Gravitational Potential Energy Relative to zero at infinity.

A B C D E

Planet Sebadoh

These points are evenly spaced.

1. At which point would you place a massive object in order to maximize Epg?

2. Assuming it takes an amount of work, W1, to move a massive object from A to B at constant speed, which of the following would be true of the work, W2, required to move the same object from B to C?

A. W2<W1 B. W2>W1 C. W2=W1

3. Which of the following *could* show the work done in lifting a satellite from point B to point D, at constant speed?

A. 0J B. -2.6x108J C. 2.6x108J D. -3.3x10-8J

4. Which of the following *could* show the net work done in lifting a satellite from point B to point D, at constant speed?

A. 0J B. -2.6x108J C. 2.6x108J D. -3.3x10-8J

5. Assuming the gravitational potential energy when a massive object is placed at A is -2.0x105J, which of the following is a *possible* value of the potential energy when the mass is placed at B?

A. -1.0x105J B. -3.0x105J C. 1.0x105J D. 3.0x105J E. 0J

6. Assuming the potential energy when a massive object is placed at C is -4.0x109J, which of the following *could* represent the potential energy when the object is placed at A and when it is placed at E?

|  |  |  |
| --- | --- | --- |
|  | EpgA (J) | EpgE (J) |
| A | 0 | -8.0x109 |
| B | -5.0x109 | -3.0x109 |
| C | -5.0x109 | -3.8x109 |
| D | -5.0x109 | -1.0x109 |
| E | -3.0x109 | -5.0x109 |

7. Assuming the Epg when a satellite of mass m=68000kg is at point C is -8.9x1010J, how much work would be necessary to lift that satellite to a point where Epg=0?

8. Assuming the Epg when a satellite of mass m=68000kg is at point C is -8.9x1010J, how much work would be necessary to lift that satellite to infinity?

9. Assuming the Epg when a satellite of mass m=68000kg is at point C is -8.9x1010J, how much work would be necessary to lift that satellite beyond the gravitational pull of Sebadoh?

10. Imagine that Sebadoh has a moon in stable circular orbit (not pictured). Also imagine that the moon is named Lou. Use the data below to answer the following questions.

MS=2.0x1025kg ML=4.0x1020kg Distance between centres of Sebadoh and Lou=5.0x109m

a. Find the Epg of the system.

b. Find the orbital speed of Lou.

c. Find the orbital Ek of Lou.