Storm Runoff

Directions: Below are questions related to calculating the storm runoff associated with a 100-year precipitation event that occurred in Bloomington-Normal in July 2003. For your information, the area of the drainage basin above the point of measurement was 52 km². The 100-year rain event produced 8.2 in, with an average intensity of 1.8 in/hr. The soils of the drainage basin are classified as hydrologic group B with an average land slope of 1.8%, and are have been used primarily for conservation tillage. The hydraulic length of the stream is 11 km. A storm hydrograph is presented on page 2. Using the data answer the following questions to the best of your abilities. Where appropriate, show all of you work and use significant figures. I would suggest that you solve the problems by using Excel.

1. On the storm hydrograph delineate the runoff using the three baseflow separation techniques. Please label the methods or use different colored lines. Which method would calculate the highest runoff, and which method would provide the lowest runoff?

2. Explain what the hydrologic conditions that three different methods represent.

3. Which method would you prefer? Explain (GRADAUTE STUDENTS ONLY)

4. Using the SCS curve number procedure, calculate the runoff attributed to the storm. Calculate the runoff for AMC I, AMC II, and AMC III.

5. Calculate the peak runoff rate for the storm using both the rational equation and the graphical method.

6. Compare the values for peak runoff. Are they similar? If not, explain what may account for the difference.

For the second half of the homework, you will begin reducing the data that was obtained from the fieldwork.

7. Using the stream gaging data, compute the discharge at the two cross-section. Please provide a graph showing the depth of water and the water velocity across both profiles. Follow the instructions on the handout to set up the excel sheet.

8. Compare the number you have for the discharge. Are the numbers similar? What may explain any differences between the numbers?

9. Begin reducing the surveying data. I have provided you with the location for your original base station. Please calculate the elevation the x and y location for each point surveyed.

   For those whose groups began at LK8. Elevation = 229.282 m, x = 55.398 and y = 208.503

   For those whose groups began at well 101. Elevation = 230.225 m, x = 00.00 and y = 00.00