



Date: 9-6-2015

Allowed time: 3 Hrs

Examiner: Dr. Saad B. H. Farid

Note: Attempt 5 questions

- Q1:
- Describe the term 'microstructure'
  - How traditional ceramics, pottery, sculpture, sanitary ware, tiles, etc., are characterized?
- Q2: Draw Differential thermal analysis (DTA) and thermo-gravimetric analysis (TGA) of two kaolinites with different degrees of crystallinity
- Q3: Distinguish between *crystalline* solids versus *amorphous*, *glassy*, or *noncrystalline* solids.
- Q4: Briefly distinguish between earthenwares and stonewares
- Q5: Explain Thermodynamics of sintering
- Q6: Show the Batch Calculations for the glass composition of  $10\text{Na}_2\text{O}-5\text{Al}_2\text{O}_3-35\text{SiO}_2$ .  
Assume that  $\text{Na}_2\text{CO}_3$  is the source of  $\text{Na}_2\text{O}$ .

Oxide	MW
BaO	153.40
CaO	56.10
PbO	223.20
$\text{Li}_2\text{O}$	29.80
MgO	40.30
$\text{K}_2\text{O}$	94.20
$\text{Na}_2\text{O}$	62.00
ZnO	81.40
$\text{Fe}_2\text{O}_3$	160.00
MnO	71.00
$\text{TiO}_2$	79.70
$\text{P}_2\text{O}_5$	142.00
SrO	103.60
$\text{ZrO}_2$	123.20
$\text{H}_2\text{O}$	18.00
F	19.00
$\text{B}_2\text{O}_3$	69.60
$\text{Al}_2\text{O}_3$	102.00
$\text{SiO}_2$	60.10

**GOOD LUCK**