CHUKA **UNIVERSITY**

UNIVERSITY EXAMINATIONS

EXAMINATION FOR THE AWARD OF DEGREE OF BACHELOR OF SCIENCE IN ELECTRICAL AND ELECTRONIC ENGINEERING

EENG 111/EPHY 212: WORKSHOP PRACTICE I/WORKSHOP TECHNOLOGY

STREAMS: BSC **TIME: 2 HOURS**

DAY/DATE: MONDAY 16/12/2024 **2.30 P.M – 4.30 P.M.**

INSTRUCTIONS:

- This paper consists of **four** questions.
- Answer Question **one** and any other **two** questions.

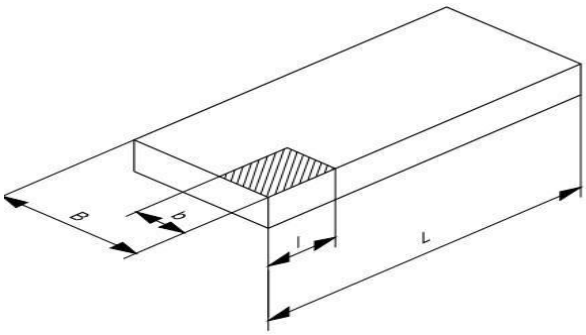
QUESTION ONE (30MARKS)

(a) (i) List any TWO causes of accidents in the workshop

(ii) Determine the length of copper wire in the roll, if the roll of copper wire weighs 8kg, the diameter of wire is 0.9cm and the density is 8.9 gm/cm^3 **(8 marks)**

(b) (i) Explain the main reasons of marking-out engineering component before working on them

(ii) A steel plate of 800 x 1400 mm is to be drawn to a scale of 1:20. What will be the lengths in the FigQ1(b) **(6 marks)**



FigQ1(b)

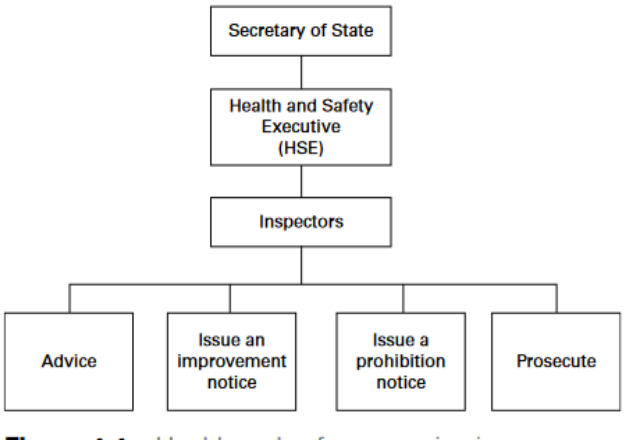
(c) Draw the following basic workshop tools and state their functions
(i) Engineer's file
(ii) Flat medium screw driver **(4 marks)**

(d) (i) State any TWO advantages of electrical portable tools over mechanical hand tools as used in the workshop
(ii) Distinguish between mechanical and adhesive joining as applied to making of joints in the workshop **(4 marks)**

(e) (i) Distinguish between Spray Foam and Dry powder types of fire extinguishers and their applications
(ii) Four 1000 W, 180-volt heaters are connected in series across 240 V supply and current carrying capacity is 15 amp, determine the total current and total power. **(8 marks)**

QUESTION TWO (20 MARKS)

(a) (i) State any TWO responsibilities of employees to ensure health and safety in their organizations
(ii) Distinguish between the I.E.E. regulations and workshop safety rules
(iii) Fig Q2 (a) shows the structures of health and safety organization, describe its operations with reference to industrial safety **(9 marks)**



FigQ2(a)

(b) (i)Fig.Q1(b) shows a right-angled bracket made from 1mm thick material, design and calculate the length of its development **(6 marks)**

