

Celestial Inquisition 2

1. Suppose a small neutron star and a planet of similar size orbiting around it, are falling into a black hole as observed by an astronaut who is far away from the black hole. Which would break up sooner, the neutron star or the planet? Why? - 4pts
2. In the year 2212, humans send an unmanned spacecraft towards a faraway pulsar. The pulsar sends the signals in a plane (say plane A) which passes through the Earth. The spacecraft is designed in such a way that it has a continuous and a constant magnitude of acceleration of 10 SI units on its way to the pulsar (as seen from an inertial frame). What is the best way for the spacecraft to proceed on its journey, through the plane A or above (or below) the plane A? Give reasons. – 3pts

Note: Assume that there are no hindrances in its path and that it does not need to stop for fuel or anything else on its journey.

3. If you want to search for planets which may sustain life, which of these types of stars might be the best to observe? – 2pts
 - a. Population I
 - b. Population II
 - c. Population III
 - d. Non-main sequence stars
4. Suppose that a small black hole (mass very small as compared to our sun) has got near our sun and started devouring our sun. After the sun has been completely devoured, which option best describes what may happen to life on earth? – 3pts
 - a) Life will just continue without any other problem, except that there won't be day on earth.
 - b) The earth will fall into the black hole because of its superb gravity and all life will perish.
 - c) Most of the life on earth will perish because photosynthesis will stop in the absence of sunlight.
 - d) Most of the life on earth will be baked and burned to death.
 - e) Most of the life will die because of the freezing cold as there is no source of heat for earth and temperatures plummet.
 - f) Earth will be broken apart because of the immense tidal forces of black hole and will form a ring around the black hole eventually. Life will then die due to lack of air.