NPTEL MOOC COURSE ON

Advanced Topics in the Science and Technology of Concrete

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OVERVIEW – Week 1

**Calcium sulfoaluminate cement-based binder: Properties and application** – Prof. Piyush Chaunsali

**Micro-structural characterisation of cementitious materials - Part 1** – Prof Karen Scrivener

**Micro-structural characterisation of cementitious materials - Part 2** – Prof Karen Scrivener

**Micro-structural characterisation of cementitious materials - Part 3** – Prof Karen Scrivener
Q) The major phases in the CSAB cement are ______________

a) Ye’elimite, Belite, Alite, Calcium alumino ferrite
b) Ye’elimite, Belite, Calcium Sulfate, Calcium alumino ferrite
c) Belite, Alite, Calcium sulfate, Calcium alumino ferrite
d) Ye’elimite, Alite, Calcium Sulfate Calcium alumino ferrite

Q) The phases patented by Alexander Klein is _____________

a) Ye’elimite
b) Calcium alumino ferrite
c) Belite
d) Alite
Q) The M value indicates ratio of___________

a) Ye’elimite to Gypsum
b) Gypsum to Ye’elimite
c) Belite to Gypsum
d) Gypsum to Alite

Q) With increasing compressive strength, concrete generally becomes _____________

a) More brittle
b) More ductile
c) More tough
d) Less stiff
Q) Match the following with respect to their interaction in SEM

<table>
<thead>
<tr>
<th>1) BSE</th>
<th>I. Caused due to the electrons transitions within the atom</th>
<th>a) 1)II, 2)I, 3)III</th>
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</thead>
<tbody>
<tr>
<td>2) X-rays</td>
<td>II. Electrons that are elastically rebounded from the atom</td>
<td>b) 1)III, 2)II, 3)I</td>
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<tr>
<td>3) Secondary electrons</td>
<td>III. Electrons that are knocked off from the upper layer of atoms</td>
<td>c) 1)I, 2)II, 3)III</td>
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Q) The slump loss of CSA cement concrete is higher than that of Portland cement concrete.
   a) True
   b) False
Q) Which of the following can be used to determine the pore structure__________

a) Proton NMR  
b) MIP  
c) XRD  
d) TGA  

Q) In chemical shrinkage testing, samples of high thickness are preferred. YES/NO.

Q) Which is the best method for hydration stoppage?
   a) Oven-drying  
   b) Freeze-drying  
   c) Solvent exchange  

Q) What's preferred □ front loading/back loading?.  


Q) Hydration stoppage results in the change in morphology of ettringite but does not change its crystallinity

a) Yes
b) No

Q) Which of the following is emitted from the area closer to the surface of the samples

a) Secondary electrons
b) Backscattered electrons
c) X-Rays

Q) Arrange in the increasing order by depth over which interactions occur with the electrons in SEM.

a) X-rays < SE < BSE
b) SE < BSE < X-rays
c) BSE < X-rays < SE
Q) Which of the following is a Non-Destructive Test (NDT)
   a)  MIP
   b)  Proton NMR
   c)  XRD
   d)  SEM

Q) As age of the sample increases,
   a)  Interlayer water increases, capillary water decreases
   b)  Interlayer water decreases, capillary water increases
   c)  Interlayer water and capillary water decreases
   d)  Interlayer water and capillary water increases
Q) In a Proton NMR, the pores in the cementitious sample must be
   a) Dry
   b) Wet
   c) Partially dry
   d) None of the above

Q) The ink bottle effect relates to ___________
   a) Sudden filling of a small sized pore after a large sized pore
   b) Sudden filling of a large sized pore after a small sized pore
   c) Filling up of all pores when a critical pressure is reached
THANK YOU