GSA 2021

Day: Part-II : Section A Date:

Q2 (a) Difference between a Star and a Planet, Magnitude of a Star and Correlation of a Star's color with their Temperature

Answer 1- Difference between a Star and a Planet

a- Star:

A luminous celestial body which produces energy and emanates light due to ongoing nuclear fusion reaction inside it is called as star.

Sun is one of the widely known star occuring in the Milkyway Galaxy. There are millions of other stars constituting galaxies and are visible in the night.

b- Planet:

A rigid astronomical body with assumed spherical shape and continously spinning along its own axis and revolving around a star is called as planet.

Planets tend to be building blocks of the solar system. They may or may not have their own natural satellites - moon. Our solary system comprises eight (planets) revolving around the Sun and are depicted in the following diagram.

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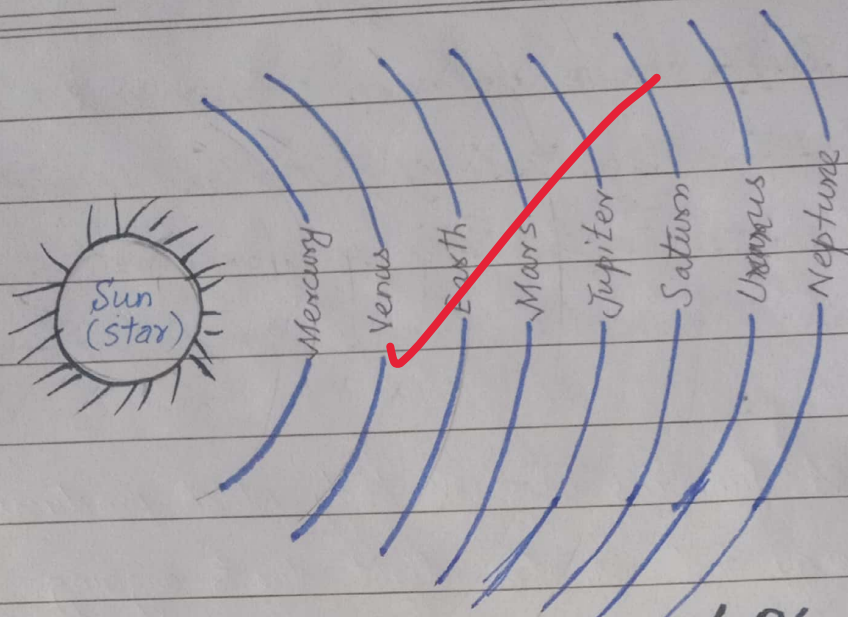

Solar System with Sun and Planets

2- Magnitude of Star

The measure of the brightness of a star is called as the magnitude of stave.

It depends upon the intrinsic luminosity and the distance of the star.

3- Correlation of the Color of Stars with their Temperature

The color of stars is correlated with their temperature such that the color indicates the intensity of temperature of a star. The color and temperature of a star is correlated as follow:

Energy increases from Red to Blue

Energy → Red — Yellow — Blue

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(b) Semiconductors – (As the Brain of Modern Electronics)

Answer 1- Semiconductor

A substance with electrical conductivity in between conductors and insulators is called as semiconductor.

2- How Semiconductors are the brain of modern electronics?

The properties of semiconductors can be modified according to the needs and requirement. Therefore their use and significance have been enhanced in the modern electronics. Following are the modern electronic equipment which owe their existence to the semiconductors:

i- Solar Cells

ii- Liquid Crystal Display Screens (LCDs)

iii- Modern Computers

iv- Cellular Phones

v- Space Equipments

vi- Digital Communication Infrastructure

vii- Medical and Surgical Equipment

discuss these arguments in detail .

Shortly, every modern instrument creating ease and comfort for humans

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use semi-conductors. Therefore, in their absence the digital age of today can collapse. That is why, semiconductors are rightly called as the Brain of Modern Electronics.

