Note: answer all the following equations

Q1: A: By sketch show the primary difference in ferrous metals with principle processes for re-melting or refining pig iron, and explain with details and drawing the furnace which used to convert the type that contain more than 2.5% of carbon?

(17 marks)

B: Calculate the impression diameter that appear by 2000kg weight on a piece of steel iron in

1- Brinell test when the diameter of ball used was 10mm and (Brinell Hardness Number was 300).
2- Vickers test when (Vickers Hardness was 400).

(6 marks)

Q2: A: Explain in detail the process of the production of lead, with drawing up to the sintering process only?

(17 marks)

B: The following curve represents the reading obtained from amplifier roughness surface gauge by taking the step 1mm find
1- Arithmetical average.
2- Root mean square average.
3- The sample length.

(6 marks)

Q3: A: Defined the welding process and what are the most important methods, explain in detail the methods that are used electrical current with drawing?

(10 marks)

B: In rolling process for Aluminum rod diameter (30 cm) the reduction was 30%, the normal force have angle (25°), the frictional force was (170N), calculate
1- the roll radius
2- the resistance force
3- approximate contact length

(10 marks)
Q4: A: Define both of the hot and cold process and what are the advantage and disadvantage for each? (10 marks)

B: from the (T - V) curve for the turning tool made of steel found that the angle of curved cutting edge (25°) and the tool life is (100 min) for cutting speed of (60 mm/min). Calculate the age of the cutting tool and how many times you need to sharpen when use to turning shaft of Aluminum alloy with the length of (400 mm), diameter of (60 mm), the speed of rotation is (300 r.p.m) and feed of (0.01 mm/rev).

Q5: Answer one of the two equations

A: Classified in detail materials which use to make Stones Grinding? (14 marks)

B: what are the important types of the hot working processes with an explanation of the way which used to produce different shapes of copper rod with drawing? (14 marks)

-Good Luck-