Engineering Interview Questions

1. What are the differences between Engineering and Physics?
2. A 30cm ruler is placed on top of one finger from each of your hands, so that you have one finger at each end of the ruler, and the ruler is resting on your fingertips. What happens if you bring these fingers together?
3. How would you design a gravity dam for holding back water?
4. You have a cylinder that is sealed at both ends. The pressure inside is rising. Will the cylinder split along the side or blow at the end first?
5. Sketch the graph y=xx for x>0, x<0.
6. What are the forces experienced by the passengers at the bottom and the tops of the loops of a rollercoaster? Can you estimate the number of G's of force that they would experience?
7. A box is sliding down a hill at a 45 degree angle. A projectile is shot from the box at 1:00pm. It then perfectly lands in the box 1 minute later. What is the distance that the box slid between the projectile being shot and landing?
8. How could you derive the formula for the area of a circle?
9. Why do large ships not sink despite weighing thousands of tonnes?
10. How do aeroplanes stay in the air? Why can some aeroplanes fly upside down?
11. Sketch a velocity-time graph of a skydiver jumping out of an aeroplane.
12. A ladder is leaning against a wall. What are the forces acting on the ladder?
13. What are the main differences between the engines in jet fighters and the engines in jet airliners, which type of engine is the more efficient, and (qualitatively) why?
14. What would happen if you drilled through the Earth all the way to the other side and then jumped into the hole?
15. A telephone company has run a very long telephone cable all the way round the middle of the earth. Assuming the Earth to be a sphere, and without recourse to pen and paper, estimate how much additional cable would be required to raise the telephone cable to the top of the 10m tall telephone poles
16. A thin hoop of diameter d is thrown on to an infinitely large chessboard with squares of side L. What is the chance of the hoop enclosing two colours?
17. What is the area of an n-sided regular polygon inscribed within a circle of radius r?
18. For a circle inscribed a regular n-sided polygon, what is the minimum n so that the ratio of the area of the part outside the circle to the area of the circle is less than or equal to 1:1000?
19. Give a vector proof that for a triangle inscribed within a semicircle, the included angle is always pi/2.
20. Why did they used to make the mill chimneys so tall?
21. Explain the following to someone with no knowledge of physics: force, momentum, power, work.
22. If I am in a room with 5 people and guess all their birthdays what is the probability of getting (only) one correct?
23. A rectangular sheet with dimensions a x b is to be made into an open-topped box by cutting a square of side h from each corner and folding the 4 sides up. Find the value of h which allows the maximum volume of the box.
24. How small can you make a computer? What are the limiting factors?

25. How does a lightbulb work?
26. How do you think you could calculate the number of calories that you have burnt after you have gone for a run?
27. How does a fridge work?
28. Imagine that I had a toy car, and propelled it by attaching a blown-up balloon to it and then releasing it. How could I increase the speed, the flow of air, and the momentum of the car?
29. What challenges do you think you would be facing as a Formula 1 engineer in 10 years time?
30. What is the difference between a turbojet and a turbofan? (illustrate on a whiteboard). which has better efficiency and why?
31. How does a helicopter fly?
32. What are the main assumptions made when modelling potential flow?
33. What is Moore's Law?
34. What limits the size of a computer chip?
35. What is the strongest naturally occurring material? How can it be cut?
36. What is the significance of superconductors?
37. What would be your first invention?
38. Why do windmills never appear stationary?
39. What would be the difficulties with building a bridge that connects the UK and Canada?
40. Differentiate: y = sinx + cosx + tanx
41. Are bridges more stable on concrete or on soil? Why?
42. Can you derive the equation that links voltage, charge and capacitance?
43. How do trains go around bends?
44. How does earthquake proofing work?
45. Derive the formula for the area of a circle.