



UNIVERSITI TUN HUSSEIN ONN MALAYSIA

PEPERIKSAAN AKHIR SEMESTER II SESI 2010/2011

NAMA KURSUS : TEKNOLOGI PEMBUATAN
KOD KURSUS : BDA 3052 / BDA 30502
PROGRAM : BDD
TARIKH PEPERIKSAAN : APRIL/MEI 2011
JANGKA MASA : DUA (2) JAM TIGA PULUH (30) MINIT
ARAHAN : JAWAB EMPAT (4) DARI LIMA (5)
SOALAN DI BAHAGIAN A DAN JAWAB
DUA (2) DARI TIGA (3) SOALAN DI
BAHAGIAN B

KERTAS SOALAN INI MENGANDUNGI ENAM (6) MUKA SURAT BERCETAK

PART A (80 MARKS):

This section contains **FIVE (5)** questions. Choose and answer any **FOUR (4)** questions **ONLY**.

- Q1**
- (a) What is a casting process? State **three (3)** capabilities and advantages of casting process.
(4 marks)
 - (b) Briefly explain, what is the function of flask, riser, core and pattern in the sand casting molds?
(4 marks)
 - (c) With the aid of a sketch state the investment casting process.
(7 marks)
 - (d) A mechanical part with the tolerance of ± 0.076 mm with small thickness will be produced using a casting process. The product needs to be produced in a high quantity and good quality of surface finish and dimensional accuracy with less finishing process. In order to produce this part, select the best casting process and discuss why it is selected.
(5 marks)
- Q2**
- (a) Draw a neat figure of a force diagram showing the geometric relationship between all the forces acting on the chips in orthogonal cutting.
(7 marks)
 - (b) By using illustrations, distinguish and explain two forms of milling in the peripheral milling. Describe the geometry of the chip formed by this process.
(6 marks)
 - (c) List down **three (3)** processes that can be done by the drill machine other than making a hole.
(3 marks)
 - (d) Explain the important steps implemented in the chemical machining.
(4 marks)

- Q3**
- (a) List all the various rolling process available? (3 marks)
 - (b) Briefly explain open die forging, impression die forging and flashless forging. (4 marks)
 - (c) Explain forward and backward extrusion assisted with figures. (5 marks)
 - (d) What are blanking, piercing / punching, bending and forming processes. Give example for each one of the processes. (4 marks)
 - (e) In general, what are all advantages and disadvantages of hot working and cold working processes? (4 marks)
- Q4**
- (a) Explain die swell in plastic processing. (3 marks)
 - (b) Explain angle of repose in plastics (3 marks)
 - (c) What are the differences between thermoplastics and thermosets plastics? Give examples for each one of them. (4 marks)
 - (d) State about the viscoelasticity, viscosity, calendaring in plastics processing. (5 marks)
 - (e) Explain with figure the vacuum thermoforming process. (5 marks)
- Q5**
- (a) In powder metallurgy process, packing factor is a very important characteristic to be known. Identify the relationship between packing factor and porosity of compacted parts. (3 marks)
 - (b) Welding process can be divided into two major categories. What are the two major categories and explain their differences from the point of processing fundamental. Give two examples for each category. (8 marks)

- (c) Welding operator found out that the joint result of metal inert gas (MIG) welded products are not constant. Some of the parts were seriously burnt and full of porosity. There were welded with inconsistent penetration depth. List out **three (3)** possible reasons and explain the countermeasures that can be taken.

(9 marks)

PART B (20 MARKS):

This section contains **THREE (3)** questions. Choose and answer any **TWO (2)** questions **ONLY**.

- Q6** In an orthogonal cutting operation, the cutting tool has a rake angle of 5° . The lathe is set so the chip thickness before the cut is 0.25 mm. After the cut, the deformed chip thickness is measured to be 0.7 mm.

Calculate:

- (a) the chip thickness ratio
- (b) the angle of the shear plane
- (c) the length of the shear plane

If a cutting tool with a rake angle of 1° is used in this cutting process, determine:

- (d) the new length of the shear plane
- (e) the new angle of the shear plane

By referring to all of the results, explain the relation of rake angle with the length and angle of the shear plane in the orthogonal cutting operation.

(10 marks)

- Q7** (a) A work piece having 75 mm diameter and length 300 mm is to be reduced to diameter of 69 mm as final size. The depth of cut is 1 mm. The work piece is rotating at 900 RPM. A carbide tool of 8 degree rake angle is used. The chip thickness is 1.3 mm. The feed rate is 0.25 mm /rev.

Calculate:

- (i) Cutting velocity,
- (ii) The time taken to machine up to 69 mm diameter to a length of 200 mm.
- (iii) Total Material Removal Rate (MRR)

(5 marks)

- (b) A slab milling operation is performed to finish the top surface of a steel work piece rectangular in section. The size of the work material is 350 mm length and 76 mm wide. A helical milling cutter, which has a 75 mm diameter and ten teeth, is set up to machine. The cutting speed is 130 m/min, the chip load is 0.15 mm/tooth and depth of cut is 3 mm.

Calculate the following:

- (i) Time taken to make one pass across the surface and

(ii) Material Removal Rate (MRR).

(5 marks)

Q8 Tool life tests in turning yield the following data:

- when cutting speed is 100 m/min, tool life is 10 min;
- when cutting speed is 75 m/min, tool life is 30 min.

(a) Determine the n and C values in the Taylor tool life equation.

(b) Based on your equation, compute,

- i) the tool life for a speed of 110 m/min, and
- ii) the speed corresponding to a tool life of 15 min.

(10 marks)