Rak-83.3200 Composite structures exam 26.5.2016

Everybody had to leave the exam papers there, but these questions were written down immediately after leaving the exam.

Exam material:

- Parts of Eurocode 1994-1-1 and 1994-1-2

Questions:

1. Explain m-k method in composite slabs
   a. Pro tip: some hints can be found in the exam material 1994-1-1, at the very end. Something to do with longitudinal shear capacity of a slab.
2. Shear connections
   a. Explain the meaning of points A, B and C in graph
      i. Pro tip: the figure is in the exam material 1994-1-1
   b. How can you calculate shear force taken by shear connectors with linear method?
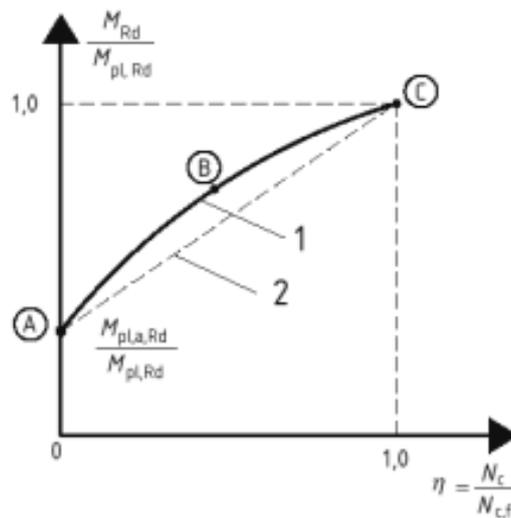
3. Calculate compression resistance of concrete filled tube column. No normal force given, no eccentricity. Column height 5 m, simply supported in both ends. All material values given. Buckling imperfection curve values and buckling coefficient equations given. Plastic compression resistance and buckling.
   a. Pro tip: remember how to calculate second moment of area of a circle... You need it for the value of I for concrete.
4. HEA160 beam and concrete slab, beam covered with 15 mm insulation. Material values given.
   a. Calculate the temperature profile of the beam after 60 minutes in a fire
   b. How long can the structure last in the fire?