

Physics, Space, Innovation

(Grade 12, Questions/Answers)

All time values in Book of Problems are indicated as UTC (Coordinated Universal Time)

Grade 12

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Grade 12

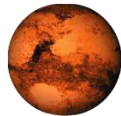
Telescope	Mars	Atmosphere	CNES	Distance	Mathematics	STEM
Astronaut	Planet	Frequency	DLR	Velocity	Chemistry	
Robot	Sun	Radiation	ISRO	Time	Informatics	
Rocket	Comet	Wave	CNES	Period	Biology	
Shuttle	Asteroid	Magnetism	DLR	Angle	Astronomy	
ISS	Meteorite	Temperature	NASA	Coordinate	Geography	
Cubesat	Earth	Mass	ESA	Orbit	Mathematics	
Satellite	Moon	Gravity	NASA	Distance	Chemistry	
Rover	Mars	Atmosphere	ESA	Velocity	Informatics	
Probe	Earth	Frequency	Roscosmos	Time	Biology	

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P-12.1 – Problem No. 41



Telescope	Mars	Atmosphere	CNES	Distance	Mathematics
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Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the right side of the text.

For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



P-12.2 – Problem No. 42



Astronaut	Planet	Frequency	DLR	Velocity	Chemistry
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Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the left side of the text.

For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

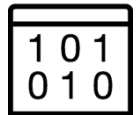
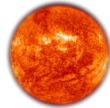
Write the text of question in bold font.

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P-12.3 – Problem No. 43



Robot

Sun

Radiation

ISRO

Time

Informatics

Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the right side of the text.

For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



P-12.4 – Problem No. 44



Rocket

Comet

Wave

CNES

Period

Biology

Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the left side of the text.

For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.

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P-12.5 – Problem No. 45



Shuttle

Asteroid

Magnetism

DLR

Angle

Astronomy

Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the right side of the text.

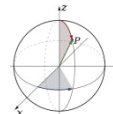
For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



P-12.6 – Problem No. 46



ISS

Meteorite

Temperature

NASA

Coordinate

Geography

Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the left side of the text.

For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



P-12.7 – Problem No. 47



Cubesat	Earth	Mass	ESA	Orbit	Mathematics
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Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the right side of the text.

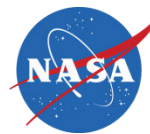
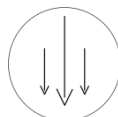
For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



P-12.8 – Problem No. 48



Satellite	Moon	Gravity	NASA	Distance	Chemistry
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Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the left side of the text.

For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

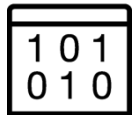
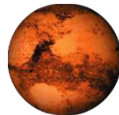
Write the text of question in bold font.

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P-12.9 – Problem No. 49



Rover

Mars

Atmosphere

ESA

Velocity

Informatics

Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the right side of the text.

For more information visit this [webpage](#). (*Fill in corresponding hyperlink*).

Question (A):

Write the text of question in bold font.



P-12.10 – Problem No. 50



Probe

Earth

Frequency

Roscosmos

Time

Biology

Write short **real space story** dealing with topics presented in the above coloured cells.

Insert **open source picture** in the left side of the text.

For more information visit this [webpage](#). (*Fill in corresponding hyperlink*).

Question (A):

Write the text of question in bold font.

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Space calendar

<http://www.spacecalendar.com>

<http://spaceflightnow.com/launch-schedule/>

January 28 (YEAR)

<http://www.astronautix.com/j/january28.html>

Catastrophic failure of space shuttle „Challenger“. The first „Teacher in Space“, astronaut Christa McAuliffe and other 6 crew members died.

January 30 (YEAR)

<http://www.astronautix.com/j/january30.html>

„Naro-1“ becomes the first carrier rocket launched by South Korea.

February 26 (YEAR)

<http://www.astronautix.com/f/february26.html>

Galileo Galilei banned from teaching the view that the earth orbits the sun.

March 22 (YEAR)

<http://www.astronautix.com/m/march22.html>

Hale–Bopp comet's closest approach to Earth.

May 13 (YEAR)

<http://www.astronautix.com/m/may13.html>

Nigerian communication satellite „Nigcomsat 1“ became the first African geosynchronous communication satellite.

July 4 (YEAR)

<http://www.astronautix.com/j/july04.html>

American robotic spacecraft „Mars Pathfinder“ landed on Mars.

August 25 (YEAR)

<http://www.astronautix.com/a/august25.html>

NASA's spacecraft „Voyager 1“ left the Solar system and entered Interstellar space.

October 16 (YEAR)

<http://www.astronautix.com/o/october16.html>

Argentina's first domestic geosynchronous communications satellite „Arsat-1“ was launched.

October 18 (YEAR)

<http://www.astronautix.com/o/october18.html>

Nuclear rocket engine proposed.

