αβ-4. XVIII century. Midday.

4.common. Totally 2 pt, including:

Calculation of the solar constant in nesessary units, result $2.12 \cdot 10^{6}$ hp / vrst^{2} or 0.94 hp / arsh^{2} – 2 pt.

4.1. Totally 3 pt, including:

Latitudes the same as now (about $54.7° – 55.2°$) – 1 pt.

Calculation of altitudes of midday Sun in winter, spring, autumn, summer – 1 pt.

$W = A \cdot \sin h$, correct final calculations – 1 pt.

4.2. Totally 3 pt, including:

Correct understanding on what the answer may depend – 0.5 pt.

Correct model of horse, including the picture – 0.5 pt.

The cross-sectional area of a horse perpendicular to the sun-rays is $1 \div 3$ arsh^{2} – 0.5 pt.

Correct calculations and result about 1-3 hp – 1 pt.

Common conclusion about surprise that horse standing in the sun, receives about one to three horse-powers of solar radiation – 0.5 pt.

αβ-5. XXI century. Midday.

5.1. Totally 3 pt, including:

Summer time, meridian $45°$, far to the east, so not possible – 2 pt.

Mention that adding of the equation of time – correction not more than $4°$ in longitude – 1 pt.

5.2. Totally 5 pt, including:

For any day during summer time the situation is similar #5.1. – 1 pt.

Finding longitudes of Lithuania, meridian $30°$ is not too far – 1 pt.

Correct equation of time using – 1 pt.

Values of η were below -15 minutes – 1 pt.

Finding the period from October 18 to November 17 (approximately) – 1 pt.

αβ-6. Supernova remnant.

6.1. Totally 4 pt, including:

Correct measurements of distances – 0.5 pt.

Finding necessary distances and mass – 1.5 pt.

Energy, finding typical speeds – 1 pt.

Final the time, correct calculations – 1 pt.

6.2. Totally 2 pt, including:

Correct measurements of distance from the center – 0.5 pt.

Calculations and correct answer – 1.5 pt.

6.common. Totally 2 pt, including:

The most data in the problem conditions was done very roughly, with maximum 1 significant digit, so the answer should be expressed also with only one significant digit, follow this principle – 2pt.