



**UNIVERSITY OF SWAZILAND  
RESIT EXAMINATION PAPER**

**PROGRAMME: BSC ABE. II**

**COURSE CODE: ABE204**

**TITLE OF PAPER: WORKSHOP TECHNOLOGY**

**TIME ALLOWED: TWO (2) HOURS**

**SPECIAL MATERIAL REQUIRED: NONE**

**INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO  
OTHER QUESTIONS.**

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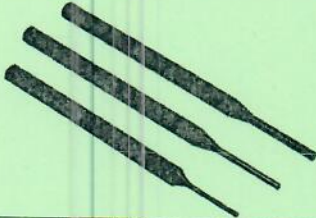
## SECTION I COMPULSORY

## QUESTION 1

- a) Tick the correct answer to the statements from the list provided [16 marks]
1. When holding soft and delicate material in a bench vice the material is protected from damage using  
(A) moveable jaw (B) shoe clamps  
(C) galvanised metal (D) jaws
  2. Aluminium is the best material for electricity transmission over long distances, because it is  
(A) Light in weight (B) good conductor of electricity  
(C) Corrosion resistant (D) All of these
  3. A diamond pointed chisel is used for cutting  
(A) Flat surfaces (B) Grooves  
(C) Key-ways (D) V-shaped grooves
  4. The cold chisels are made from  
(A) Cast iron (B) Mild steel  
(C) High speed steel (D) Cast tool steel
  5. Low carbon steel that has been shaped by hot-working tends to  
(A) Become work hardened; (B) Remain soft and ductile;  
(C) Have an improved surface finish; (D) Have increased elasticity.
  6. The purpose of tempering a hardened steel component is to  
(A) improves its malleability; (B) improve its toughness;  
(C) increases its hardness (D) increase its ductility
  7. Hermaphrodite (odd-legged) callipers are used to scribe  
(A) circular lines; (B) lines parallel to an edge;  
(C) lines perpendicular to an edge; (D) irregular profiles.
  8. A fixed point, line, edge or surface from which a measurement can be made is known as a  
(A) coordinate; (B) centre;  
(C) datum; (D) dimension line.



b) Name the tools in the Table and state their intended functions. [16 marks]

	IMAGE	NAME	FUNCTION
1			
2			
3			
4			

c) What reading is shown for the opening of the Vernier calliper in Figure 1? [4 marks]

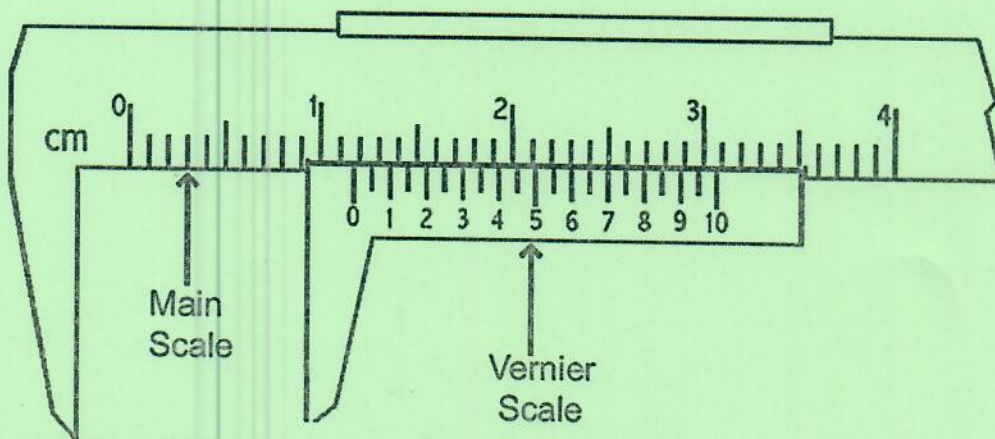


Figure 1 Readings of a Vernier calliper

d) Name the steels that constitute the group of Plain Carbon Steel. [4 marks]

## SECTION II ANSWER ANY TWO QUESTIONS

## QUESTION 2

- a) Grid electricity has made the operation of agricultural workshops very productive. What are the advantages and disadvantages of using power tools? [8 marks]
- b) Name the common types of teeth-set. [4 marks]
- c) Discuss the functions of tooth-set during the cutting of materials [6 marks]
- d) Figure 2 shows three points of cold chisels for workshop activities.
- (i) Name the chisels [6 marks]
- (ii) What are the uses of each of the chisels in Figure 1? [6 marks]

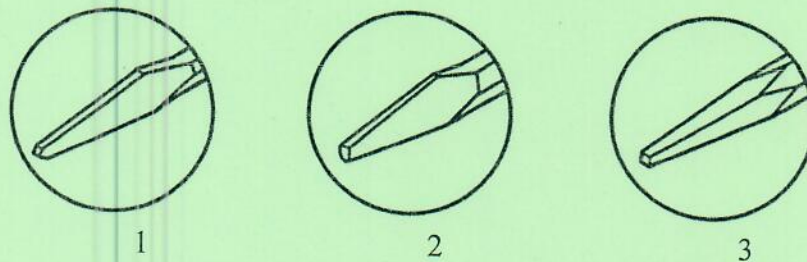


Figure 2. Three types of cold chisels

## QUESTION 3

- a) Distinguish between ferrous and non-ferrous metals. [4 marks]  
Give three examples of metals in each category of metals. [6 marks]
- b) Briefly explain the following terms as used in heat treatment of steel:
- (i) Tempering; [3 marks]
- (ii) Annealing; [3 marks]
- (iii) Quenching; and [3 marks]
- (iv) Case hardening. [3 marks]
- c) Why are common metal tools made from hard carbon steels or high speed steels instead of mild steel? [8 marks]

## QUESTION 4

- a) What advantages do the drill presses have over portable drill press?  
[6 marks]
- b) Figure 3 shows a stationary drill press whose power is transmitted using belt-pulley drive system. The belt connects 100 mm motor pulley to 150 mm spindle pulley. The motor runs at 1500 rpm to drive the spindle.

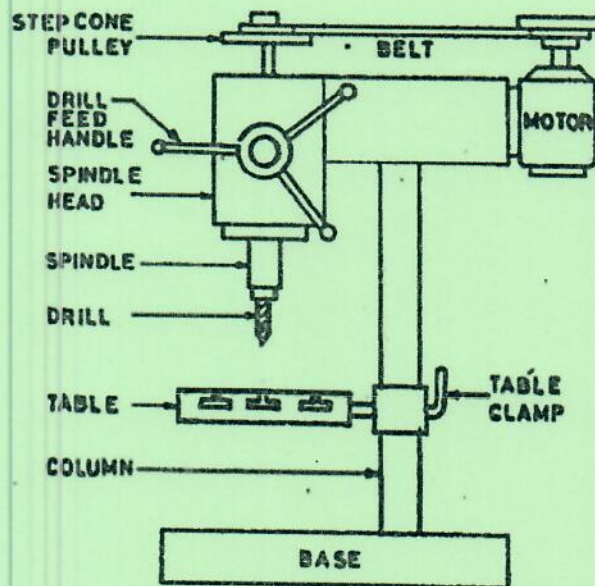


Figure 2. a bench drill with its drive mechanism

- i. Determine the gear ratio. [5 marks]
  - ii. Calculate the speed of the drill connected to the spindle. [5 marks]
  - iii. The amount of material removed from 5 mm thick material using a 10 mm drill. [8 marks]
- c) Explain why it is usual to mark the position of a scribed line with a series of fine indentations (dots). [6 marks]