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(c) The Most Popular and Accepted Theory about the Origin of the Universe

Answer The Big Bang Theory is deemed as the most popular and accepted theory about the origin of the Universe

1- Big Bang Theory

According to Big Bang Theory, the Universe came into being due to sudden explosion or bang 15-20 billion years ago. This theory explains that all of sudden an extremely dense particle exploded marking the change of nothingness to the existence of space marked by time. The universe came into being periodically.

First of all four basic natural forces were created.

i- Gravitational force

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ii- Strong Nuclear force

iii- Weak ~~Electric~~ Nuclear force

iv- Electric force

After creation of forces, the hot dense substance starts cooling and expansion. Chemically Helium and Hydrogen were the main constituents. However, as the cooling increased, their chemical interaction produced new chemical elements. Presently Helium and Hydrogen are 98% with 2% remaining elements. Similarly, expanding matter coalesced forming stars and planets. The radioactive elements concentrated heavily in the centres of stars started nuclear fusion emanating light and energy.

2- Evidences of Big Bang Theory

i- Expanding Universe

The observation of Universe reveals that every astronomical body is expanding — moving at the rapid speed. Whereas from their expanding

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speed, their previous location can be determined.

ii- 2K Microwave Radiation Theory

2K Microwave Radiation Theory is the supporting theory of Big Bang Theory. According to it the echoe of bang can be heard while the radiations emanated at that time can also be observed.

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(d) Advantages and Limitations of Renewable Energy Resources and Prospects of Non-conventional Energy Resources in Pakistan

Answer. i- Renewable Energy Resources

Energy resources which are inexhaustible and can be replenished in short span of time are called as renewable energy resources

ii- Examples

a- Solar Energy

b- Hydal Energy

c- Wind Energy

d- Coastal Energy (Wind and Tidal Energy)

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e) Geothermal Energy

iii- Advantages of Renewable Energy Resources

Renewable energy resources have following advantages:

1- Cheaper Sources of Energy
2- Sustainable Sources of Energy
3- Clean Sources of Energy- Environmental friendly
4- Wide and Easy Availability Everywhere
5-

iv- Limitations of Renewable Energy Resources

Renewable energy resources have following limitations:

1- Transition from non-renewable energy resources to renewable requires heavy capital investment due to costly production infrastructure
2- The exploitation of renewable energy resources requires modern equipment which are not easily available to the major portion of global population.

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3- Lack of energy storage infrastructure for renewable energy decrease their usefulness in the long run. As these resources are widely exposed to natural climatic variations. For example cloudy day decreases efficiency of solar pannels while vasiations in wind circulation compromise the yield of wind wane.

V- Prospects of non-conventional Energy resources in Pakistan.

Following are the prospects of non-conventional energy resources in Pakistan.

1- Prospects of Solar Energy

Geographically, Pakistan lies within the sunny belt, where sunlight falls around the whole year. Therefore, this country can harness huge potential of solar energy

2- Prospects of Wind Energy

The coastal belt of Sind and Baluchistan has huge potential

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of wind energy which can fulfill the local needs besides providing to national grid.

3- Prospects of Coastal Energy

Pakistan has km long coast, which can prove of huge potential of tidal and wave energy if exploited.

4- Prospects of Hydal Energy

Pakistan possesses huge potential of hydal energy or hydropower; however, meagre portion of it is utilized. The studies reveal that Indus River alone has the potential of 60000 MW hydropower around the year.

5- Geothermal Energy's Prospects

Pakistan lies within active seismo-tectonic region tectonically. Therefore, huge prospects of geothermal energy lies in the northwestern and southern mountainous region of Pakistan.

Concisely, Pakistan has huge prospects of non-conventional energy resources and their exploitation can helps us

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in overcoming energy crisis and environmental challenges.

4.5

good answer!!

attempt and upload a single qs at atime. work on the pointed mistakes.

Q.4 and then attempt the next qs

(a) **Sequence of Strata of Atmosphere and Depending Factors**

Atmosphere is the blanket of gases surrounding the Earth and enables the life to sustain.

