Data Analysis question – reserve

3. Analysis of comet photographs

You are provided with two pictures of a comet, taken at different times, and a map in equidistant projection which includes the region of the pictures. Table 1 gives the coordinates of several of the stars, and table 2 gives details of the photographs.

(a) Using the first picture of the comet, estimate the angular size of the comet's head and tail. (Mark picture 1 with a line showing where you assume the end of the tail is.)

(b) Mark the stars from the table on the map and on pictures 1 and 2.

(c) Mark on the map the position of the comet's head from pictures 1 and 2.

Using information from table 2, calculate :

(d) the comet's elongation,

(e) the distance of comet from the Earth,

(f) the linear size of the comet's head,

(g) the linear size of the comet's tail,

(h) Using the second picture, estimate the angular speed of comet.

Assume that the tail is parallel to the direction defined by the comet's head and the Sun.

Table 1:

Star	α_{2000} (h, m, s)			δ_{2000} (° ′ ″)		
A	21	51	01	39	33	42
B	21	48	28	38	02	10
C	21	34	37	38	17	12
D	21	36	58	40	24	56
E	21	27	25	37	7	59
F	21	17	33	39	22	15

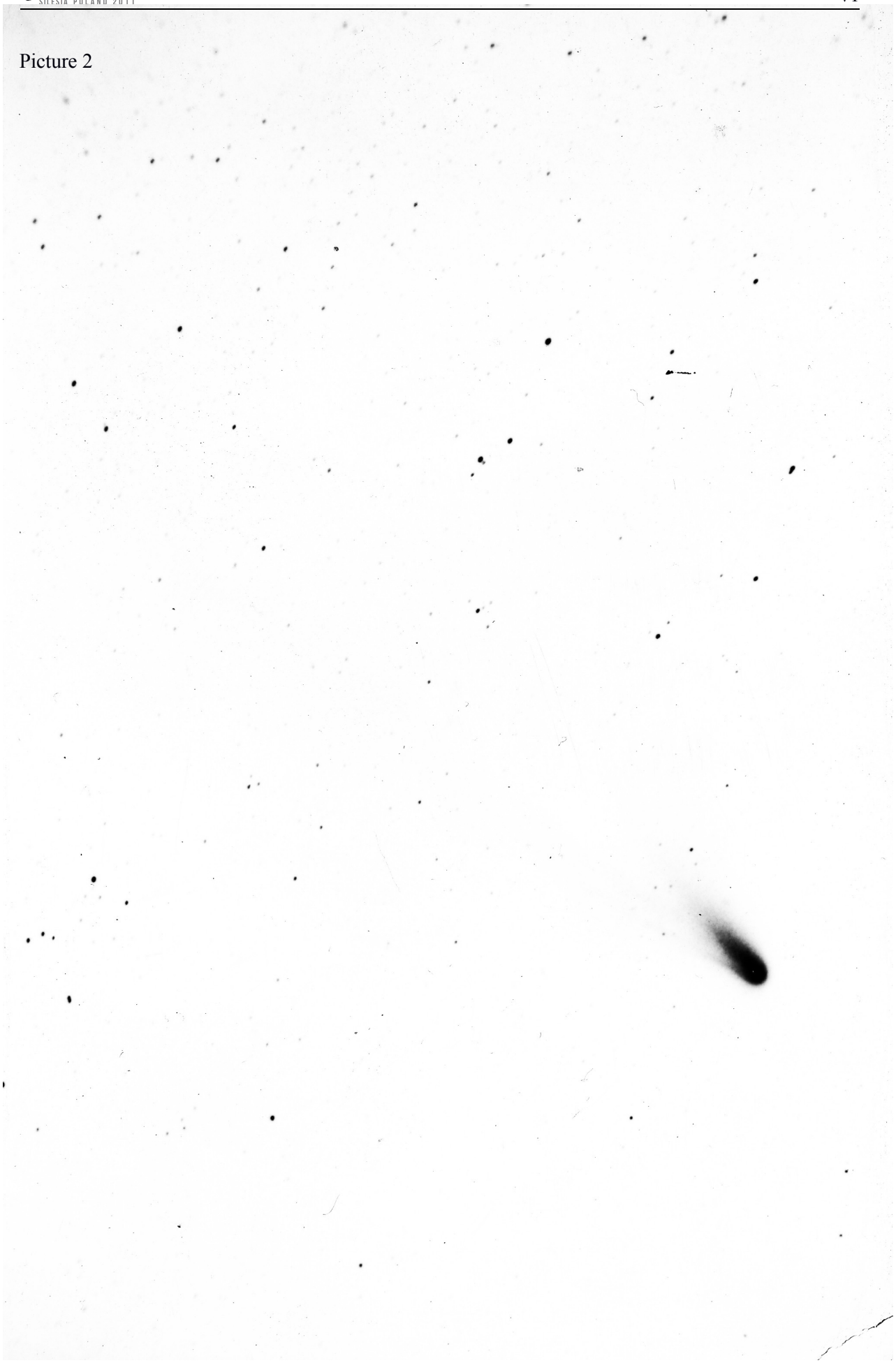
Table 2 :

