

- (d) The limits of a hole and a shaft are given as $31.00 \pm \begin{smallmatrix} 0.25 \\ 0.01 \end{smallmatrix}$ and $31.00 \pm \begin{smallmatrix} 0.18 \\ 0.02 \end{smallmatrix}$ respectively. Determine and sketch the type of the resulting fit.

(4 marks)

Candidates were given a drawing of a hexagonal chisel and they were to give the properties of a suitable material for making the chisel and also explain how to forge and heat treat it. In part (d), of the question candidates were required to determine the limits of a hole and shaft given their tolerances.

Expected Responses

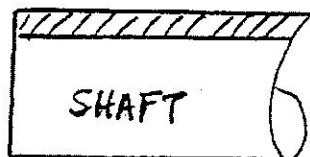
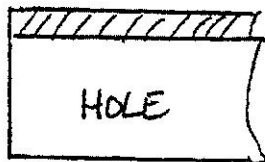
The properties of suitable materials for making the chisel should include toughness, malleability and high carbon content. The procedure of forging should include cutting the material, marking the blade length, heating the blade length and forging to shape.

In the heat treatment process, the cutting edge should be heated to red hot and allowed to cool in air. The cutting edge should be heated again to red hot and quenched in oil or water. Finally, the edge should be cleaned, heated to tempering colour and quenched in oil or water.

The following are the limits of the shaft and hole:-

- (d) (i) - Largest shaft = $31.00 + 0.18 = 31.18$
- Smallest hole = $31.00 + 0.01 = 31.01$

- Smallest shaft = $31.00 + 0.02 = 31.02$
- Largest hole = $31.00 + 0.25 = 31.25$
- Final fit = Transition Fit



19.2 PAPER 2 (445/2)

This practical paper was composed of detailed working drawings of a pipe vice together with a cutting list of materials required to make the vice. Candidates were expected to make each of the parts to specific size and shape and then assemble the parts together using different assembly methods in order to come up with different and functional vice. The following were the main skills tested in this project.

- The ability to read and interpret correctly all the working drawings provided
- Filing each part to the correct size and shape