UNIVERSITY COLLEGE TATI

UNIVERSITY COLLEGE TATI (UC TATI)

FINAL EXAMINATION QUESTION BOOKLET	
COURSE CODE	: BME 1053
COURSE	: WORKSHOP TECHNOLOGY & PRACTICE
SEMESTER/SESSION	: 1-2022/2023
DURATION	: 3 HOURS

Instructions:

1. This booklet contains 5 questions. Answer **ALL** questions.
2. All answers should be written in answer booklet.
3. Write legibly and draw sketches wherever required.
4. If in doubt, raise your hands and ask the invigilator.

DO NOT OPEN THIS BOOKLET UNTIL YOU ARE TOLD TO DO SO

THIS BOOKLET CONTAINS 6 PRINTED PAGES INCLUDING COVER PAGE

Answer ALL questions.

QUESTION 1

A good machinist should be capable of using all hand tools skillfully. Bench work or hand tool operations include the operation of laying out, fitting and assembling through filing, drilling, grinding, counterboring, countersinking and etc.

a) **List** four (4) types of files. (4 Marks)

b) **Clarify** and **illustrate** the grinding process. (5 Marks)

c) **Interpret** the differences between countersinking and counterboring. (6 Marks)

d) Figure 1 shows the drill failure. **Identify** four (4) causes of drill failures and **illustrate** how to solve those drill failures. (8 Marks)

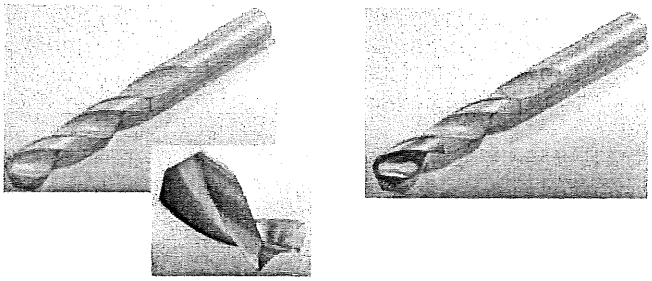

Figure 1: Drill Failure

QUESTION 2

One of the most basic machining processes is turning, meaning that the part is rotated while it is being machined. Turning processes typically are carried out on a lathe machine. These machine ade very versatile and capable of producing a wide variety of shapes.

a) **List** three (3) components of lathe machine. (3 Marks)

b) **Describe** about:

i. Depth of cut (2 Marks)

ii. Feed rate (2 Marks)

c) Knurling process as in Figure 2 is used to obtain a good surface. **Sketch** three (3) patterns of Knurling process. (5 Marks)

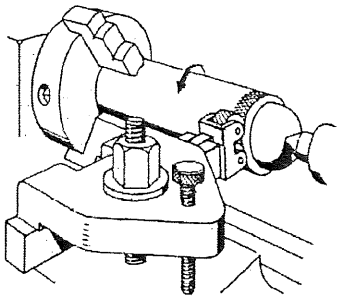

Figure 2: Operation X

d) **Identify** three (3) factors should be considered when selecting cutting speed. (6 Marks)

e) A 160mm long, 13.5mm diameter 304 stainless steel rod is being reduced in diameter to 13.0mm by turning on lathe. The spindles rotates at N= 450rpm. **Determine**:

i. Cutting speed at the outer diameter. (3 Marks)

ii. Cutting speed at the machined diameter. (3 Marks)

QUESTION 3

Cutting fluid is essential in metal cutting operation in which machining operations produce chips. Chiseling is not a machining operation and it does not require any cutting fluid during its operation.

a) **Illustrate** any one (1) of chiseling technique. (2 Marks)

b) Figure 3 interpret few types of cutting fluids and lubricants. **Interpret** two (2) characteristics of good cutting fluids. (2 Marks)

