PHYSICS

ROUND 1

1. Born 200 years ago John Tyndall is best remembered for the man who discovered why the sky is blue. Which county was he from? **Carlow**
2. Which two planets in our solar system do not have moons? **Mercury & Venus**
3. I-LOFAR is a low frequency radio telescope. Where is it located? **Birr** Castle
4. A capacitor stores energy. Is the energy stored in the
   - **Electric field**
   - Magnetic field
   - Both
5. Ernest Walton won a Nobel Prize for his work on splitting the atom, but who was the engineer that helped build the apparatus used for this experiment and the supervisor? **Cockroft and Rutherford**
6. If the acceleration due to gravity on a planet is 20 ms^{-2} at the surface, what the acceleration at a height of 3 times the radius above the surface?

1.25 ms^{-2}

- gravity is proportional to 1 /distance squared
- height of 3R above surface = distance from centre of planet of 4R
- so R--> 4R will reduce gravity by 1/4 squared ie divided by 16
- 20/16 = 1.25

ROUND 2

1. Rutherford said that all science is just one subject while comparing the rest to stamp collecting? What was the subject? **Physics**
2. If Jupiter has the 'great red spot', which planet has the great dark spot? **Neptune**
3. A BER certificate is an indication of the energy performance of a home. What does BER stand for? **Building Energy Rating**
4. You have a 1.4 kW toaster with a missing fuse. What is the lowest rating of fuse you could use in Ireland: is it 3A, 5A, 10A, or 13A?
   - P = V x I
   - I=P/V
   - =1400/230 or 1400/220
   - = 6A or 6.3A
   - **Best fuse = 10A**
5. Who is the unit of capacitance named after? Michael **Faraday**
6. A transistor is a semiconductor device used to amplify or switch electronic signals and electrical power. The word "transistor" is a contraction of which two other words? **Transfer resistor**

ROUND 3

1. Pulsars were discovered by an Irish scientist who is Pro-Chancellor of Trinity College. Who is she? **Jocelyn Bell Burnell**
2. When astronomers talk about 'atmospheric scintillations' what are there referring to? Twinkling **stars**
3. In a nuclear reactor, the purpose of the moderator is to reduce
   - A Temperature of the reactor
   - B Number of neutrons causing the fission
   - **C Speed of the neutrons**
   - D At which energy is being released
4. Who first demonstrated that light is a mixture of colours? Isaac **Newton**
5. There are 3 factors on which the resistivity of a wire depends. Resistance is one, what are the other two? **Cross sectional area** and **length**
6. It is assumed that the depth of water in a harbour rises and falls with simple harmonic motion. On a certain day the low tide has a depth of 9 m at 12:20 and the following high tide had a depth of 13 m at a time of 18:20.

Which of the following is true?

- A Amplitude is 4 m and period is 12 hours
- B Amplitude is 2 m and period is 6 hours
- C Amplitude is 4 m and period is 6 hours
- **D Amplitude is 2 m and period is 12 hours**

ROUND 4

1. Who was the German born mechanical engineer and physicist who discovered X-rays? Wilhelm Conrad **Röntgen**
2. When a cannon ball is fired and the cannon recoils which of the following is true?
   - A Cannon's momentum is greater than the canon ball's momentum
   - B Cannon's momentum is equal to the canon ball's momentum
   - C Cannon's momentum is less than the canon ball's momentum
   - **D The sum of the two momentum values is zero**
3. Name the Swedish chemist and industrialist who invented dynamite. Alfred **Nobel**
4. Which of the following was the first to recognise a connection between electricity and magnetism?
   - Coulomb
   - Faraday
   - Galvani
   - **Ørsted**
5. On a resistor colour code what number does red stand for? **Two/ 2**
6. What is the SI unit of inductance? Joseph **Henry**

ROUND 5

1. Austrian scientist's 1944 book, written while he was working in Trinity College Dublin has been credited by both Crick and Watson as inspiration for their initial work on DNA. Erwin **Schrödinger**
2. A U-value indicates the overall heat loss rate through a complete building. Will a well-insulated house have a HIGH or LOW U value? **LOW**
3. At what point in its motion does a pendulum have its greatest acceleration? **At the extremities of its motion**
4. Which Irish Scientist invented the Induction Coil? Nicholas **Callan**
5. In which of the following is the speed of sound greatest?
   - A air
   - B water
   - **C steel**
   - D sand

(Speed of sound in normal air is 340 m/s, in water the speed is 1,430 m/s and in steel the speed is 5920 m/s).

6. An elevator lifts a weight of 2000 N through a height of 10 m in 5 s.
   What is the power of the elevator? **4000 W**

Work = Force x distance = 2000 x 10m = 20,000J	Power = $\frac{\text{Work done}}{\text{time}} = \frac{20\,000\text{J}}{5\text{s}}$ = 4000 W

ROUND 6

1. The anemometer was invented in 1845 in Ireland for the purpose of measuring the speed of the wind. What was the name of the inventor? **Rev Romney Robinson**
2. Name the fixed point or axis around which a lever is free to turn? **Fulcrum**
3. Calculate the distance the ship is from the seabed given speed of sound in water = 1500 m/s and the time taken for the sound to be heard is 0.2 s

   Distance = Speed x Time
   = 1500 m/s X 0.2 s
   = $\frac{300}{2}$ m = **150 m**
4. Below which temperature is salt spread on icy roads ineffective? **-9'C (15F)**
5. A body starts from rest with a uniform acceleration a. The time t taken for it to undergo a displacement s is given by? **A**

A	B	C	D
$t = \sqrt{\frac{2s}{a}}$	$t = \sqrt{\frac{2a}{s}}$	$t = \sqrt{\frac{a}{2s}}$	$t = \sqrt{\frac{s}{2a}}$

6. The candela (cd) is the SI base unit of luminous intensity. A common candle emits light with a luminous intensity of roughly how many candelas? **One/ 1**