⇒ **Sequence of Strata of Atmosphere**

Following are the strata constituting the atmosphere from bottom to top;

i- Troposphere

It is the outermost sphere or layer of the atmosphere and the weather formation takes place in it.

ii- Stratosphere

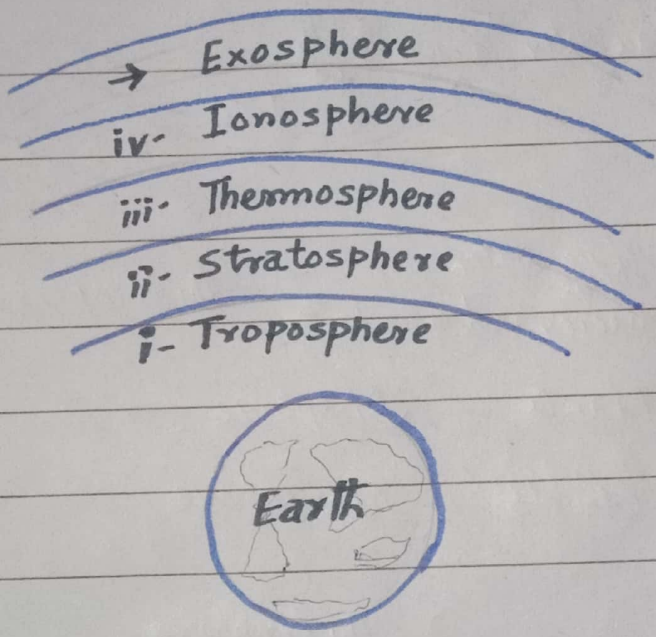
It is the second layer of atmosphere and it houses the ozone layer.

iii- Thermosphere

It is the third layer of atmosphere. In this layer, temperature increases with distance.

iv- Ionosphere

It is the last layer of the atmosphere and it constitutes the last bordering layer of atmosphere. It separates atmosphere from the outer space – exosphere.



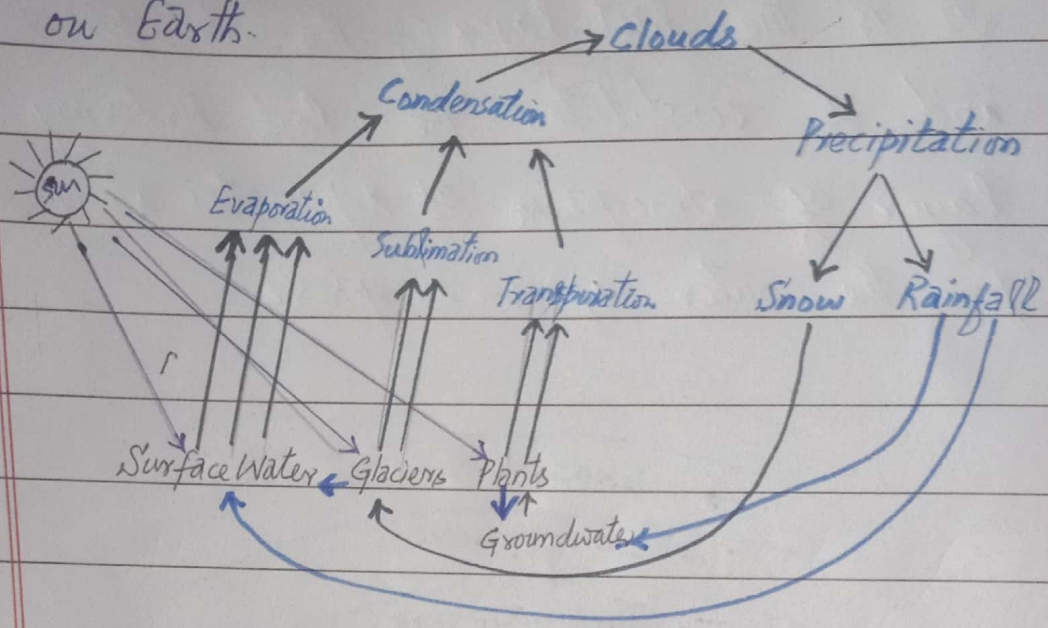
(b) Water Cycle and Major Processes Involved in Water Cycle

1- Water Cycle

Natural cyclic processes responsible for exchange of water among hydrosphere, atmosphere and biosphere is called as water cycle.

