

Study questions on Descartes (*Principles of Philosophy* and commentary - Huggett, Chapter 6)

1. Why don't we have to worry about being deceived by "clear and distinct" perceptions, according to Descartes?
2. What is the essence of corporeal substance? What is the essence of thinking substance?
3. Is there a difference between an extended body and an extended space, according to Descartes?
4. Why does Descartes think that, in relation to different bodies, we may say that the same thing is both changing and not changing its place at the same time?
5. What is the distinction between "internal place" and external place", according to Descartes?
6. What do variation and diversity in matter depend on?
7. How does Descartes define "motion"?
8. Does Descartes think it takes more action to move a body than to keep it at rest?
9. What is Descartes' first law of motion?
10. How does Descartes' first law of motion resolve Aristotle's problem of describing projectile motion?
11. What is Descartes' second law of motion?
12. How does Descartes avoid Aristotle's objection to the identification of place with matter?

Study questions on Newton (*De Grav* and *Principia* - Huggett, Chapter 7)

De Gravitatione

1. Why is the tendency of the Earth to recede from the Sun hard to explain on Descartes' relational theory of motion?
2. According to Newton, how can the following two situations be distinguished:
 - (a) Earth at rest and stars revolving around the Earth;
 - (b) Earth rotating on its axis and stars at rest.
3. According to Descartes, can the two situations in #2 be distinguished?
4. Why does Newton think that, on Descartes' account of motion, a moving body has no determinate velocity and no determinate line in which it moves?
5. For Newton, are body and extension identical?
6. What are some characteristics of extension (i.e., space), according to Newton?
7. Why does Newton claim that the parts of space are motionless?
8. What does Newton mean when he says, "Whatever is neither everywhere nor anywhere does not exist"?

Principia

9. How does Newton define absolute time?
10. How does Newton define absolute space?
11. How does Newton define place? How does this differ from the accounts of Plato, Aristotle and Descartes?
12. How does Newton define absolute motion?
13. According to Newton, how can we distinguish absolute rest and motion from relative rest and motion?
14. What are the causes by which true and relative motions can be distinguished?
15. What does Newton's bucket experiment demonstrate?
16. Why are true motions difficult to distinguish from apparent (relative) motions?
17. What does Newton's globes experiment demonstrate?

Study questions on Leibniz and Clarke (*The Leibniz-Clarke Correspondence* - Huggett, Chapter 8)

1. What is Leibniz's Principle of Sufficient Reason?
2. What is space, according to Leibniz?
3. According to Leibniz, how would the existence of absolute space violate the Principle of Sufficient Reason?
4. How does Clarke respond Leibniz's "Static Shift" argument described in #3?
5. How do Clarke and Leibniz differ over what the Principle of Sufficient Reason entails about God's actions?
6. What is Leibniz's Principle of the Identity of Indiscernibles?
7. According to Leibniz, how would the existence of absolute space violate the Principle of the Identity of Indiscernibles?
8. Leibniz considers the following claim: "God can cause the whole universe to move forward in a right line, or in any other line, without making otherwise any alteration in it". Why does the existence of absolute space entail this claim? Why does Leibniz think that this claim violates the Principle of Sufficient Reason? Why does he think it violates the Principle of the Identity of Indiscernibles?
9. Why does Clarke disagree with the Principle of the Identity of Indiscernibles?
10. According to Clarke, does a motion have to be observed in order to be real?
11. What type of motion of the universe does Clarke think would be discernible and thus would not violate the Principle of the Identity of Indiscernibles?
12. According to Leibniz, does a motion have to be observed in order to be real?
13. According to Leibniz, how is absolute true motion distinguished from relative motion?

Study questions on Berkeley and Mach (Huggett, Chapter 9)

1. Why does Berkeley think absolute space is "mere nothing"?
2. Why does Berkeley think it makes no sense to speak of the rotational motion of two globes in an otherwise empty universe?
3. According to Berkeley, what causes the water to recede from the axis of rotation in Newton's spinning bucket? Why is this an inadequate response?
4. According to Berkeley, with respect to what is the water in Newton's spinning bucket rotating?
5. According to Mach, why should mechanics be concerned only with relative motions and not absolute motions?
6. According to Mach, what "twofold error" do we commit when we attempt to talk of the motion of a body K in the absence of other reference bodies?
7. Why does Mach think it is "not permitted [of] us to say how things would be if the earth did not rotate"?
8. What conclusion about the motion of the water in Newton's spinning bucket does Mach think it is legitimate to draw? How is this conclusion different from the conclusion that Newton draws?
9. Instead of Newton's absolute space, what does Mach suggest we use as a frame of reference from which to judge inertial motions?