SENSORS

TD1

AIR Parameters

(1) The flight level of an aircraft is FL300 and the SAT equals to 228 K. Are these conditions standard ?

(2) What is the speed of sound at FL320 in the condition of temperature ISA + 10 ?

(3) An aircraft flies at Mach 0.80 at FL300 in condition of ISA + 15. The Kr recovery coefficient of the temperature probe for these conditions is equal to 0.90. What is the value of the kinetic heating ΔT ?

(4) An aircraft flies at Mach 0.80 and the impact measured temperature is -28° C. The temperature probe recovery coefficient Kr = 0.85. What is the SAT of the mass of air around the plane ?

(5) If TAS = 490 kts, M = 0.83, FL = 340, what is the difference with the standard temperature?

(6) An aircraft flies at FL250 and CAS is constant. How will the Mach number change if the SAT increasing ?

(7) At a pressure altitude equals 0, the air speed indicator indicates 200 kts for Pt-Ps equals x hPa. At F140 where the air density ratio is 0.64, what is the indicated air speed for the same value of Pt-Ps ?

(8) An aircraft flies at FL300 under standard conditions. What is the impact on TAS if Mach number change 0.03 ?

(9) To measure the pressure altitude, how to adjust the altimeter ? The altitude of Toulouse-Blagnac Airport is 480 ft. What should be the QNH if QFE =1000 hPa ?

(10) An aircraft flies at certain flight level and goes to a high pressure zone. How is the actual altitude ?

(11) An altimeter is set to QNH 1031. The plane is flying at an altitude of 5500 ft, what is the pressure altitude ?

(12) The following table gives the trends of parameters: ↑, →, ↓

Climb

CAS	TAS	Ma	A
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Descent

CAS	TAS	Ma	A
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(13) Consider a Pitot static tube has certain blockage at the following part:

a) Blockage: Pitot tube
Normal: static port/drain hole

b) Blockage: Drain hole/static port/Pitot tube
Normal: None

c) Blockage: Pitot tube/drain hole
Normal: static port

d) Blockage: Static port
Normal: Pitot tube/drain hole

(14) Typical air data static pressure sensors have a full scale pressure range of 0 to 130 kPa (0–1,300 mb. They are required to operate over a temperature range of −60° C to +90° C (or higher). What will be the effect of a 100 Pa error in static pressure measurement at sea level ? What will be the effect of the same error at 13000 m ?