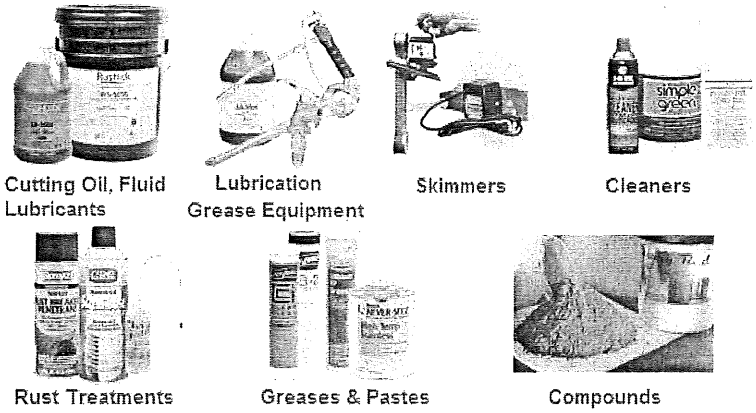

Figure 3: Cutting Fluids and Lubricant Equipments

c) **Distinguish** between three (3) basic types of chips formation. (6 Marks)

QUESTION 4

Computer numerical control (CNC) is a system in which a control microcomputer is an integral part of a machine.

Clarify four (4) advantages of CNC. (4 Marks)

Classify two (2) types of programming modes in CNC. (4 Marks)

Figure 4 shows a component to be machined. Using the absolute and incremental method, **designate** a program starting from point A for both systems respectively.

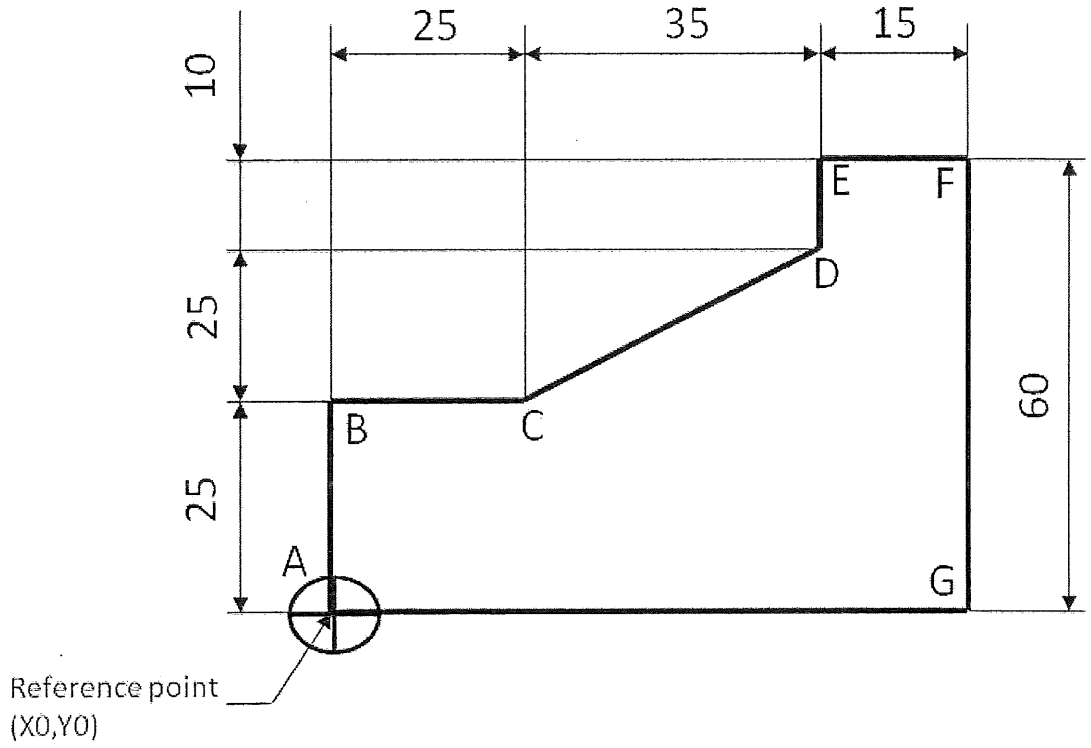

Figure 4: Component to Be Machined

(9 Marks)

QUESTION 5

Milling is one of the most versatile processes in which a rotating cutter removes material while traveling along various axes with respect to the workpiece.

a) **State** four (4) operations of milling machine. (4 Marks)

b) **Illustrate** and **explain** about flycutter. (4 Marks)

c) **Predict** possible causes of tool breakage problem during milling operations. (4 Marks)

d) **Determine** the r/min (RPM) required for 85mm diameter high speed steel milling cutter when cutting machine steel (CS 30 m/min). (6 Marks)

e) **Summarise** relative characteristics of climb milling and conventional milling. (8 Marks)

----------End of questions----------

Criteria	Marks
All question answered will be marked according to the answer scheme	/100