



MACHAKOS UNIVERSITY

University Examinations for 2020/2021

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

FIRST YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (MECHANICAL ENGINEERING)

EMM 104: WORKSHOP PROCESSES AND PRACTICES I

DATE: 16/6/2021

TIME: 2:00 – 4:00 PM

INSTRUCTIONS

Answer Question One and Any Other Two Questions

QUESTION ONE (COMPULSORY) (30 MARKS)

- a) A machine bracket shown in figure 1 is to be fabricated in the workshops out of a flat bar work piece of the 20mm by 60mm by 100 mm length.

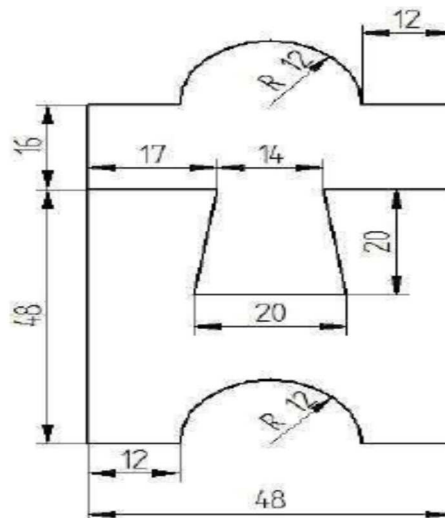


Figure1 : Machine bracket

- Outline the five hand tools required (2 marks)
 - Specify the four safety precaution when using the above hand tools (2 marks)
 - Explain the procedure required to fabricated this component (10 marks)
- b) Describe three causes of accident in the workshop (9 marks)

- c) With the aid of a sketch, explain the meaning of the term ‘draw filing’ (7 marks)

QUESTION TWO (20 MARKS)

- a) The plant layout of Jua Kali industry is as shown Figure 2 below. Of late management there is rampant fire outbreak. A Mechanical Engineer has been contracted to carry out an audit and give recommendation.

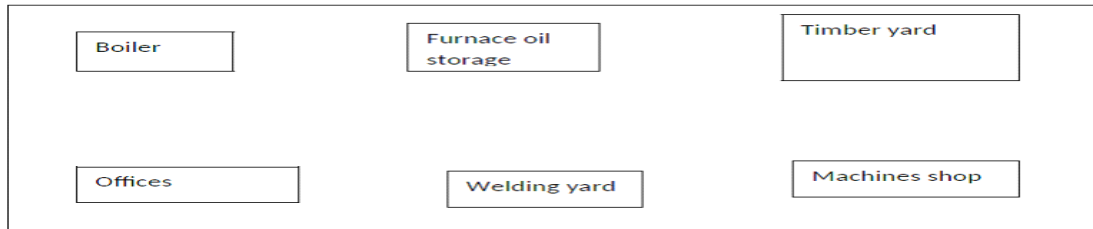


Figure 2 :Plant Layout of Jua Kali Industry

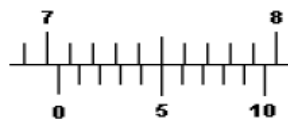
- i. Explain any four types of fires that can occur in this workshop (6 marks)
 - ii. Describe any four types of extinguishers required (8 marks)
- b) Using sketch show the following reading

i



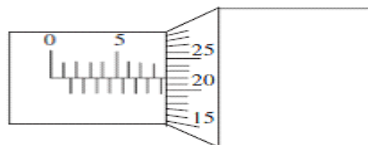
(2 marks)

ii



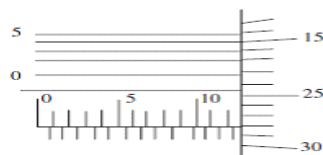
(2 marks)

iii



(2 marks)

Iv



QUESTION THREE (20 MARKS)

- a) A clearance fit has to be provided for a shaft and bearing assembly having a diameter of 40 mm. Tolerances on hole and shaft are 0.00 and 0.004 mm respectively. The tolerances are disposed unilaterally. If an allowance of 0.002mm is provided, find the limits of size for hole when

- Hole basis system (6 marks)

- Shaft basis system is used (6 marks)

- b) A Mechanical engineering student in Machakos University was given a project to joining components together as shown below in figure 3, After completing the job, he realized the joint was weak .

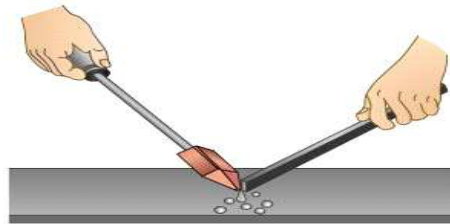


Figure 3: Joining process

As a Mechanical engineer, explained soldering techniques (8 marks)

QUESTION FOUR (20 MARKS)

- a) Using neat sketches, explain how a dial test indicator can be used to check for the following features in a component
- i. Parallelism (3 marks)
 - ii. Roundness (3 marks)
 - iii. Concentricity (3 marks)
- b) If a person receives an electric shock and is not conscious, what are the first two actions, one must take upon arriving at the scene of accident. (3 marks)
- c) Differentiate between brazing and soldering process (8 marks)

QUESTION FIVE (20 MARKS)

- a) Describe the working principles of surface gauge (5 marks)
- b) Explain the working principles of
- i) snap gauges
 - ii) plug gauges
 - iii) telescopic gauges (6 marks)
- c) Table 1 show the slip gauges available.

Table 1: Set of Slip Gauges

Range (mm)	Steps (mm)	No. of pieces
1.001 to 1.009	0.001	9
1.01 to 1.49	0.01	49
0.5 to 9.5	0.5	19
10 to 90	10	9
1.0005	-	1
	Total	87

Build the following

- i) 49.3825mm (3 marks)
- ii) 87.3215 mm (3 marks)
- iii) 35.4875mm (3 marks)