

## CHAPTER SEVEN TEST

### I. Vocabulary Matching (2 points each = 30 points)

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|------------------------------|--------------------------------|-----------------------------|------------------------------------|
| A. Beauty                    | F. Evolutionary<br>Convergence | I. Book of Wisdom           | L. General Theory<br>of Relativity |
| B. Nucleotides               | G. Anthropic<br>Coincidence    | J. Strong Nuclear<br>Force  | M. Big Bang Theory                 |
| C. <i>Anthrōpos</i>          | H. Cosmological<br>Constant    | K. Multiverse<br>Hypothesis | N. Argument<br>from Design         |
| D. DNA                       |                                |                             | O. Supernovas                      |
| E. <i>Ab Initio Temporis</i> |                                |                             |                                    |

- \_\_\_\_\_ 1. Albert Einstein’s theory that refined the theory of Newton from some 200 years earlier. Einstein stated that things experience gravitational force by warping the space (actually the space and time) near them. (pp. 155, 160–161)
- \_\_\_\_\_ 2. Feature of the universe that is exactly what is needed for the existence of life, yet seemingly could have been otherwise. Scientific discoveries reveal that the universe is exactly “fine tuned” for the possibility and existence of life. (pp. 167, 169)
- \_\_\_\_\_ 3. “Long-standing” argument for the existence of God that spans from biblical times to the current day. In Sacred Scripture and in early Christian writings, its proposition is that the beauty, harmony, and order in the world are a sign of its creation by a Mind, clearly revealing God’s design. (pp. 173, 176)
- \_\_\_\_\_ 4. Chemical building blocks of DNA. These complex structures somehow “navigated” over a vast “ocean” of chemical possibilities until they converged upon the complex genetic code that all life shares. (pp. 169–170)
- \_\_\_\_\_ 5. Introduced by Einstein, this “term” denotes the energy density of space. He included the term in his equations for general relativity, thinking that it would allow his equations to describe a stable, eternal universe. Later, science would show that, even with this term, the expansion of the universe was an unavoidable implication of Einstein’s equations. (p. 161)
- \_\_\_\_\_ 6. Greek for “human being.” (p. 167)
- \_\_\_\_\_ 7. Prevailing cosmological model for the beginning of the observable universe that proposes that the universe started out very small – in the form of a unique singularity – and has been expanding for billions of years. The whole universe would be the result of the disintegration of this “primeval atom.” (p. 162)
- \_\_\_\_\_ 8. Speculative position that the laws of the universe may differ in various regions of it. (p. 171)
- \_\_\_\_\_ 9. Old Testament book written just fifty to 100 years before the Birth of Jesus Christ. The Sacred Author condemns the pagan practice of nature worship, suggesting a proper way in which beauty in the natural world can lead us to worship the one true God. (p. 173)
- \_\_\_\_\_ 10. Defined by the ancients as the proper relationship between the parts and the whole of a given thing; the splendor we discover when we see order and harmony in things. Scientists uncovered this feature within the depths of nature to a much greater extent than what is visible on its surface, as Kepler exclaimed in his treatise *Harmonices Mundi*. (pp. 173–174)
- \_\_\_\_\_ 11. Latin for “from the beginning of time”; as taught by the Fourth Lateran Council and the First Vatican Council, God created the universe “from the beginning of time.” (p. 163)

- \_\_\_\_\_ 12. Explosions of stars that also emit the elements made inside stars out into space, where they can form into new stars, planets, and living things. (p. 168)
- \_\_\_\_\_ 13. Abbreviation of deoxyribonucleic acid; molecule that contains the genetic code for the functioning and reproduction of all organisms. (p. 170)
- \_\_\_\_\_ 14. Attractive force that causes protons and neutrons to stick together to form nuclei. One of the four known fundamental physical interactions. (p. 169)
- \_\_\_\_\_ 15. Phenomenon whereby unrelated species evolve nearly identical biological traits. (p. 169)

**II. People Matching (2 points each = 20 points)**

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|------------------------|------------------------|----------------------|---------------------------|
| A. Johannes Kepler     | D. Georges Lemaître    | F. Werner Heisenberg | I. William Rowan Hamilton |
| B. Edwin Powell Hubble | E. Simon Conway Morris | G. Hermann Weyl      | J. William Paley          |
| C. Paul Dirac          |                        | H. Minucius Felix    |                           |

- \_\_\_\_\_ 16. Cambridge paleontologist who in 2015 wrote about evolutionary convergence in his important book *The Runes of Evolution*. He concluded that the general forms that life can develop and adapt are not haphazard but follow definite genetic and environmental pathways that were largely “predetermined from the Big Bang.” (p. 169)
- \_\_\_\_\_ 17. Known for his three great Laws of Planetary Motion, he saw these as magnificent examples of divine artistry. In his treatise *Harmonices Mundi*, he wrote, “I thank thee, Lord God our Creator, that thou allowest me to see the beauty in thy work of creation.” (p. 174)
- \_\_\_\_\_ 18. American astronomer who is known to many because of the space telescope named after him to honor a great discovery he made in the 1920’s using another telescope: He discovered that other galaxies were moving away from our own at incredibly high speeds. (p. 162)
- \_\_\_\_\_ 19. Mathematician who invented a system of numbers (quaternions) that would be needed to describe the way electrons and similar particles “spin” as well as other properties of subatomic particles. (p. 175)
- \_\_\_\_\_ 20. One of the founders of quantum mechanics who also stressed the importance of the criterion of beauty in physics. He wrote, “In exact science, no less than in the arts, beauty is the most important source of illumination and clarity.” (p. 175)
- \_\_\_\_\_ 21. Belgian priest and physicist, known for his “hypothesis of the primeval atom” now known as the Big Bang Theory. (p. 162)
- \_\_\_\_\_ 22. Physicist that sought an equation to describe electrons in a way that would be consistent with the principles of relativity theory. He was guided in his search primarily by mathematical beauty, formulating an equation which is regarded as one of the greatest discoveries of twentieth-century physics. (p. 174)
- \_\_\_\_\_ 23. Anglican theologian who argued that living things are too complex to have emerged naturally; instead, God must have made them directly. His “watchmaker analogy” for God incorrectly recast the theological Argument from Design. (pp. 176, 181)
- \_\_\_\_\_ 24. Catholic theologian who wrote at the beginning of the third century AD, “When you see providence, order, and law in the heavens and on earth, believe that there is a Lord and Author of the universe.” (p. 176)
- \_\_\_\_\_ 25. Great twentieth-century mathematician who also played a leading role in theoretical physics. He said, “In our knowledge of physical nature we have penetrated so far that we can obtain a vision of the flawless harmony which is in conformity with sublime reason.” (pp. 175–176)

**III. Short Answer (5 points each = 30 points)**

*Answer these questions in 2-3 sentences.*

26. How did the observation of a solar eclipse in 1919 change the direction of modern science?

27. Why does the idea of God as First Cause not necessarily eliminate the possibility of a perpetual universe?

28. How does the Big Bang Theory support the idea that time itself had a beginning?

29. Why can we not say that the Big Bang Theory proves the existence of a divine Creator?

30. Name the “curious coincidences” listed in the textbook and explain why they point to the existence of a divine Creator.

31. Explain why the universe can be described as “beautiful” and how that beauty points to a divine Creator.

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**IV. Essay (20 points)**

*Answer the following in 2-3 paragraphs.*

32. Explain how Einstein’s theory of relativity led to the Big Bang Theory. What does the Big Bang Theory say about the nature of both space and time?