TECHNICAL UNIVERSITY OF MOMBASA

Faculty of Engineering & Technology

DEPARTMENT OF MECHANICAL & AUTOMOTIVE ENGINEERING

UNIVERSITY EXAMINATIONS FOR DEGREE IN

BACHELOR OF SCIENCE IN MECHANICAL ENGINEERING

EMG 2202: WORKSHOP PROCESSES AND PRACTICE

SUPPLEMENTARY/SPECIAL EXAMINATIONS

SERIES: MARCH 2014

TIME: 2 HOURS

INSTRUCTIONS:

- You should have the following for this examination:
  i) Answer booklet
  ii) Drawing instruments
  iii) Electronic calculator
- This paper consists of **FIVE** questions.
- Answer any **THREE** questions.

This paper consists of Three printed pages

QUESTION 1

a) i) Name the **TWO** types of drill jigs in use.
ii) Make simple sketches of the TWO drill jigs in (i). **(5 marks)**

b) i) You have been assigned the task of drilling holes on a cylinder head shown in figure 1. Design a drill jig for drilling the **FIVE** holes in the quickest time possible for a batch of 1000 components.
ii) Make a sectional sketch of your work set for drilling and label the main parts. **(8 marks)**

c) Make a neat block diagram of the radial arm drilling machine and label **SIX** main parts. Indicate the **THREE** main movements of the arm. **(7 marks)**

QUESTION 2

a) i) State **FIVE** benefits of using cutting fluids.
ii) State **FOUR** characteristics of a good cutting fluid.
iii) Name the **FIVE** types of cutting fluids. **(7 marks)**

b) i) Name **FIVE** work holiding methods on the lathe.
ii) Briefly explain the procedure of setting up a turning tool on the lathe tool post.
iii) With the aid of sketches explain the effect of setting the turning tool off-centre. **(9 ½ marks)**

c) With the aid of sketches briefly explain the procedure of turning short tapers wring the compound slide. **(3 ½ marks)**

QUESTION 3

a) i) Sketch the single point cutting tool and label the clearances.
ii) Explain the effect of increasing depth of cut to the cutting speed. **(7 marks)**

b) In a metal-cutting test under orthogonal conditions a lathe knife tool, rake angle 20^{o}, was used to machine the end of a steel tube of wall thickness 3.2mm, at a feed of 0.38mm/rev. The following data were obtained from the test:

Vertical cutting had 2440N
Axial thrust load 1100N
Average chip thickness 0.9mm

Determine:
i) The angle of inclination of the shear plane
ii) The friction force
iii) The coefficient of friction of the chip tool interface. **(13 marks)**

QUESTION 4

a) Make a neat labeled sketch of the knee turning tool holder, showing its application. **(6 marks)**

b) The component shown in Fig. 2 is to be made on the turnet from hexagonal bright mild steel of 25mm A/F:
i) Prepare the tooling schedule chart
ii) Sketch the tooling arrangement. **(14 marks)**

QUESTION 5

a) With the aid of sketches explain the principle of quick return motion mechanism of a shaper and outline its importance. **(7 marks)**

b) i) Illustrate the setting of thin workpieces on the machine vice.

ii) With the aid of sketches explain the precaution taken to avoid tilting of work in the machine vice of reshaper. **(8 marks)**

c) Explain briefly the procedure of stroke adjustment for the shaper. **(5 marks)**