

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 bassemmer converter and the production of steel.
- 1b. Write short notes on the following
 - (i) Charging position of the bassemmer (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 of recalescent 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