Water cycle is natural water filtration phenomenon. It helps in

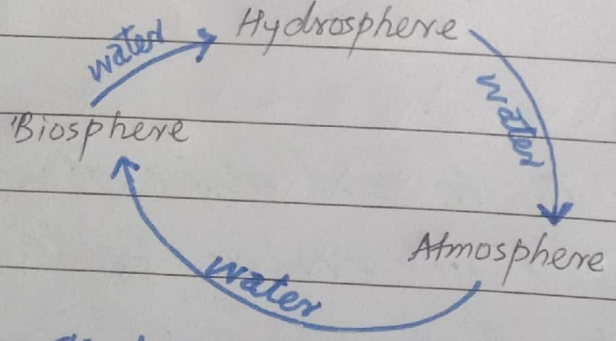
temperature variation and wind circulation on Earth.



Surface water Plus Glaciers and Groundwater } Hydrosphere

Plants → Biosphere

Clouds → Atmosphere



Sketch of Water Cycle

2- Major Processes Involved in Water Cycle

i- Evaporation

The transformation of water on the Earth's surface to vapours due to heat provided by the sunlight is called

as evaporation

ii- Sublimation

The direct conversion of glacial mass into vapors is called sublimation

iii - Transpiration

The release of vapors from the plant's body due to heat is called as transpiration

iv- Condensation

The conversion of water vapors into water droplets due to fall in temperature is called as condensation. It results in clouds

v- Precipitation

The conversion of clouds into either snow and rainfall depending upon temperature is called as precipitation

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(d) Difference between Food Contaminants and Food Adulterants

1- Food Contaminants

The detrimental substances which deteriorate the quality of food on addition making it unhealthy are called as food contaminants.

Food contaminants can be

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living substance like microbes or non-living substance carrying the germs. They are generally added to food due to carelessness or unhygienic conditions.

2- Food Adulterants

The substances added intentionally or unintentionally to food to either increase quantity, make attractive or deteriorate their quality are called as food adulterants.

Food adulterants are added to the food substance for economic purposes generally. They either change color, flavor, taste or increase the quantity of food.

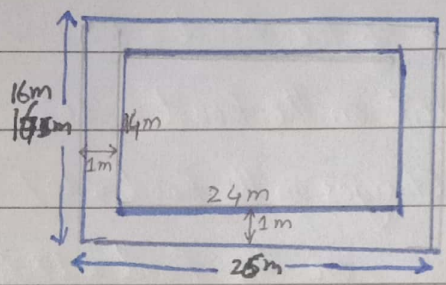
Day: Section - B Date:

Q6

(b) Tiles of $20cm^2$ required for 1 meter wide footpath around the 24m long and 14m broad grassy plot

Solution

Area of footpath = Total Area - Area of Grassy plot



Area of Grassy plot = Length × Width

$= 24 \times 14$

$= \boxed{336\ m^2}$

Total Area of plot = Length × Total Width

$= 16 \times 25$

$= \boxed{416\ m^2}$

Area of footpath = $(416 - 336)\ m^2$

$= 80\ m^2$

Total Tiles required = $\frac{\text{Area of footpath}}{\text{Area of Tile}}$

$= \frac{80\ m^2}{20\ cm^2}$

$= \frac{80\ m^2 \times 100 \times 100}{20\ m^2}$ ∴Convert cm into m

$= 40000$

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(Number of Tiles required = 40000)

Answer

(C) Total amount of money paid by Faheem for dinner at a restaurant

Given Data

Marked Price of the Food = RS 15000/-

Discount on the Food = 10%.

