# Practical round

**7. Noon.** An observer based in some city in Bangladesh monitored time of local noon on each day in the year 2012. In table 1, first column is serial number, second column is date of observation (**D**), third column is time of local noon (**T**) as per observer's clock and the last column is measured altitude of the Sun at local noon (**a**) in degrees. Bangladesh follows UT+6 hours timezone, and it is known that on 15th April every year, the mean sun's position matches exactly with the true sun. Use this data to find:

**7.1.** Longitude of the Observatory.

**7.2.** Latitude of the Observatory.

**7.3.** Use the given map of Bangladesh, to identify the city. Write the name of city exactly as given in the Map.

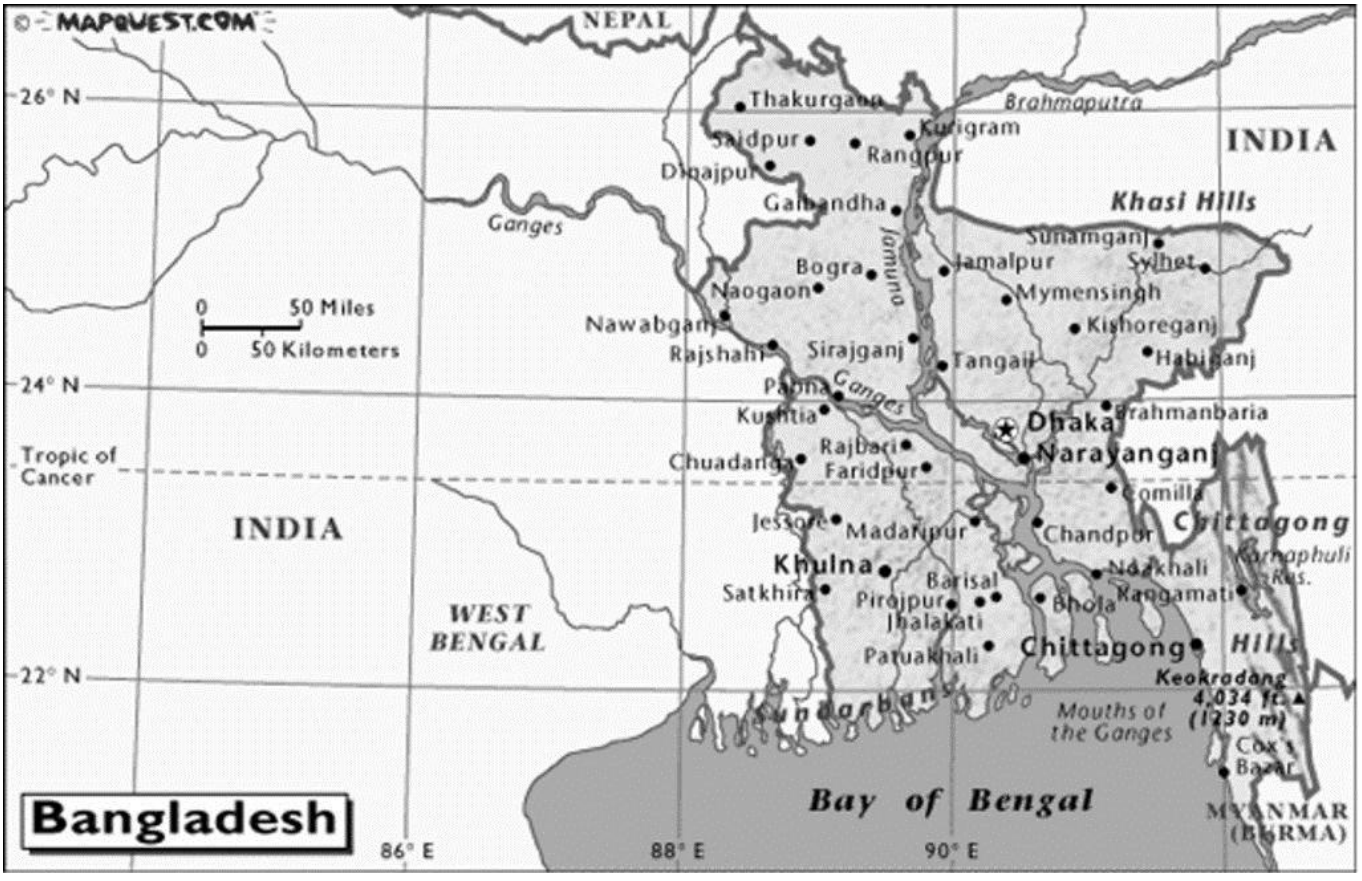
**7.4.** Draw a graph showing equation of time (EoT) correction required (in minutes) for each day.

**7.5.** Date on which the Sun culminates at the earliest and difference in minutes from local noon.

**7.6.** Date on which the Sun culminates at the latest and difference in minutes from local noon.

**7.7.** Dates apart from 15th April when the Sun culminates exactly at local noon.

*Note:* write all dates in DD.MM.YYYY format using Arabic numerals only.



# Practical round

**8. The black cloud.** In science fiction novel "The black cloud", written by Sir Fred Hoyle in 1957, an interstellar dark cloud is discovered approaching the solar system. We will try to retrace the steps explained in the novel to estimate motion of the cloud. Two photographs given below show a small region inside the constellation of Orion. The photographs are taken exactly 2 years apart. The grid in the image has the size of $1^o$ x $1^o$.

**8.1.** In how many years (after the second image) the cloud will entirely cover the belt of Orion (seen on the left)?

**8.2.** In how many years (after the second image) the cloud will arrive at the Earth? Assume the cloud to have uniform velocity throughout the journey.

