Q. 4 (a) In a GSM system, 8 channels can co-exist in 200 kHz bandwidth using TDMA. A GSM based cellular operator is allocated 10 MHz bandwidth. Assuming a frequency reuse factor of 0.2, i.e. a five-cell repeat pattern. Determine the maximum number of simultaneous channels that can exist in one cell. **3 marks**

(b) A 36 MHZ bandwidth limited transponder is allotted with voice only carrier in FDMA mode with 45 KHz separation between centre frequency of carriers. Assuming 40% voice activity, what will be the number of carriers? **4 marks**

(c) The speed of an aircraft is 500 Km/hr and it is heading toward the airport control tower at an elevation of 25^0. The communication between the tower and the plane takes place at a frequency of 128 MHz. Find the difference between the received frequencies at the aircraft receiver when it moves toward the airport and when it moves away from the airport. **3 marks**