

FINAL
Examination Paper
(COVER PAGE)

Session : August 2019

Programme : Diploma In Mechanical Engineering (DMEN)

Course : EGM2166 : Workshop Technology & Workshop Practice

Date of Examination : December 7, 2019 (Saturday)

Time : 2:00 pm – 4:00 pm Reading Time : Nil

Duration : 2 Hours

Special Instructions :

This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Materials permitted :
Non-Programmable Calculator

Material provided :
Nil

Examiner : Dr Aaron Edward Teo Sheng Jye and Mohd Hafis Zakaria

Moderator : Ir Gerald Victor Richard Joseph

DIPLOMA IN MECHANICAL ENGINEERING PROGRAMME (DMEN)
EGM2166: WORKSHOP TECHNOLOGY AND WORKSHOP PRACTICE
FINAL EXAMINATION: AUGUST 2019 SESSION

Instructions: This paper consists of **SIX (6)** questions. Answer any **FOUR (4)** questions in the answer booklet provided. All questions carry equal marks.

Question 1

- (a) Describe the casting procedure to make a product like an engine block as shown in Figure Q1 with the aid of a neat sketch.

(12 marks)

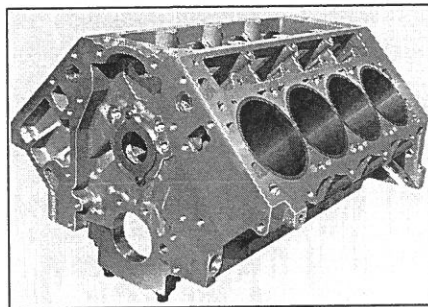


Figure Q1: Engine block

- (b) Brazing and welding is generally a process of joining two or more metals. Describe **THREE (3)** differences between brazing and welding process.
- (c) Using a simple sketch, explain the difference between fullering and edging process.

(6 marks)

(7 marks)

Question 2

- (a) Figure Q2 shows the product of one of the cold working process in metal forming. Describe the process with the aid of a neat sketch.

(8 marks)

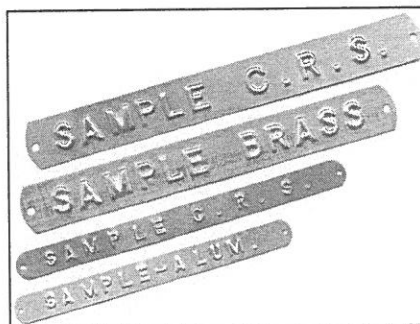


Figure Q2

- (b) Describe **THREE (3)** types of defects that commonly occur in welding processes with the aid of a neat sketch. (9 marks)
- (c) If you were asked to choose between cold and hot work for forging a crankshaft for a car, which method would you choose? Give **TWO (2)** advantages and **TWO (2)** disadvantages for your choice. (8 marks)

Question 3

- (a) Describe the functions of the following components in a lathe machine. Also sketch lathe machine and label each component (listed below) on your sketch.
- (i) Bed
 - (ii) Headstock assembly
 - (iii) Tailstock assembly
- (13 marks)
- (b) Describe **THREE (3)** advantages of GT (Group Technology). (6 marks)
- (c) Describe the following types of drilling operation:
- (i) Reaming
 - (ii) Counter boring
 - (iii) Tapping
- (6 marks)

Question 4

- (a) What is difference between piercing and blanking? Use neat sketches to support the description. (9 marks)
- (b) Is sawing one of the most efficient means of cutting metal? Explain why. (6 marks)
- (c) Describe the press forging process and its characteristics. Give **ONE (1)** advantage and **ONE (1)** disadvantage of press forging. (10 marks)

Question 5

- (a) Figure Q3 shows a bed-type milling machine. Explain briefly **THREE (3)** principal parts of the machine. (9 marks)

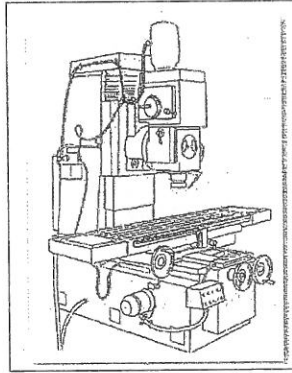


Figure Q3: Bed-type Milling Machine

- (b) What is Just-in-Time (JIT) in manufacturing system? State **THREE (3)** advantages of JIT in a manufacturing system. (8 marks)
- (c) Describe **FOUR (4)** types of machining operations that can be performed on a lathe. (8 marks)

Question 6

- (a) Two flat copper sheets, each 1.0 mm thick, are being spot-welded by the use of current 5,000 A of a current flow time of 0.25 seconds. The electrodes are 5 mm in diameter. Estimate the heat generated and heat distribution (loss) in the weld zone. Assume that the resistance is $100 \mu\Omega$. Copper density is $8,970 \text{ kg/m}^3$ and the heat required to melt 1.0 g of copper is 1,100 J. (Assume that the volume of weld nugget formed may regard as approximately 76% of the weld zone volume). (15 marks)
- (b) Describe the following tools that are used for bench work and fitting:
- (i) Scriber
 - (ii) Try square
 - (iii) Feeler gauge
 - (iv) Tap
 - (v) Die
- (10 marks)

-THE END-