RYANAIR TECHNICAL QUESTIONS

1. **What are the take-off segments?**
    a. 4 segments
        i. From Screen height to Gear up
        ii. Gear up to 400ft AGL (or Flap retraction alt)
        iii. 400ftAGL (or Flap retraction alt) to Flaps up and MCT
        iv. Flaps up/MCT to 1500ft AGL

2. **What high lift devices does the B737-800 have?**
    a. Leading edge slats
    b. Trailing edge flaps

3. **What is the coffin corner?**
    a. Refers when Stall speed intersects with Mcrit. If the aircraft accelerates or decelerates it will enter a stall.

4. **How does a jet engine work?**
    a. Continuous cycle: Air enters the engine which then it is compressed, whilst compressed it increases the density and temperature therefore, the energy. After compressing it is ignited with a mixture of fuel and finally it goes through the turbine which makes the compressors work.

5. **What does TCAS mean and how does it work?**
    a. Traffic Collision and Avoidance System: It works by interrogating other transponders and measuring the time between both, by measuring the time it estimates a distance from which it obtains a Traffic advisory or resolution advisory.

6. **If OAT 10ºC where is the Freezing level?**
    a. 5000ft 2degrees per 1000ft

7. **What are the altitude effects on aircraft performance?**
    a. Altitude decrease aircraft performance due to the air density

8. **If you want max range, where do you want to have your CG? (aft, middle, Rear)**

a. Aft

9. What is MCP?

a. Mode Control Panel: Panel in which the autopilot is controlled

10. What is FMC?

a. Flight Management Computer: Computer which contains a navigation database and a performance database, you can input the computer via the CDU

11. What do you know about the Hydraulics of the B737-800?

a. It has two systems (A and B) with two engine driven pumps and two electrical pumps

12. Give an example of an aircraft with anhedral wings, Why do you think it has anhedral?

a. AN225 It has anhedral wings because one of the advantages of the anhedral wings is the high maneuverability and little stability

13. What is a lenticular cloud?

a. Cloud which forms due to mountain waves

14. What is Radiation/Advection Fog?

a. Radiation fog forms when during the night the land is losing temperature so it reaches the dew point, this kind of fog forms with clear nights, temperature close to dew point and no wind.
b. Advection fog forms in a similar way but instead of no wind and the cooling of the surface, it requires some wind so it moves the air mass into a colder surface.

15. How many Emergency exits?

a. 8?

16. How many cabin crew do Ryanair Have?

17. How does the altimeter work?

a. It consists mainly of aneroid capsules which expand as you climb and via some gears it transforms that expansion into an altitude reading

18. Why do some aircraft have swept wings, advantages?

a. Swept wings are better for high speed flight mainly because they increase Mcrit and are less affected by turbulence (Due to the poor lift capabilities)

19. How does a VOR work and its effective range?

a. VOR works with a reference signal which is omnidirectional and a variphase signal, the aircraft then compares the phase difference between the two signals to obtain a radial.
b. VOR effective range is determined by the Line of Sight which can be calculated by the following formula sqr alt x 1.23 + sqrt alt x 1.23

20. How does GPS work?

a. Satellite sends a signal with its position and time sent, Receiver identifies the signal and decodes it to get a position

21. What is the screen height?

a. Imaginary screen located at the end of the runway (or clearway if fitted) with a height of 35ft. Official end of the TOD

22. How does ASI work?

a. Total pressure enters a capsule and it expands or contracts according to the pressure, outside the capsule but inside a contained box there is static pressure. The capsule connects via gears to the indicator

23. How many passenger seats in Ryanair configuration?

a. 189?
b. 197 (B737-8200). Its 197 because if they exceed 200 seats, one more cabin crew is required

24. Carburetor icing, is it possible if OAT is 30ºC?

a. It is possible up to 38º if the conditions are met

25. How do you calculator the stall speed when you are given a Vref?

a. You divide it by 1.3

26. What is a Jetstream?

a. A jetstream is defined as a flat tubular wind current with a minimum of 60kts.

