

1. Specifically the electronics, what are the most compatible electronics? A 12 volt power supply? Specifically what are the standard electronics?
Visit http://reprap.org/wiki/RepRap_Options and scroll down to "Electronics" for details on standard electronics. Specifically, research the RAMPS AND RAMBO microcontrollers.
2. Does the size and mass for the nozzles on the PRP mean the entire printer head including the nozzles?
Yes
3. Can we take apart one of the printer heads to see how look at the inside of one of them?
Remind me next Friday, and I'll try to find an old one that we can sacrifice. However, the RepRap web site will have lots of useful information under "Section 6 Extruder".
4. What do you think would be a good product to help us benchmark? We have to do an assignment for benchmarking and there isn't much information specifically on printer heads, just 3D printers themselves, but that information won't really help us with our project. Do you have any advice as to what we could benchmark to?
You can benchmark against the 3D printers by looking at their specifications for maximum temperature (usually ~280C), the material that they can print (lower temperature materials such as ABS, PLA, nylon versus higher temperature materials such as ULTEM), and the material form (filament only). MakerBot is viewed as the market leader.
5. We came up with some design challenges and were wondering if you think they are the most difficult design challenges we will have:
 - a. Controlling the heat – make sure it stays within confined area and doesn't affect the pellets
 - b. Feed mechanism – how are we going to drive the pellets? If we use an auger bit how are we going to machine it?
 - c. Transferring Pellets/Location of feedstock – how will the pellets be held?
 - d. Are we designing for a base that is still with a moving head or moving base with a still head?

That seems like a good list for now. There are always things that pop up as a project evolves. You just have to roll with the punches as they come.

6. 10 hour print time: how many times?
Just once. If it can print for 10 hours, it should be fine.
7. In regards to cleaning out a clogged nozzle, what is an ideal clean out time?
I wouldn't worry too much about cleaning time, but 15 minutes would be a reasonable target.
8. What is the average flow rate of the extruded filament?

Most of these printers print material using a head translation speed of anywhere from 30-100 mm/sec. On average, the velocity of plastic coming out of the nozzle should approximately match the head translation speed. If the nozzle diameter is 0.4 mm, then you can calculate the cross sectional area of the bead coming out of the nozzle. Multiply that area (mm^2) by the velocity (say 100 mm/sec), and you've got an estimate for volumetric flow rate in mm^3/sec .

9. On a 1-3-9 scale, how important is it to have “off the shelf components” so that hobbyist can easily build a printer head?

I would give that a 6-7. It's not all that important that a hobbyist be able to make the parts him/herself, but it's extremely important that all parts be machinable in a reasonably equipped CNC machine shop.

10. Can you send us the Dublin university report information?

I haven't been able to locate it yet, but I'll keep looking.

11. Do you have the previous 3D printer head model that the female student you said was working on last summer? We would like to look at it more in depth and see how she incorporated the auger screw.

Ask me when we meet next Friday, and I'll see what I can find.