

# Astronomy, 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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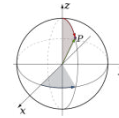


# Grade 12

Telescope	Mars	Magnetism	NASA	Coordinate	Chemistry	<b>STEM</b>
Astronaut	Planet	Temperature	ESA	Trajectory	Informatics	
Robot	Sun	Mass	NASA	Orbit	Biology	
Rocket	Comet	Gravity	ESA	Distance	Geography	
Shuttle	Asteroid	Atmosphere	Roscosmos	Velocity	Mathematics	
ISS	Meteorite	Frequency	JAXA	Time	Physics	
Cubesat	Earth	Radiation	CNSA	Angle	Chemistry	
Satellite	Asteroid	Wave	ISRO	Coordinate	Informatics	
Rover	Meteorite	Magnetism	CNES	Trajectory	Biology	
Probe	Earth	Temperature	DLR	Orbit	Geography	



A-12.1 – Problem No. 41



Telescope

Mars

Magnetism

NASA

Coordinate

Chemistry

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.

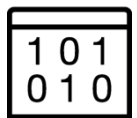
For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



A-12.2 – Problem No. 42



Astronaut

Planet

Temperature

ESA

Trajectory

Informatics

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.

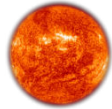
For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



A-12.3 – Problem No. 43



Robot

Sun

Mass

NASA

Orbit

Biology

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.

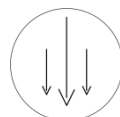
For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



A-12.4 – Problem No. 44



Rocket

Comet

Gravity

ESA

Distance

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.



A-12.5 – Problem No. 45



Shuttle

Asteroide

Atmosphere

Roscosmos

Velocity

Mathematics

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.



A-12.6 – Problem No. 46



ISS

Meteorite

Frequency

JAXA

Time

Physics

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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A-12.7 – Problem No. 47



Cubesat

Earth

Radiation

CNSA

Angle

Chemistry

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.

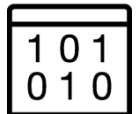
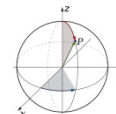
For more information visit this [webpage](#). (Fill in corresponding hyperlink).

Question (A):

Write the text of question in bold font.



A-12.8 – Problem No. 48



Satellite

Asteroid

Wave

ISRO

Coordinate

Informatics

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.

SPACEOLYMP

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A-12.9 – Problem No. 49



Rover	Meteorite	Magnetism	CNES	Trajectory	Biology
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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.



A-12.10 – Problem No. 50



Probe	Earth	Temperature	DLR	Orbit	Geography
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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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## Space calendar

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

January 21 (YEAR)

<http://www.astronautix.com/j/january21.html>

Write very brief message about space-related event of this day in history, specify a year.

March 13 (YEAR)

<http://www.astronautix.com/m/march13.html>

Write very brief message about space-related event of this day in history, specify a year.

March 15 (YEAR)

<http://www.astronautix.com/m/march15.html>

Write very brief message about space-related event of this day in history, specify a year.

May 4 (YEAR)

<http://www.astronautix.com/m/may04.html>

Write very brief message about space-related event of this day in history, specify a year.

May 6 (YEAR)

<http://www.astronautix.com/m/may06.html>

Write very brief message about space-related event of this day in history, specify a year.

June 25 (YEAR)

<http://www.astronautix.com/j/june25.html>

Write very brief message about space-related event of this day in history, specify a year.

June 27 (YEAR)

<http://www.astronautix.com/j/june27.html>

Write very brief message about space-related event of this day in history, specify a year.

August 18 (YEAR)

<http://www.astronautix.com/a/august18.html>

Write very brief message about space-related event of this day in history, specify a year.

September 21 (YEAR)

<http://www.astronautix.com/s/september21.html>

Write very brief message about space-related event of this day in history, specify a year.

October 9 (YEAR)

<http://www.astronautix.com/o/october09.html>

Write very brief message about space-related event of this day in history, specify a year.

November 30 (YEAR)

<http://www.astronautix.com/n/november30.html>

Write very brief message about space-related event of this day in history, specify a year.



## ANSWERS



## Grade 12

### A-12.1 (Q)

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Problem solution comment.

Answer: write in the answer.

### A-12.2 (Q)

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Problem solution comment.

Answer: write in the answer.

### A-12.3 (Q)

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Problem solution comment.

Answer: write in the answer.

### A-12.4 (Q)

[Return to Content](#)

Problem solution comment.

Answer: write in the answer.

### A-12.5 (Q)

[Return to Content](#)

Problem solution comment.

Answer: write in the answer.

### A-12.6 (Q)

[Return to Content](#)

Problem solution comment.

Answer: write in the answer.

### A-12.7 (Q)

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Problem solution comment.

Answer: write in the answer.

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**A-12.8 (Q)**

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**Problem solution comment.**

**Answer:** write in the answer.

**A-12.9 (Q)**

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**Problem solution comment.**

**Answer:** write in the answer.

**A-12.10 (Q)**

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**Problem solution comment.**

**Answer:** write in the answer.

## INFORMATION SOURCE

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ESA - [http://www.esa.int/ESA/Our\\_Missions](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](https://cnes.fr/en/fiches_mission_alpha)

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

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

<https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Space.Based.Astronomy.html#.VieUP9LhDEY>

[https://www.nasa.gov/pdf/58277main\\_Space.Based.Astronomy.pdf](https://www.nasa.gov/pdf/58277main_Space.Based.Astronomy.pdf)

<http://www.nasa.gov/audience/forstudents/5-8/index.html>

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

[http://www.nasa.gov/audience/foreducators/k-4/features/materials\\_archive\\_1.html](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.

### Asteroid

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

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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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