Stellar Evolution.

1. If 2 stars are on the main sequence we can be sure that
   a) The more luminous star is more massive
   b) The more luminous star will live longer
   c) The fainter star is hotter
   d) The more luminous star will have a redder colour
   e) All of the above

2. A star evolves off the main sequence when
   a) Nuclear reactions begin in the core of the star
   b) Hydrogen is exhausted in the core of the star
   c) Hydrogen is exhausted everywhere in the star
   d) Helium is exhausted in the core of the star

3. When a star's core gets smaller, the rest of the star usually
   a) Also gets smaller
   b) Stays the same size
   c) Gets larger
   d) Explodes as a supernova

4. When a star becomes a red giant it becomes brighter because
   a) It is moving towards us
   b) It is losing its outer envelope
   c) It is fusing iron in its core
   d) It is increasing in size

5. The event which marks the end of a star's life before becoming a white dwarf is
   a) A planetary nebula
   b) A supernova
   c) Exceeding the Chandrasekhar limit
   d) Exhaustion of hydrogen in the core

6. Which of the following is probably oldest?
   a) A 1 solar mass main sequence star
   b) A 1 solar mass white dwarf
   c) A 10 solar mass main sequence star
   d) A 10 solar mass red giant

7. Which of these stars ends its main sequence life most rapidly?
   a) A very massive star because it burns its fuel very fast
   b) A star like the sun because its fuel consumption balances its mass
   c) A low mass star because they have less hydrogen to burn
   d) None of the above: all stars have a main sequence lifetime of about 10 billion years.

8. Why do some neutron stars exhibit pulses of radio radiation?
   a) The poles of their magnetic fields happen to sweep across our line-of sight
   b) They are still cooling down after the supernova, ejecting material as they do so
   c) When variable stars go supernova, their pulsations are now visible in the radio
   d) There a periodic nuclear reactions in the accretion disk around the neutron star which cause flashes of radiation
   e) Electrons are ejected in short bursts after the supernova

9. A black hole is best described as
   a) A star that sucks all matter onto itself
   b) The remnant of all supernova explosions
   c) A object that is smaller than its Schwarzschild radius
   d) The final result of all stellar evolution
   e) An object that exceeds the Chandrasekhar limit in mass

10. Which of the following can escape from inside the event horizon of a black hole?
    a) Photons
    b) Anti-matter
    c) X-rays
    d) Neutrinos
    e) None of the above

11. The equivalence principle tells us
    a) That mass is equivalent to energy: $E = mc^2$
    b) The faster an object moves, the heavier it becomes
    c) Nothing can travel faster than the speed of light
    d) It is impossible to tell the difference between the force of gravity and acceleration
    e) Gravitational redshift is equivalent to Hubble expansion