Team Number: _____

Team Name: _____KEY_____

Total Score: /127
Section Score: /57

NSO Astronomy C Event 2013 – Answers Section A

1. (A)__Rho Ophiuchi, 9____(B)____X____ (3 points)

2. (A)__Pulsar_____(B)__12, 16, 10__ (4 points)

3. (A)__Cepheid variable____(B)__8, Delta Cep (Cephei)__ (3 points)

4. (A)__2,5,15,18_____(B)__A_____ (5 points)

5. __B (T,R,F,P,A)__ (3 points)

6. (A)__Semiregular variable___(B)__Betelgeuse, 2____ (3 points)

7. __3,6,12,16,17____ (5 points)

8. (A)__Cyg X-1___(B)__Nowhere for Cyg X-1, G or T__ (3 points)

9. __The Cepheid Instability Strip____ (1 point)

10._____D,L,K,E_____ (1 point)

11. (A)__P__ (B)__Supernova Remnant, Neutron star (or pulsar)__ (3 points)

12. (A)__Wolf-Rayet Star_____(B)___O____ (2 points)

13. (A)__4,13___ (B)__13, NGC 3582____ (4 points)

14. ___X-Ray Binaries____ (1 point)

15. (A)__V838 Mon___ (B)____Z_____ (2 points)

16. __protostar, O/B star, Cepheid, red supergiant, semiregular, supernova remnant, wind driven pulsar___ (5 points or 0 points)

17. (A)__6,13,16____(B)__Shockwaves from SNR clump gas into protostars__ (4 points)

18. __Neutron stars (pulsars) cannot be plotted on an H-R diagram_____ (1 point)

19. (A)__17____(B)__Shockwave breaking through gas surrounding star__ (2 points)

20. __8,11___ (2 points)

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NSO Astronomy C Event 2013 – Answers Section B

21. (A)_____Cas A_____**(B)**_____Radio_____

(C)_____Purple or Magneta or Red _____ **(3 points)**

22. (A)_____Infrared_____**(B)**_____Higher, more light absorbed by gas_____ **(2 points)**

23. (A)__279.2 – 279.9 _,_281.0 – 281.6__ **nanometers (B)**____Magnesium____ **(3 points)**

24. _____X-Ray_____ **(1 point)**

25. (A)_____PSR J0108-1431_____**(B)**_____Optical_____**(2 points)**

26. _____0.06 – 0.1_____ **AU** **(2 points)**

27. _____-5 to 5_____ **km/s** **(2 points)**

28. _____0.65 – 0.95_____ **Solar Masses** **(2 points)**

29. _____0.7 - 1_____ **Solar Radii** **(1 point)**

30. _____1.4 – 2.1_____ **Solar Radii** **(1 point)**

31. _____2 - 3_____ **kpc** **(2 points)**

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NSO Astronomy C Event 2013 – Answers Section C

32. ____-5.5 to -6.5_____ **(2 points)**

33. ____0.2 – 0.6_____ % **(1 point)**

34. ___Increase, nonlinearity of period-luminosity relationship at high periods_____ **(2 points)**

35. ___Type I_____ **(1 point)**

36. ____ W Vir/Type II_____ **(1 point)**

37. ____Leaving AGB, on the way to White Dwarf_____ **(2 points)**

38. ____Balmer Absorption Lines_____ **(2 points)**

39. ____Hydrogen_____ **(2 points)**

40. ____They faded away_____ **(1 point)**

41. ____Helium (I)_____ **(1 point)**

42. ____Type IIb_____ **(2 points)**

43. ____Rapid expansion velocities_____ **(2 points)**

44. ____Iron and Nickel (Fe, Ni)_____ **(2 points)**

45. ____Electron degeneracy pressure_____ **(2 points)**

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NSO Astronomy C Event 2013 – Answers Section D

46. _____**(2 – 3) x 10^5**_____ **W/m^2** **(2 points)**

47. _____**8,000 – 10,000**_____ **Solar Luminosities** **(2 points)**

48. _____**3400 – 4400** _____ **Years** **(2 points)**

49. _____**3 - 5**_____ **kpc** **(2 points)**

50. ____**The interstellar medium is dispersive due to interactions of the pulses with charged particles in the medium**_____ **(2 points)**

51. _____**(1 – 3) x 10^{39}**_____ **Joules** **(2 points)**

52. _____**0.24 – 0.34**_____ **km/s** **(2 points)**

53. _____**Shock Wave forms**_____ _____ **(2 points)**

54. _____**2 – 4**_____ **Mpc** **(2 points)**

55. _____**7,400 – 7,500**_____ **Kelvin** **(2 points)**

56. _____**2.5 – 3**_____ **Solar Radii** **(2 points)**

57. _____**7.5 – 8.5**_____ **(2 points)**

58. _____**8,000 – 12,000**_____ **Kelvin** **(2 points)**