

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA  
DEPARTMENT OF INDUSTRIAL AND TECHNOLOGY EDUCATION  
SECOND SEMESTER EXAMINATION 2019/2020  
COURSE TITLE: MATERIALS AND FUNDARY TECHNOLOGY  
COURSE CODE: ITE 382

INSTRUCTION: Answer four question, two from each section  
DURATION: 2hr:20mins

**SECTION A: MATERIAL TECHNOLOGY**

- 1a. Explain the operation of the bassemer converter and the production of steel.  
1b. Write short notes on the following  
(i) Charging position of the bassemer (ii) Blowing position (iii.) Pouring
- 2a. Using carbon-tensile stress graph, explain how gradual increase in carbon affects the following property of steel.  
(i) Hardness (ii) Strength (iii) Malleability (iv) Ductility
- 2b. Explain in detail the following concepts as it pertains into internal constitutions of steel.  
(i) Ferrite (ii) Pearlite (iii) Martensite (iv) Austenite (v) Cementite
- 3a. Using heating and cooling curves diagram explain the internal changing that take place in steel
- 3b. Discuss the following  
(i) Process annealing (ii) Lower critical points and upper critical points (iii) Critical range  
(iv) Points ofrecalescent and decalescent (v) Annealing and normalizing

**SECTION B: FOUNDRY TECHNOLOGY**

- 4a. Explain foundry sands in terms of types, importance, controlling, handling and preparation for quality casting exercise.
- 4b. Identify six (6) properties of moulding sand and critically discuss each properly
- 5a. Discuss the following sand testing processes in foundry and how they are achieved  
a. Gravity casting b. Sand strength c. Centrifugal casting d. Sand casting e. Die casting  
(use sketches to support your explanation)
- 5b. In constructing a patterns certain factors are taking into consideration for the purpose of allowance. Identify those factor and explain them
- 6a. The following are problems usually associated with sand casting. Explain what they are, their causes and probable remedies.  
(a) Shrinkages (b) Porosity (c) Misruns and cold shuts (d) Excessive grain size (e) Inclusion