

**FEDERAL UNIVERSITY OF TECHNOLOGY, MINNA,
SCHOOL OF SCIENCE AND TECHNOLOGY EDUCATION,
DEPARTMENT OF INDUSTRIAL & TECHNOLOGY EDUCATION,
FIRST SEMESTER 2022/2023 EXAMINATION**

COURSE CODE: - ITE 215

COURSE TITLE: - METALWORK TECHNOLOGY

TIME ALLOWED: - 2 HOURS.

INSTRUCTION: - ATTEMPT FOUR (4) QUESTIONS ONLY.

- (1a). Why do we need precision measuring tools?
 - b. Using a neat diagram of micrometer screw gauge describe the following parts of a micrometer: Anvil; Spindle; Sleeve; Thimble; Ratchet stop.
 - c. Briefly explain the three main categories of machine tools used in the metal industries.

- (2a). Explain the following Mechanical properties of metals: Malleability; Hardness; Plasticity; Fusibility; Hardenability.
 - b. Annealing and Normalizing processes appears to be the same to a non-metal specialist, clearly differentiate between the two processes.
 - c. State the functions of the following machine tools: Lathe; Milling; Drilling; Shaper; Grinding.

- (3a). Outline five (5) ways of caring for micrometers
 - b. Briefly describe a vernier caliper with reference to main scale; vernier scale; Jaw (fixed & movable); clamp screw and measuring surfaces (inside & outside work).
 - c. List five (5) types of casting processes that may be available in metal working industries.

- (4a). Briefly discuss hardening, tempering, and case hardening as heat treatment process
 - b. Using relevant sketches, differentiate between bending and welding as a forging process
 - c. Draw the following rivets: Snap head, countersunk head, pan head, flat head and conical head.

- (5a). Differentiate between the following gauges using relevant sketches:
Plug; Ring and Snap gauges
 - b. Outline five (5) relevant precautions to be observed in order to preserve the accuracy and life of gauges.
 - c. List four (4) other gauges used in the metal workshop.

- (6a). Two (2) students on fieldtrip were involved in an argument on differences between forging and casting and consulted you as a metalwork specialist, explain to the students clearly the differences between the two processes.
 - b. With the aid of neat sketches differentiate between drawing down and upsetting as forging processes.
 - c. Briefly describe five (5) common tools required for sand casting

GOOD LUCK