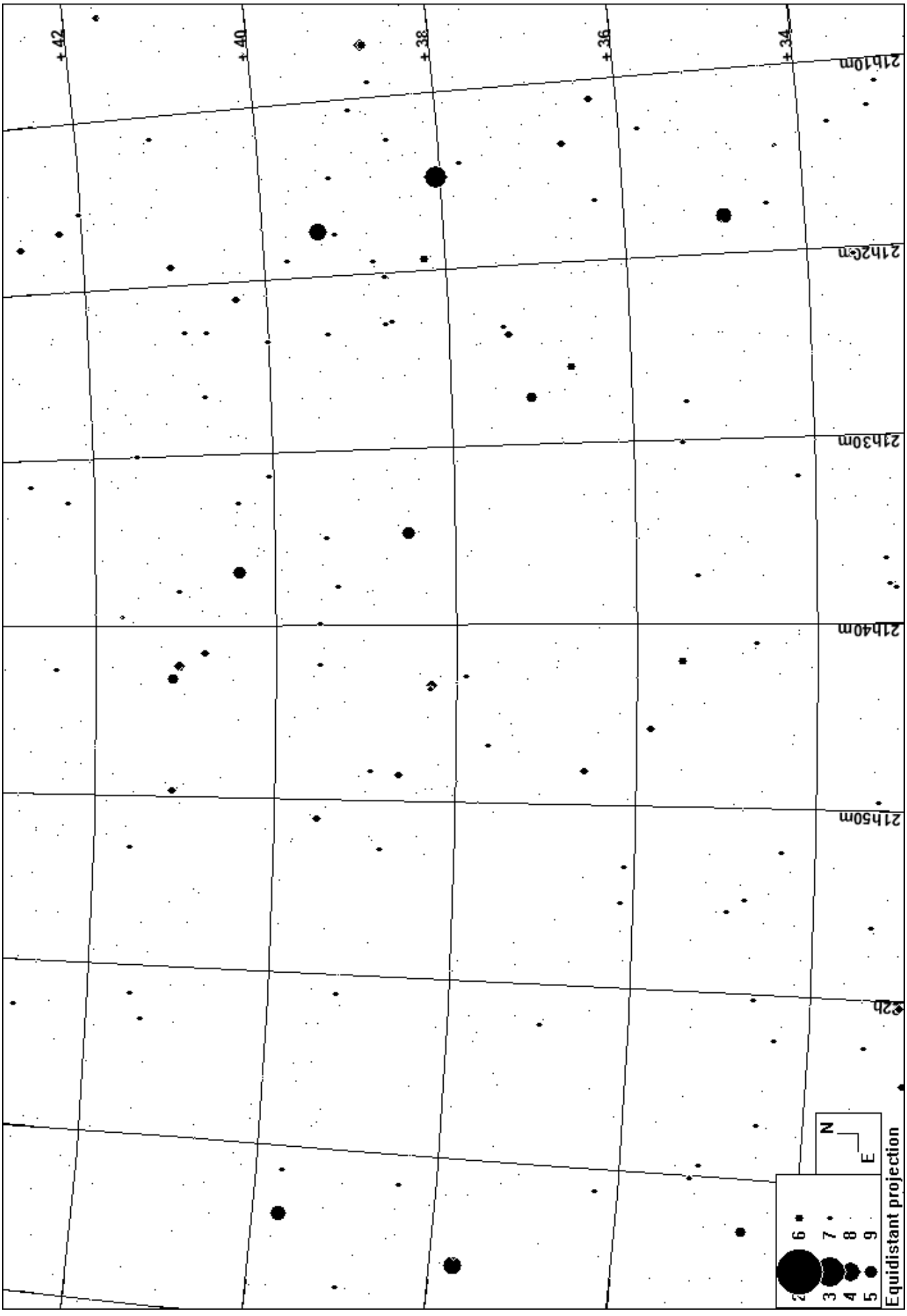
	Time of exposure of the pictures	Coordinates of Sun at the moment of exposure	The distance of comet from Sun
Picture 1	6 III 1997 3:00 UT	$\alpha = 23^h\ 06^m \quad \delta = -5^\circ\ 49'$	R_1 = 1.024 AU
Picture 2	8 III 1997 3:00 UT	$\alpha = 23^h\ 13^m \quad \delta = -5^\circ\ 02'$	R_2= 1.009 AU

Code no.:

Picture 1

Picture 2




+42
+40
+38
+36
+34
21h10m
21h20m
21h30m
21h40m
21h50m
22h
N
E
2
3
4
5
6
7
8
9
Equidistant projection