual turret to complete the final product by continue filling Table 2.

(8 marks)

(b) As a production engineer, you need to suggest to the management if you want to produce 1000 unit components as shown in **Figure S2**, which machine you want to use either (i) turn/mill centre completed with bar feeder, or (ii) CNC turning and CNC milling. Based on you explanation what are the advantages compared to other approaches.

(5 marks)

(c) During turning operation to produce flat surface where, it is accomplished by moving the cutting tool against with the axis of workpart rotation. Given are the diameter of workpart, d_m = 30 mm, Feed rate, f = 0.5 mm/min, a_p = 1 mm and workpart rotational speed, n_w = 800 rev/min. Determine;

i) Machining time, t_m

ii) Maximum value of cutting speed, v_{max}

iii) Maximum Material Removal Rate, Z_{wmax} (MRR)

(7 marks)

SECTION B

S3 The product design usually begins with the motive that a new product is needed to meet the market or customer's demand and Product development process involved various individuals and lead by team leader.

(a) Product Design Process normally begins with understanding of customer needs or requirements. List other **FOUR (4)** process in product design

(4 marks)

(b) List **FIVE (5)** individuals who involve in design and product development.

(5 marks)

(c) Marketing professional is one of the important people for developing products. Discuss the importance of these personnel in 'divergent thinking' phase when developing products.

(5 marks)

(d) A product will be going through its life cycle; introduction, growth, maturity and decline as shown in **Figure S3**. Discuss what happen to the product during the growth and maturity phase.

(6 marks)

S4 Design for Assembly (DFA) is a process by which products are designed with ease of assembly in mind. The reduction of the number of parts in an assembly has the added benefit of generally reducing the total cost of parts in the assembly. Fewer parts mean faster and more accurate assembly, and fewer mistakes.

(a) Describe the importance of DFA at the early stage of design process.

(4 marks)

(b) List **FIVE (5)** of the part features that affect manual handling time.

(5 marks)

(c) 'Design parts with self-locating features' is one the DFMA principles for mechanical design. Explain how this approach could benefits the designers and engineers.

(5 marks)

(d) What is the equation for determining manual assembly design efficiency? Based on the following available data below,

Items	Old design	New design
No of parts	47	26
Total estimated assembly time	6.37 min	2.58 min
Theoretical minimum number of parts	7	7

Determine:

i. The assembly costs if the manual assembly worker's rate is RM10.00 per hour.

ii. The percentage of part reduction.

iii. The assembly efficiencies for the new design.

(6 marks)

S5 (a) What are Rib and Bosses in injection molding operations and why rib and bosses is very important part in plastic product.

(5 marks)

(b) Refer **Figure S4**, list all the major part in Injection Mould Component

(4 marks)

(c) What is Draft angle and why it is so important in injection molding operations? Show you answer with some sketching.

(5 marks)

(d) A batch of 15 cm diameter disks with a thickness of 4 mm, to be molded from ABS in a six-cavity mold. Determine the appropriate machine capacity in KN unit? (Given the % increase in area due to the runner is 15%, and the recommended injection pressure for ABS is 500 bars or 500 x 10^5 N/m^2)

(6 marks)

S6 (a) What is stamping process and give **TWO (2)** examples of product that using this process

(4 marks)

(b) With some sketching, differentiate between these three operations of shearing the external profile of the part;

i) cut-off

ii) part-off

iii) blanking

(6 marks)

(c) You have been given a job to buy a mechanical press machine. What are the considerations you should aware in order to select the machine?

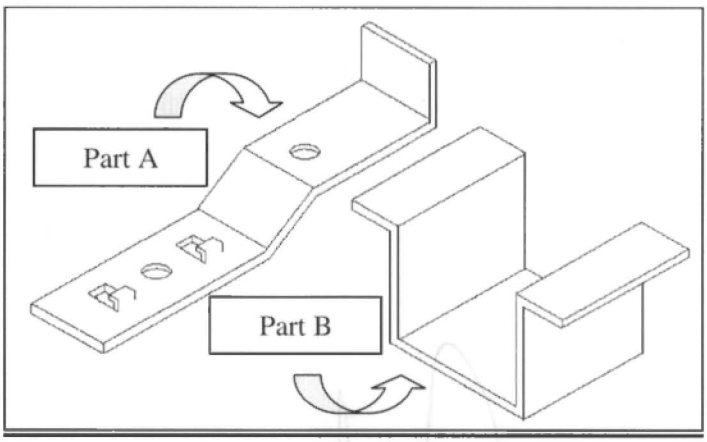
(4 marks)

(d) What are the advantages of using cut-off die?

