

VIII Азиатско-Тихоокеанская
астрономическая олимпиадаVIII Asian-Pacific
Astronomy Olympiad

ЯЗЫК	<u>English</u>
language	

Practical round

- 8. Variable stars.** An enthusiastic astronomer in Dhaka found the data given in table 2 about variable stars in Large Magellanic Cloud (LMC) from virtual observatory. In the table, first column is serial number of star, second column is its Right Ascension (α), third column is Declination (δ), fourth column is period of pulsation in days and last column is its observed magnitude (m).
- 8.1.** Help the observer to classify the variables as classical Cepheids (C1), type II Cepheids (C2) and RR Lyrae stars (R). You should write these symbols in front of each star in the table. You may or may not use graph paper.
- 8.2.** Period-luminosity relation for Cepheids takes the form $M = A \cdot \log_{10}(p) + B$, where M is absolute magnitude of the star and A and B are some constants. For LMC, find value of A and B for both types of Cepheids. You can assume distance of LMC as 48 kpc.
- 8.3.** Identify foreground (mark "F") and background (mark "B") stars (if any) in the data.
- 8.4.** Estimate distance to the stars which are not part of LMC.

Notes:

- Classical Cepheid stars are a type of pulsating variable stars, which show linear relationship between period of pulsation and absolute luminosity in a log-log plot.
- Type II Cepheid stars show exactly similar kind of relationship as classical Cepheids but are fainter than a classical Cepheids for a given period.
- RR Lyrae stars are another type of pulsating variable stars which show very short period (less than 1 day) of pulsation and for all RR Lyrae stars, the absolute luminosity is nearly constant.