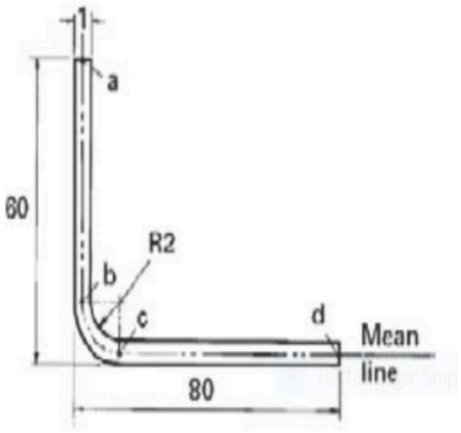


Fig.Q1(b)

(ii) With neat sketches enumerate how the turning operation is achieved on a lathe machine **(5 marks)**

QUESTION THREE (20 MARKS)

(a) With reference to bench marking -out of engineering components discuss the importance of the following functions:
(i) Datum
(ii) Co-ordinates **(6 marks)**

(b) (i) Fig.Q3(c) shows a Vernier caliper's reading of a width of a pipe, outline how the total length is obtained from the readings indicated on the Vernier calipers scales

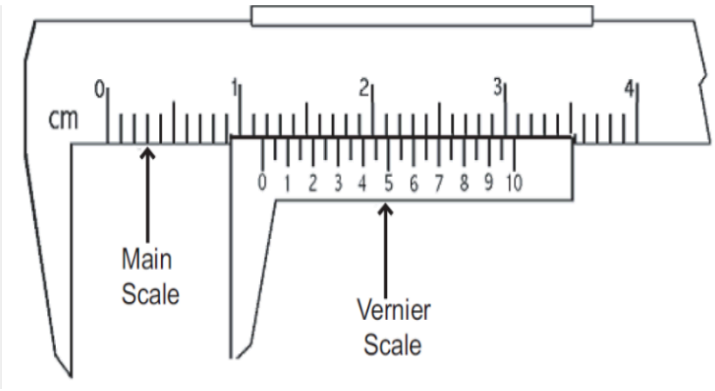


Fig.Q3(b)

(ii) Outline any FOUR steps followed when soldering electrical cable joints **(8 marks)**

(c) (i) Fig.Q3(c) shows a Micrometer screw gauge reading of external diameter of a round bar, calculate the total diameter measurement from the readings indicated on the Micrometer screw gauge scales and show how it is obtained

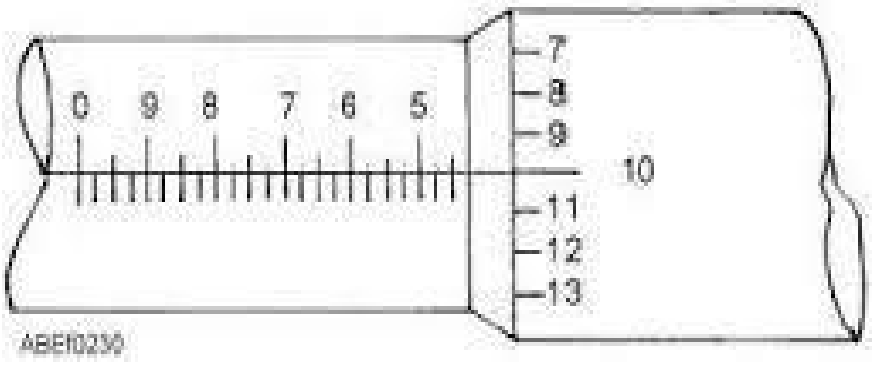


Fig.Q3(c)

(ii) State any TWO safety rules applied in a busy workshop **(6 marks)**

QUESTION FOUR (20 MARKS)

(a) With reference to measuring instruments distinguish between the following standards of measurements
(i) Limit of size and Upper deviation
(ii) Tolerance and Minimum material condition
(iii) Minimum and Minimum material conditions **(6 marks)**

(b) (i) A steel shaft of 25mm diameter is turned at a cutting speed of 50 metres per minute calculate the speed of the shaft
(ii) Find the time required for one full cut on a workpiece of 350mm long and 50mm in diameter if the cutting speed is 35 metres per minute and the feed is 0.5mm per revolution **(7 marks)**

(c)Distinguish between the following methods of joining sheet metal parts and state their applications:
(i) Soldering and riveting
(ii) Welding and brazing **(7 marks)**