(3 marks)

(e) How many bend stages for both Part A and B?

(3 marks)



Appendix 1

PEPERIKSAAN AKIIIR

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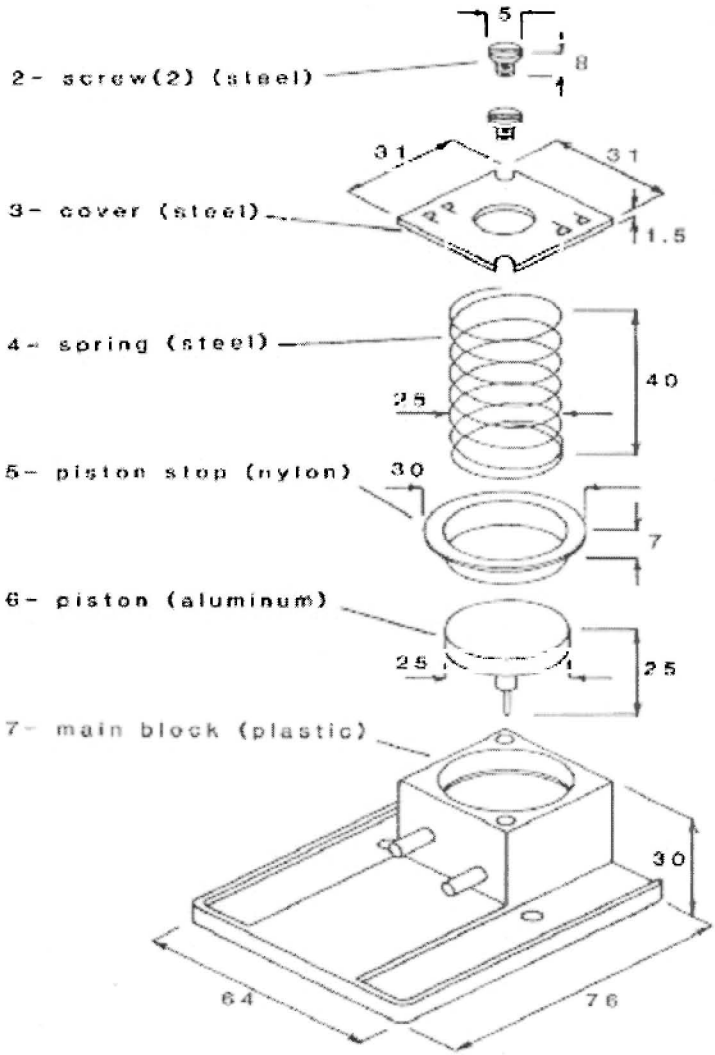

FIGURE S1 : Pneumatic Piston Sub-assembly, dimension in mm

Appendix 2

PEPERIKSAAN AKHIR

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TABLE 1 – Please include this table in your answer sheet

DESIGN FOR MANUAL ASSEMBLY - WORKSHEET									
Part No	**A**	**B**	**C**	**D**	**E**	**F**	**G**	**II**	
2	4	11	1.8	39	8.0	30.2	12.6	0	Screws
3	1	23	2.36	08	6.5	8.86	3.69	0	Steel cover
4	1	05	1.84	00	1.5	3.34	1.39	1	Spring steel
5	1	10	1.50	00	1.5	3.00	1.25	1	Piston stop
6	1	10	1.50	10	4.0	5.50	2.29	1	Piston sub
7	1	30	1.95	00	1.5	3.45	1.44	1	Plastic base
						I	**J**	**K**	Design Efficiency = ?
						TM	CM	NM	

