UTHM
Universiti Tun Hussein Onn Malaysia

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION
SEMESTER II
SESSION 2015/2016

|		
COURSE NAME	:	MANUFACTURING TECHNOLOGY
COURSE CODE	:	BPB 23303
PROGRAMMECODE	:	BPA / BPB
EXAMINATION DATE	:	JUNE / JULY 2016
DURATION	:	3 HOURS
INSTRUCTION	:	ANSWER **ALL** QUESTIONS

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

**Q1**   (a)   Draw classification tree of metal forming operation.

                                                                             (4 marks)

       (b)   Use schematic diagram to describe ring rolling process.

                                                                               (8 marks)

       (c)   A round disk of 150 mm diameter, D, as in **Figure Q1(c)(i)** is to be blanked from a strip of 3.2 mm thick, t, of half-hard cold-rolled steel whose shear strength = 310 MPa as in **Figure Q1(c)(ii)**.

           Calculate:

           (i)   Clearance, c, given that clearance allowance value, A_c, for half-hard cold-rolled steel= 0.075

                                                                               (2 marks)

           (ii)   Die opening diameter, D_b

                                                                                 (2 marks)

           (ii)   Punch diameter, D_h

                                                                                 (2 marks)

           (iii)   Blanking force, F

                                                                                 (2 marks)
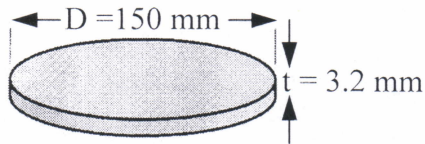
Figure Q1(c)(i)
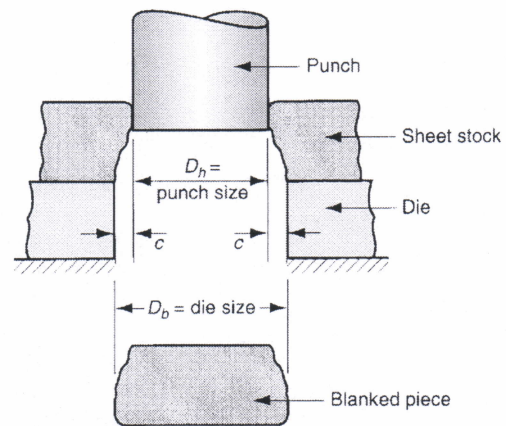
Figure Q1(c)(ii)

Q2   (a)   Describe the function of connecting rod in internal combustion engine.

                                                                            (5 marks)

       (b)   List **SIX(6)** process steps in hot forging to produce connecting rod.

                                                                                 (3 marks)

(c)   List **SIX(6) process** steps in powder metallurgy to produce connecting rod.

(3 marks)

(d)   Discuss the differences between hot forging and powder metallurgy of producing connecting rod from the following criteria:

(i)   mechanical properties,

(3 marks)

(ii)   weight,

(3 marks)

(iii)   cost competitiveness.

(3 marks)

Q3   (a)   Explain differences between a die and a mold by using analogy.

(4 marks)

(b)   Describe extrusion process.

(3 marks)

(c)   List **THREE(3)** products made from extrusion process.

(3 marks)

(d)   Compare direct and indirect extrusion with the help of schematic diagram.

(10 marks)

Q4   (a)   Define machining process.

(3 marks)

(b)   State **THREE(3)** scope of conventional machining.

(3 marks)

(c)   Identify the importance of machining from commercial and technological perspectives.

(6 marks)

(d)   An engine lathe is used to turn a cylindrical work part 150 mm in diameter by 500mm long. Cutting speed = 2.50 m/s, feed = 0.3 mm/rev, and depth of cut = 3.0mm.

Calculate:

(i)   Cutting time

(4 marks)

3

(ii)   Metal removal rate

(4 marks)

Q5   (a)   Discuss **FIVE(5)** importance of assembly operations in manufacturing.

(10 marks)

(b)   Sketch **FIVE(5)** basic types of welding joints.

(5 marks)

(c)   List **FIVE(5)** advantages of bonding of aircraft skin panels using adhesive over joining them with mechanical fastening.

(5 marks)

-END OF QUESTIONS-