ELIZADE UNIVERSITY, ILARA-MOKIN, ONDO STATE, NIGERIA

DEPARTMENT OF MECHANICAL ENGINEERING

FIRST SEMESTER EXAMINATIONS

2019/2020 ACADEMIC SESSION

HOD'S SIGNATURE

COURSE: MEE 301 – Manufacturing Technology (3 Units)
CLASS: 300 Level Mechanical Engineering
TIME ALLOWED: 3 Hours
INSTRUCTIONS: Answer any **FIVE** questions

Date: February, 2020

Question 1

a. Describe the term "Metal Fabrication" and identify the 5 most common stages/processes of the metal fabrication with a brief explanation of just ONE of the process **(4 Marks)**
b. Briefly differentiate between THREE modern methods of cutting in metal fabrication **(3 Marks)**
c. Differentiate between "Metal Spinning" and "Deep Drawing" fabrication methods and identify any three methods that can be used to assemble products during metal fabrication **(3 Marks)**
d. What are core prints used for and state any four properties of moulding sand **(2 Marks)**

Question 2

a. Identify FOUR different reasons why casting is preferred to other manufacturing methods **(2 Marks)**
b. Differentiate between "pattern", "mould" and "core" in casting. Describe any three different types of pattern commonly used in casting **(5 Marks)**
c. Identify any FOUR allowances provided in a pattern and briefly discuss any one of them **(3 Marks)**
d. State the four moulding process and classify core into 4 different ways according to how it is being positioned in the mould **(2 Marks)**

Question 3

a. Identify any THREE tests that can be carried out on moulding sand and briefly discuss any one of it **(2 Marks)**
b. Identify the five main types of furnace used in foundries and briefly describe any one of your choice **(5 Marks)**
c. State the effects of low pouring rate and high pouring rate in casting? Hence, describe optimum pouring rate in casting **(3 Marks)**
d. Briefly explain any two common defects in casting and state any two ways of cleaning casting **(2 Marks)**

Question 4

a. Identify all the essential components of a typical gating system with the aid of a well labelled diagram in casting and briefly explain the function of any three of them **(4 Marks)**
b. State any FOUR different types of casting process available and briefly explain any ONE out of it with the aid of simple sketches **(3 Marks)**
c. Identify the four bulk deformation process in metal forming and briefly describe any ONE of your choice with the aid of well labelled diagram **(2 Marks)**
d. Briefly differentiate between the three types of forging operation, with the aid of well labelled diagram, according to the degree to which the flow of metal constrained by dies **(3 Marks)**

Question 5

a. A cylindrical workpiece is subjected to a cold upset forging operation. The starting piece is 75mm in height and 50mm in diameter. It is reduced in the operation to a height of 36mm. The work material has a flow curve defined by K = 350 MPa and n=0.17. Assume a coefficient of friction of 0.1. Determine the force as the process begins, at intermediate heights of 62 mm and at the final height of 36 mm. **(4 Marks)**
b. Differentiate between the following types: **(3 Marks)**
   i. two types of drop hammers in forging
   ii. direct and indirect extrusion
   iii. impact and hydrostatic extrusion
c. Describe fusion welding and state the three groups of fusion welding commonly available with the aid of simple sketches **(3 Marks)**
d. Identify any four types of weld joints with the aid of simple sketches **(2 Marks)**

Question 6

a. Briefly differentiate between "resistance welding" and "laser welding" with the aid of simple sketches **(4 Marks)**
b. Identify and sketch any three work holding and any tool holding devices used in a drilling machine and state the importance of flutes in a twist drill **(4 Marks)**
c. Describe trepanning process and state the formulae for drilling cutting speed, cutting feed, depth of cut and machining time **(2 Marks)**
d. Differentiate between "GRIT" and "BOND" in grinding process **(2 Marks)**

Question 7

a. Identify the sequence of ISO coding marking system in a typical grinding wheel and state any four factors which affect the selection of a grinding wheel **(4 Marks)**
b. Describe the process of sounding for cracks in a grinding wheel, and state the importance of dressing in a grinding wheel **(2 Marks)**
c. State the formula for calculating work speed in Grinding operation with its parameters **(2 Marks)**
d. Describe any five common hand tools, with the aid of sketches, used in a foundry. Briefly differentiate between foundry crucible, ladle and moulding box **(4 Marks)**