Appendix 3

PEPERIKSAAN AKHIR

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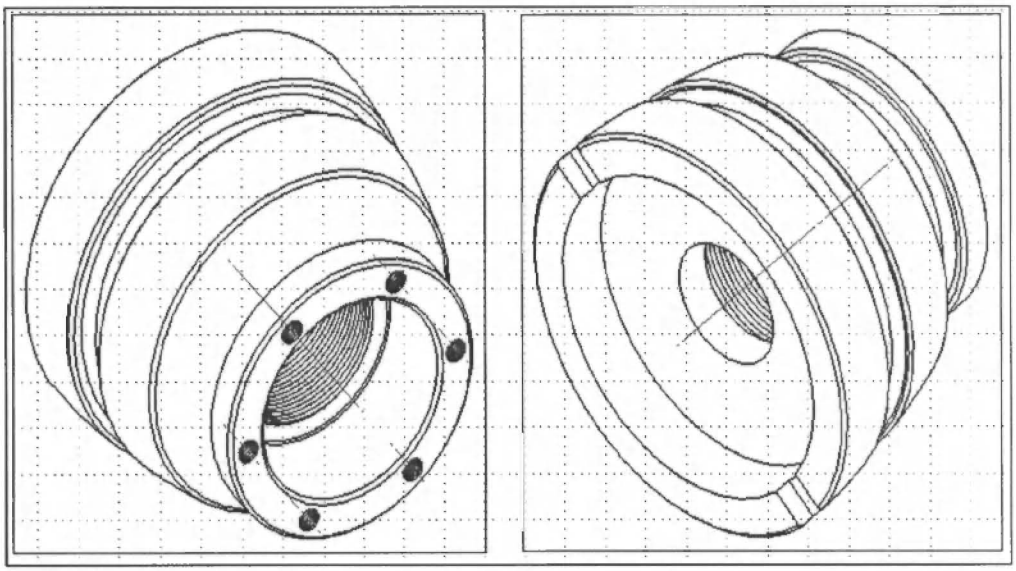

FIGURE S2

Table 2 Operation Plan for Turn/Mill Component (Figure S2, No need to consider dimension)

Material : Aluminium				
Op. No	**Op. Type**	**Op. Description**	**Tool No.**	**Tool description**
1	Turn	Face the billet	T1	Facing tool
2	Turn	Rough the external profile	T2	External turning tool
-				
-				
-				
-				
n				

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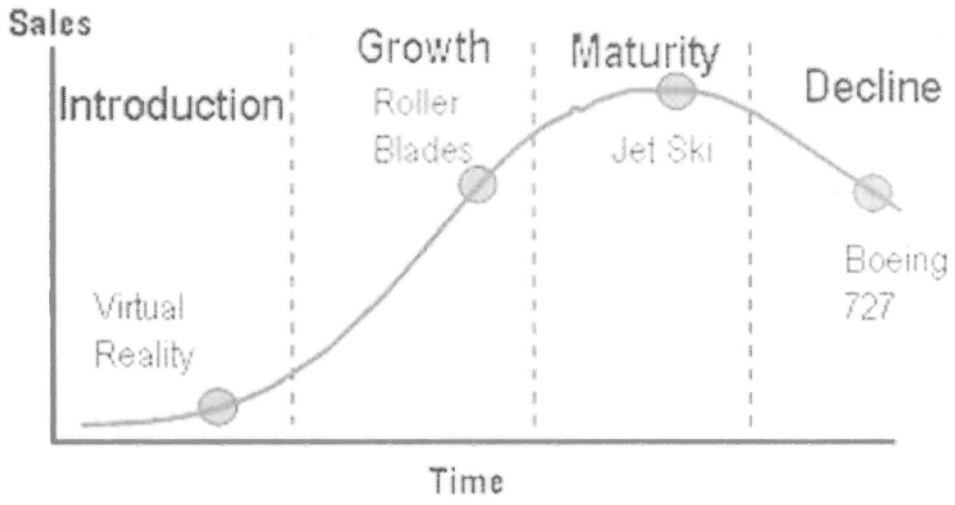

FIGURE S3

Appendix 5

PEPERIKSAAN AKHIR

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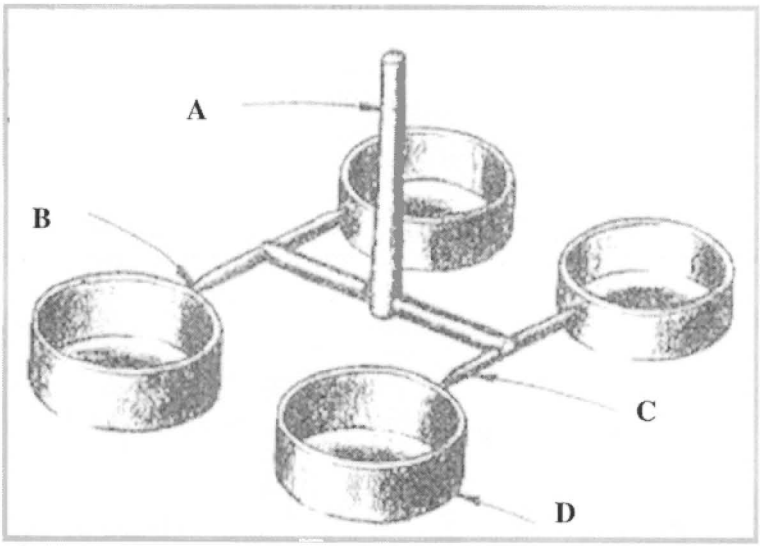

FIGURE S4