MURANG'A UNIVERSITY COLLEGE

Constituent college of Jomo Kenyatta University of Agriculture and Technology

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL ENGINEERING

DIPLOMA IN PRODUCTION ENGINEERING CLASS:MRUC ME/14D(J)

END OF SEMESTER EXAMINATIONYEAR II-SEM II

PRODUCTION TECHNOLOGY & PRACTICE I-SEM1214

DATE: 28TH APRIL 2015 TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES.

Answer question **ONE*(Compulsory)*** and any other **TWO** questions.

Question One:

(a) (i) Define the term "powder metallurgy". (2 marks)

(ii) State any **four** reasons for using powder metallurgy in the manufacture of metallic shapes. (6 marks)

(b) Outline the procedure of holding a milling cutter on a milling machine. (10 marks)

(c) List **two** advantages and **two** disadvantages of shell moulding. (4marks)

(d) Describe the **four** steps of powder metallurgy process. (8 marks)

Question Two:

(a) State **four** differences between a capstan and a centre lathe. (4 marks)

(b) The component below is to be machined on a capstan lathe.

Prepare an operation sheet and sketch the tool layout. (12 marks)

(c) Distinguish between capstan and turret lathes. (4 marks)

Question Three:

(a) (i)Distinguish between up-cut milling and down-cut milling giving**two** advantages and**two**limitations in each. (6 marks)

(ii)A gear is to have 89 teeth. Determine the gear train for cutting the gear using the differential indexing method.

Plates available:16,17,18,19,20,21,23,25,27,29,31,33,37,39,41,43,47 and 49 holes.

Gears:20(2),28,32,40,44,48,56,64,72,86 and 100 teeth. (5 marks)

(b) With the aid of a sketch, describe the working principle of screw injection moulding and state **two** of its advantages. (9 marks)

Question Four:

(a) List **four** types of casting defects. (4 marks)

(b) Using sketches, describe the steps to be followed in the manufacture of the following products from metal powders.

(i) Self-lubricating bush bearings.

(ii) Tungsten carbide tips. (12 marks)

(c) With the aid of sketches, explain how metal powders may be produced by atomization method. (4 marks)