

Jan 15th, 2014

P340: Homework Assignment No. 1

DUE DATE: Wednesday, Jan 28th, 2014

Please note that late assignments will not be marked

(1) Material Objects: Demokritus vs Aristotle: Aristotle and Demokritus came up with 2 quite different views on the nature of matter. Aristotle argued that a complete understanding of any physical object could be attained once the 4 'Causes' of that object had been exhaustively described. He also described the Material Cause in terms of 5 elements. Demokritus argued that a material object could be completely characterized and understood once one knew which 'atoms' made it up, and in what way the atoms were arranged together.

(i) Explain what Aristotle's theory was, explaining (a) what the 4 Causes were, and (b) the role of the elements in this theory. Then illustrate what you have said by explaining, in as much detail as you can, what you think are the 4 causes for (a) a stone on the seashore, and (b) a clock. Do you think this does give a complete characterization of these objects? If not, what in your opinion is missing?

(ii) Now describe what were the main features of the theory of Demokritus - and the arguments he gave for them. Then explain (a) how Demokritus would describe the make-up of a solid crystal, of a liquid, and of a gas; and (b) what would be involved, according to the atomic theory, in our sensations of objects (for example, using vision, touch and taste). Finally (c) do you think his theory does give a complete characterization of physical objects? If not, what in your opinion is missing?

NB: You will find it helpful to use diagrams in this question!

(2) The Cosmos: Aristotle and Ptolemy: Aristotle and Ptolemy were both interested in explaining the phenomena seen in the sky using the naked eye - the stars, the sun and moon, and the planets, and how they moved.

(i) First explain the theory of the cosmos as sketched by Aristotle. You should not only describe his theory of the cosmos in detail, but also discuss how it related to his views on dynamics - what made objects move, what slowed them down, and how all of this related to his ideas about Material Cause.

(ii) Now explain in detail how the epicycle theory, in the later form developed by Ptolemy, was supposed to work. You should use pictures to help explain your argument, and include a discussion of the equants.

Then describe how this was supposed to explain the motion of a planet like Jupiter. First show how Jupiter appears to move in the sky as seen from earth, and then describe in detail how the Ptolemaic epicycle theory was supposed to explain the observed motion of Jupiter.

NB: You will also find it helpful to use diagrams in this question!

(3) Building Blocks, Change, and Permanence: Both the Greek philosopher Heraclitus, and Siddhartha, argued that a fundamental feature of the universe is change - that in fact permanence is an illusion, and that nothing is permanent - not matter, nor even the universe. This argument seems to have an obvious flaw, noted by Plato and others - that to define change at all, one needs to change between things that do not change.

Modern physics has found that none of the things that we are aware of in our direct experience are unchanging - they are all created and destroyed. However it has also found that there is an underlying set of fields (the "elementary particles") of which everything is composed, that do not change.

Write an essay of roughly 400 words explaining your point of view on this question, viz. on whether it is possible to argue that everything changes - and if so, how do you deal with Plato's objection?