PA State Science Olympiad 2013 Astronomy C Division

1. Image 7	T15 26. Image 12
T4 2. Caldwell 27	27. Image 24
3. WR 136	28. IGR J17091
4. Image 2	29. Smallest mass black hole, fastest wind
5. >100 GeV	30. 3C 461
6. Image 19	31. Cassiopeia
7. Image 10	32. Polarization
8. Image 23	33. Image 3
9. Light echoes	34. HD 206267
10. Image 5	T8 35. Image 14
11. Superbubble	36. Image 20
12. J0047.5-7308 or J0047.2 or J0046.6	37. Microquasar
13. Image 13	38. Cygnus OB3 Association
14. SXP 1062	T2 39. Image 1
T6 15. Young X-ray pulsar with slow period	40. RCW 57
16. Antares	41. PAHs polycyclic aromatic hydrocarbons
17. Image 21	42. Type IIn
18. Image 11	43. Apparent magnitue
19. IC 4604	44. 40-45 days
20. Image 4	45. 1.5 magnitudes
21. Delta Cephei, δ Cep	T9 46. -5.90 to -6.10
T11 22. HD 213306	47. 16000 to 23000
23. Image 15	48. 15 to 26 Mpc
24. Image 18	49. F4 - F7
25. UGC 5189A	50. κ-mechanism or Eddington's valve

School #	School Name	SCORE
	Participants	

51. Magnitude, temperature, radius, radial velocity	76. 2.5 magnitudes
52. Neutron star	77. V (dwarfs)
53. Rotation axis	78. 8.86 days
54. Magnetic axis	79. Neutron star
55. Radio beam	80. 2.48E16 J
56. Magnetic field lines	81. 74.2% or 0.742c
57. AXPs or SGRs or magnetars	82. 27.9%
58. High energy pulsars with SNR	83. 3.42E13 kg/s
59. "Normal" pulsars	T7 84. HMXB high mass X ray binary
T5 60. Millisecond pulsars or binary pulsars	T12 85. 5
61. 1.44E38 kg m^2	86. 5-6 or 6-7 or 5-7
62. 1.34E42 J	87. 3-4
63. 8.74E30 W	88. 7 or 8
64. Magnetic dipole radiation	89. 9
65. 4850 years	90. 10-11
66. foe	T10 91. Pulsar glitch
67. 0.01%	92. Frame-dragging or Lense-Thirring Effect
T13 68. Neutrino radiation	93. XJ
69. Accretion shock	T1 94. Tolman -Oppenheimer-Volkoff Limit
70. Long-soft GRBs	95. Stromgren sphere
T3 71. Strong, broad emission lines	T14 96. BL Herculis
72. Strong Nitrogen lines in emission	97. Alfven radius
73. Type Ib or Ic supernova	98. Jeans Criterion or Jeans Mass
74. Stellar winds and mass loss	99. Thorne-Zytkow object
75. LBV, luminous blue variable	100. Rayleigh-Taylor instability

Bonus	George Volkoff