27. What is the 737-800 cabin pressure at FL280 (Max differential PSI)

28. Explain Orographic lifting?

a. In mountanious areas air is forced upwards which, given the conditions, it can create clouds

29. What are the winglets for?

a. Winglets help in the reduction of induced drag by reducing the effect of wingtip vortex

30. What is an advantage/disadvantage of a T-tail configuration?

a. T-tail aircraft elevator's are more efficient
b. T-tail aircraft are more prone to deep stall

31. What type of engines are fitted on the 737-800?

a. CFM56-7

32. How to work out the crosswind component?

a. We used the clock code (15º ¼, 30º ½, 45º ¾, 60º full) for mental calculations. If not we calculate it with the wind speed times the sin of the angle between the runway and wind direction

33. What does High bypass mean?

a. By pass of the engine is the ratio that goes into the compressor and the ratio it bypasses the compressor. High bypass means that more air is redirected outside the compressor

34. What is a critical engine?

a. The one that when it fails it generates the greatest yawing moment

35. How is V2 calculated?

a. 1.13Vsr or 1.1Vmc

36. Why do we need a load and trim sheet?

a. It is a document to make sure that the aircraft is within structural limits according to the weight

37. What is the significance of the black arrow on the approach plate?

a. Highest point?

38. What is VMCG?

a. Minimum control speed on the ground

39. Type of cloud you find steady rain?

a. Nimbostratus

40. What is mach tuck?

a. Due to the expansion wave above the speed of sound, it makes the CP move backwards and decreases the downwash which creates a nose down pitching moment

41. How do thunderstorms form?

a. Unstable atmosphere, Lifting action and humidity

42. What are V speeds and in what order?

a. Vs VMCG V1 VR V2

43. Rhumb lines and great circle lines - Which is shortest, Whats the difference, why is a great circle shorter distance?

a. Great circle is shorter. But you don't follow a straight line. Rhumb line is longer and you follow a straight line

44. AC and DC differences, why do buildings use AC instead?

a. Easier construction, lighter

45. What is Dutch roll?

a. Undesired effect when the AC posses a weaker directional stability and positive lateral stability

46. How many generators on the 737-800?

a. Two plus apu?

47. What are the 737 navigation systems?

a. IRS, GPS, ILS, VOR, ADF

48. Explain the take-off segments. Why do we have them?

a. To determine the minimum climb gradient on each one

49. What angle are the swept wings on the 737-800?

a. 25º

50. What is the tropopause and why does it vary between the poles and the equator?

a. The tropopause is the limit between the troposphere and the stratosphere, its heigh depends mainly on the surface temperature

51. What are the hazards associated with flight in the vicinity of thunderstorms?

a. Lightning activity, hail, ice formation

52. What is an ADIRU - Air Data Inertial Reference Unit?

a. IRS combined with an air data computer for more precise information

ALSO STUDY SOME THINGS OF THE 737 MAX

Boeing has certified the Max series under an amended type certificate as part of the 737 family rather than go for a whole new type certificate.

The 737 MAX has about 3,200 ordersas of Jun 31, 2016.

New features:

- **CFM LEAP-1B fan with 18-blade, woven carbon-fiber fan blades giving a 69.4 in diameter compared to 61 in. for the 24-blade titanium fans of the CFM56-7. This gives 9:1 bypass ratio versus 5.1:1 for the older engine. Rated thrust LEAP-1B28: 29,317lbs.**
- **New CFM LEAP-1B custom core with 11-12% reduction in fuel burn and 7% reduction in operating cost.**
- **New engine nacelle and pylon will cause engines to project further forward than CFM56-7BE on 737NG.**
- **Updated EEC software, fuel and pneumatic systems.**
- **Nose gear extension of 15-20cm to give more engine ground clearance.**
- **Minor changes to nose wheel well to accommodate longer nose gear strut.**
- **Fly-by-wire spoiler system - to improve production flow, reduce weight and improve stopping distances.**
- **Maneuvering Characteristics Augmentation System (MCAS) – Applies nose down stabilizer trim during high AoA flight when the flaps are up and the A/P is not engaged.**
- **Reshaped tailcone to reduce drag giving a 1% reduction in fuel burn.**
- **Advanced technology winglets which feature upward and downward-directed composite airfoils**
- **Widespread structural strengthening.**
- **Onboard Network System (ONS).**
- **Four 15.1 inch LCD cockpit display screens in landscape orientation.**
- **New electronic bleed air system, allowing for increased optimization of the cabin pressurization and ice protection systems, giving in better fuel burn**
- **PSEU light changed to MAINT**
- **• A computerized synthetic third AoA sensor system to be introduced with the MAX-10 followed by retrofits to the rest of the MAX fleet later.**