multiple choce questions

**Module 5 Advanced Mechanics**

A projectile is launched at 60 m.s-1 at 30o to the vertical. what is its range [m]

1. 92
2. 159
3. 184
4. 318 \*

The horizontal component of a projectile launched at 60o to the horizontal is 80 m.s-1. What is the magnitude of its launch velocity [m.s-1]

1. 160 \*
2. 92.4
3. 69.3
4. 40

What acceleration [ms-2] is experienced by a 70 kg test piolet pulling out of a curve in a circular arc of radius 1 km at a speed of 200 m.s-1?

1. 4.1
2. 5.1 \*
3. 41
4. 42

A planet has 4 times the mass of the Earth and twice its radius. What is the acceleration due to gravity on the surface of the planet?

1. 4.0 g
2. 2.0 g
3. g \*
4. 0.5 g

A person’s weight at sea level compared to the top of Mt Everest will be

1. Less, as weight depends on height above sea level
2. More, as weight depends on height above sea level \*
3. Less, but weight is independent on the height above sea level
4. More, but weight is independent on the height above sea level

Two satellites ate in the same low Earth orbit. Satellite P has twice the mass of satellite Q. What is the ratio P:Q of the speeds needed to keep their orbits stable.

1. 1:2
2. 1:1 \*
3. 2:1
4. 4:1

The escape velocity of a rocket depends upon:

1. Its mass and the mass of the planet it is on
2. Its mass and the acceleration due to gravity of the planet
3. The mass and the radius of the planet \*
4. The gravitational force acting on the rocket

Which graph shows the relationship between the gravitational force and the distance from the centre of the planet? draw graphs

1. 1
2. 2
3. 3
4. 4

For three planets, you given shown some information on the orbital period and orbital radius. What is the radius [km] of the orbit for Nepture?

Venus T = 0.62 years R = 1.09x108 km

Jupiter T = 11.86 years R = 7.8x108 km

Nepture T = 164.8 years R = ? km

1. 4.5x109 \*
2. 3.0x1014
3. 1.2x1016
4. 9.2x1028

The Earth has a mass of6.0x1024 kg and a radius of 6400 km. A 600 kg satellite experiences a gravitational acceleration of 0.025 m.s-2 in its orbit. What is the altitude [km] of its orbit?

1. 3.36x104 \*
2. 3.36x107
3. 3.97x104
4. 3.97x107

Which statement about satellites in a stable orbit is correct?

1. The higher the altitude of the orbit, the faster the satellite travels.
2. The higher the altitude of the orbit, the slower the satellite travels.\*
3. The greater the mass and higher the altitude, the faster it travels.
4. The greater the mass and higher altitude, the slower it travels.

**Module 7 The Nature of Light**

What were Michelson and Morley trying to find in their experiment?

1. The speed of light
2. The existence of the aether
3. The speed of the Earth relative to the aether \*
4. The speed of the Earth through the aether

What is an inertial frame of reference?

1. A frame of reference which is not accelerating \*
2. An accelerating frame of reference
3. One in which inertial forces act
4. One in which there is no inertia

According to Special Relativity, an object travelling near the speed of light as viewed by an observer in an inertial frame of reference

Lengths get longer and time passes more quickly

Lengths get shorter and time passes more quickly

Lengths get longer and time passes slowly slowly

Lengths get shorter and time passes more slowly \*

Einstein’s first though experiment involved looking at a mirror while travelling in a train moving at the speed of light. Which of the following is NOT a conclusion he made from his experiment?

1. An outside observer would see the light travelling at twice the speed of light. \*
2. There is no need for an aether.
3. The speed of light is constant regardless of the motion of the observer.
4. They would see their reflection in the mirror.