December 7 (YEAR)

<http://www.astronautix.com/d/december07.html>

The final Apollo manned lunar landing mission „Apollo 17“ was launched.

December 9 (YEAR)

<http://www.astronautix.com/d/december09.html>

Wallops Island Launch Site founded in the USA. The two first lithuanian Cubesats were launched from this site in 2014.

ANSWERS



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P-12.1 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.2 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.3 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.4 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.5 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.6 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.7 (Q)

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Problem solution comment.

Answer: write in the answer.

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P-12.8 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.9 (Q)

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Problem solution comment.

Answer: write in the answer.

P-12.10 (Q)

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Problem solution comment.

Answer: write in the answer.

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INFORMATION SOURCE

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ESA - http://www.esa.int/ESA/Our_Missions

NASA - <https://www.nasa.gov/missions>

DLR - <http://www.dlr.de/dlr/en/desktopdefault.aspx/tabid-10012/#/Missionen/Start/Feature>

JAXA - <http://global.jaxa.jp/projects/>

CNSA - <http://www.cnsa.gov.cn/n6443408/index.html>

CNES - https://cnes.fr/en/fiches_mission_alpha

ISRO - <http://www.isro.gov.in/missions-o>

Roscosmos - <http://en.roscosmos.ru/>

<http://funphysics.jpl.nasa.gov/>

<http://www.nasa.gov/audience/foreducators/stem-on-station/lessons>

http://www.nasa.gov/audience/foreducators/k-4/features/materials_archive_1.html

<http://myasadata.larc.nasa.gov/educators/>

Information on Launch vehicles, Satellites, Space Shuttle and Astronautics:

<http://space.skyrocket.de/index.html>

VOCABULARY

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Telescope

Earth or Space based instrument for observation of remote objects.

Astronaut

Person trained for human spaceflight (as well cosmonaut or taikonaut).

Robot

Mechanical apparatus capable to perform programmed physical tasks in space.

Rocket

Flying space device powered by the reactive force.

Shuttle

Reusable spaceplane for Earth orbiting or human/cargo delivery to ISS.

ISS

Earth's largest artificial satellite - International Space Station.

Cubesat

Earth's artificial cube shaped satellite, dimensions 10×10×10 cm, mass – 1 kg.

Satellite

Artificial object launched by human efforts and orbiting any space body.

Rover

Vehicle designed to explore surface of any space body.

Probe

Automatic spacecraft exploring bodies of Solar system.

Earth

Third planet from the Sun and fifth largest planet of Solar system.

Moon

Earth's natural satellite.

Mars

Fourth planet from the Sun and seventh largest planet of Solar system.

Planet

Space body revolving around a star (including the Sun).

Sun

Earth's closest star.

Comet

Small icy space body (cometoid), when passing close to the Sun displaying coma or tail.

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Asteroid

Minor planet (planetoid) orbiting the Sun in elliptical orbit.

Meteorite

Debris from space object (meteoroid) survived the passage through atmosphere.

Temperature

Object's (space body) warmth.

Mass

Quantity of matter.

Gravity

Interaction between material bodies depending on their mass.

Atmosphere

Gas layer surrounding space body of sufficient mass.

Frequency

Event recurrence per unit of time.

Radiation

Spontaneous decay of atomic nuclei.

Wave

Energy transfer in space and time.

Magnetism

Magnetic interaction occurring between the moving electric charges.

NASA

National Aeronautics and Space Administration – governmental agency of USA.

ESA

European Space Agency – intergovernmental space exploration organisation.

Roscosmos

Roscosmos State Corporation for Space Activities – governmental body of Russia.

JAXA

Japan's National Aero-space Agency - national agency of Japan.

CNSA

China National Space Administration - national agency of China.

ISRO

Indian Space research Organisation – governmental agency of India.

CNES

National Center of Space Research - governmental agency of France.

DLR

German Aerospace Center – national center of Germany.

Time

Duration of object (space body) existence.

Period

Time elapsed for one rotation of object (space body) around its axis or other space body.

Angle

Figure (area) formed by two rays sharing the common endpoint.

Coordinate

Object's (space body) position in plane or space.

Trajectory

Path that moving object (space body) follows through space.

Orbit

Curved path of moving object (space body) around other object (space body).

Distance

Length (interstice) between objects (space body) in plane or space.

Velocity

Completed distance of object (space body) per unit of time.

Mathematics

Science of structures, variations and spatial patterns.

Physics

Science of all forms of matter.

Chemistry

Science of chemical elements and nature of materials.

Informatics

Science of information processing and storage, the use of computers.

Biology

Science of life and living organisms.

Astronomy

Science of celestial objects and processes outside the atmosphere of Earth.

Geography

Science of the lands, the features, the inhabitants and the phenomena of Earth.

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