



2007 PENNSYLVANIA SCIENCE OLYMPIAD STATE FINALS
ASTRONOMY C DIVISION

ANSWER SHEET

/3 1. Orion Nebula, M42, NGC1976

/1 2. Trapezium

/2 3. Image 7, Betelgeuse

/2 4. Image 8, Mira (Omicron Ceti)

/3 5. Image 4, Ant Nebula (Mz3)

/2 6. Cassiopeia A, Radio

/2 7. Image 3, Image 9

/1 8. ~12 billion years

/3 9. ~18000 ly

/2 10. 47 Tucanae, Omega Centauri

/2 11. Image 12, 1987

/1 12. Sanduleak 69° 202a

/1 13. Neutrino burst detection

/1 14. Tycho Brahe

/1 15. Type Ia supernova remnant

/2 16. Type Ia and Type II supernova remnants

/1 17. Image 1

/2 18. Image 2, Algol (Beta Persei)

/1 19. GK Per (Nova Persei 1901)

/1 20. Image 10

/1 21. $3.25E-17$ (parsec/m)

/1 22. 3600 (arcseconds/degree)

/2 23. 3.11-3.19 pC

/2 24. Star A is more luminous

/3 25. A D E

43 SCHOOL NAME AND CODE

/1 26. F

/1 27. B

/1 28. E

/1 29. C

/4 30. A B C F

/3 31. F M R

/3 32. A N V

/3 33. G K T

/3 34. B I X

/3 35. H P Q

/3 36. C J W

/3 37. E O S

/3 38. D L U

/2 39. 30 km/s

/3 40. 220 km/s

/3 41. 63 km/s

/2 42. 2170 solar

/2 43. 29.1 solar

/2 44. -3.49

/2 45. 1.19

/2 46. 5.40

/2 47. 600 parsecs

/2 48. 9 solar masses

/2 49. 7 solar masses

/2 50. 2 solar masses

57 PARTICIPANTS

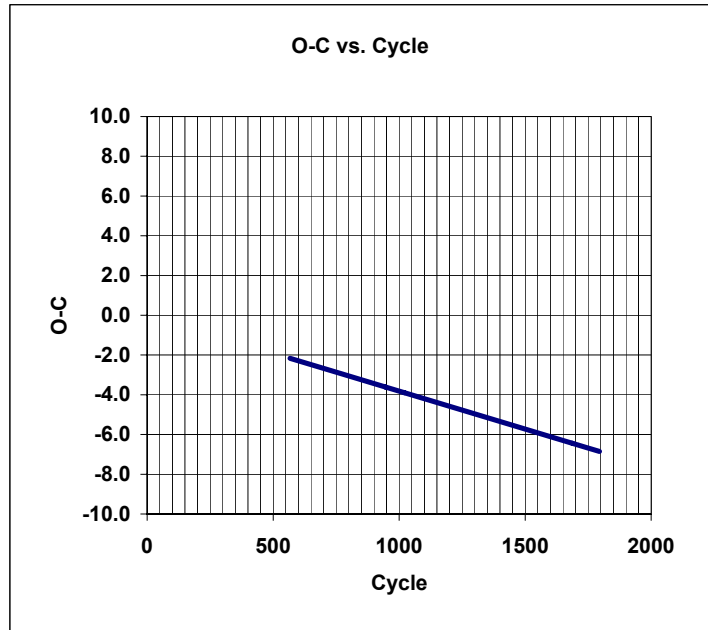


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ANSWER SHEET

- /3 51. 1.66E31 N
- /2 52. B and A
- /1 53. 25.1
- /1 54. 26.5
- /2 55. 27 days
- /1 56. Cepheid
- /2 57. -5.33
- /2 58. 11270 L_{SUN}
- /2 59. 1.68E7 pC
- /1 60. Temperature, Kelvins
- /1 61. Spectral class
- /1 62. Luminosity, solar value
- /1 63. Absolute magnitude
- /1 64. J
- /1 65. F
- /1 66. K
- /1 67. H
- /1 68. M
- /1 69. L
- /1 70. G

/5 72.



- /1 73. B
- /3 74. 5.47 minutes (5:28)
- /1 75. D
- /1 76. E
- /1 77. E
- /1 78. A
- /1 79. B
- /1 80. Any answer will do!

15

/10 71.

CYCLE	OBSERVED	CALCULATED	O - C
567	2443053.582	2443055.746	-2.16358
945	2443420.818	2443424.429	-3.61064
1021	2443494.658	2443498.555	-3.89739
1687	2444141.700	2444148.14	-6.43982
1795	2444246.628	2444253.478	-6.84984

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BONUS

HENRIETTA LEAVITT - CATALOGUED MANY VARIABLE STARS AND ESTABLISHED THE PERIOD-LUMINOSITY RELATIONSHIP FOR CEPHEIDS