Team name: KEY Team number: KEY

Answer Page: Section A

1. (a) 12
   (b) Lie in the habitable zone
2. (a) AB Aurigae, protostar
   (b) D
   (c) 28
3. (a) Transit
   (b) Planet-to-star radius ratio
4. (a) 2, Barnard 68
   (b) 11, M47 (Orion Nebula)
5. 11,9,3,14,1
6. (a) Brown dwarf
   (b) K,F
   (c) 21,27
   (d) Patchy clouds
7. (a) HD 95086
   (b) Direct imaging
   (c) 29
8. (a) HAT-P-11b
   (b) Transmission spectroscopy
   (c) 26
9. (a) 24
   (b) B
10. D,E,B,K,F
11. (a) Brightness temperature for a range of wavelengths
    (b) WASP-43b
12. (a) 15
    (b) Scattered outwards by interactions with other planets or nearby star
13. (a) 55 Cancri
    (b) O,H
    (c) 22
14. (a) 23
    (b) Mass, eccentricity, orbital period
15. (a) WASP-18b, hot Jupiter
    (b) Changing its magnetic field
16. (a) E
    (b) 30
17. (a) GD 165
    (b) L
    (c) H/K,C
18. (a) 51 Pegasi b
    (b) Radial velocity

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Answer Page: Sections B & C

19. (a) M
    (b) Longest main-sequence lifetime

20. (a) M
    (b) Shorter orbital period, higher transit probability
    (c) Shorter orbital period, higher stellar radial velocity

21. (a) M
    (b) UV
    (c) Flaring

22. (a) M
    (b) Smaller disk masses

23. (a) More metal-rich disks can more easily create the cores of giant planets which then accrete gaseous envelopes
    (b) H, He
    (c) Core accretion, the bulk of the planet's mass is gaseous and hence increases in mass past that of the core is due to gas, not solid accretion

24. (a) 1 ± 0.2 AU
    (b) 0.14 ± 0.05 AU
    (c) 28.5 ± 5 Days
    (d) 6.6 ± 1 Times
    (e) 1.8 ± 0.5 Times
    (f) 20 Parsecs
    (g) 54.8 ± 10 Times
    (h) Star B! One can perform many repeat measurements and beat down the signal to noise that way rather than simply through a stronger signal.