Name :   Roll no. :

1. Answer all questions.
2. All parts of a particular question should be answered together.
3. Credits will be given for neat and to-the-point answering.
4. Unnecessary / confusing words are liable to negative marking.

1. MTU (Maximum Transfer Unit) defines the size of a packet that you can send to a target in Internet   (5)
   through a specific path without the packet getting fragmented into smaller packets. So, if you try to send
   a packet of size bigger than the MTU, you will get a message that your packet would be fragmented.
   This way, you can find the MTU of a specific path is by trying to send packets of increasing size until
   you get the fragmentation message.
   Suppose you have to determine X, which is the MTU of some path, and X could be potentially huge.
   Give an efficient algorithm to determine X and give its complexity in terms of X. (Remember, you do
   not know the value of X beforehand)

2. Water flows into Hoover dam at a variable rate throughout every month (i.e., 30 days: the tidal cycle)   (8)
   and water is released at a regular interval (once every month). You have the detailed water level data
   for a period of 30 consecutive days (not necessarily a calendar month, and not necessarily starting or
   ending with the time of releasing the water).
   Give an efficient algorithm to find out exactly when the water was released. (Assume there are no
   leakage, usage, groundwater absorption or evaporation losses. Also, you may assume that the water is
   released instantly, and the monthly average of water level does not increase).

3. In a social gathering, there are b boys and g girls (b>g) of different ages. You have two unsorted arrays (7) giving their ages (one for the boys, the other for the girls). Devise an efficient algorithm to find out the ages that are common between both the boys and girls.