Service Charges on the Food = 10%.

GST on the Food = 17%.

Required

Total Money Paid by Faheem = ?

Solution

Total Discount on food = Marked Price × Discount

$= 15000 \times \frac{10}{100}$ %

Discount = RS 1500/-

Price after Discount = 15000 - 1500

= (RS 13500/-)

Service Charges on food $= 13500 \times \frac{10}{100}$

= 1350/-

GST on food $= 13500 \times \frac{17}{100}$

= 2295/-

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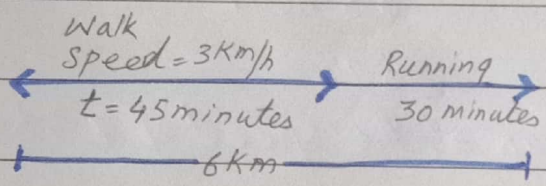
Total Amount paid for dinner = Price after discount + Service Charges + GST

= 13500 + 1350 + 2295

= RS 17145

Total Amount paid by Faheem for dinner is RS 17145/-

(d) To find the Fastness/Speed of run of Mr. Khawaja



Distance covered while Walking ⇒ (S)

S = Speed x time taken

= 3 Km/hour x 45 minutes

$= \frac{3\text{Km}}{60\text{minutes}} \times 45\text{ minutes}$

$= \frac{\cancel{3}}{\cancel{60}_{\cancel{20}_{4}}} \overset{9}{\cancel{45}}\text{ km} = \frac{9}{4}\text{ Km}$

$= \boxed{2.25\text{ km}}$

Distance left for Running in 45 minutes = Total Distance − Walked Distance

= 6Km − 2.25 Km

= 3.75 K

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Time taken while running = 30 minutes = $\frac{30}{60}$ hour

= 0.5 hour

~~Walking Dis~~

Running Speed = $\frac{\text{Distance Covered}}{\text{Time taken}}$

= $\frac{3.75 \text{ Km}}{\frac{3}{4} \text{ hour}}$

= $\frac{3.75 \times 4}{3}$ Km/hour

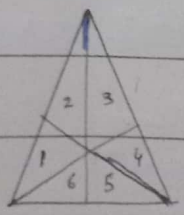
= $\frac{3.75 \text{ km}}{0.5 \text{ hour}}$ = 7.5 Km/hour

Khwaja run at the speed of 7.5 km/hour.

Q8

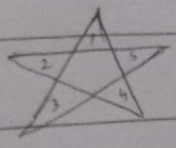
(b) Finding number of triangles in 2 images

i.



Total Triangles = 10

ii



Total Triangles = 08

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(d) Find the missing number in given series

(i) 4, 18, 48, 100, 180, 294

(ii) 15, 31, 63, 127, 255

(iii) 1, 8, 27, 64, 125, 216

(iv) 132, 156, 182, 210, 240
(24, 30)

(v) 8, 24, 12, 36, 18, 54, 27

(2) Finding out Correct word from jumbled Spellings:

i- UORSEIS = Serious

ii- REGAHT = Gather

iii- TYLEAL = Lately

iv- RAMYR = Marry

v- RYUHR = Hurry

TIME ALLOWED: THREE HOURS	PART-I (MCQS)	MAXIMUM MARKS = 20
PART-I(MCQS): MAXIMUM 30 MINUTES	PART-II	MAXIMUM MARKS = 80

NOTE:
(i) **Part-II** is to be attempted on the separate **Answer Book.**
(ii) Attempt **ONLY FOUR** questions from **PART-II** by selecting **TWO** questions from **EACH SECTION. ALL** questions carry **EQUAL** marks.
(iii) All the parts (if any) of each Question must be attempted at one place instead of at different places.
(iv) Write Q. No. in the Answer Book in accordance with Q. No. in the Q.Paper.
(v) No Page/Space be left blank between the answers. All the blank pages of Answer Book must be crossed.
(vi) Extra attempt of any question or any part of the question will not be considered.
(vii) **Use of Calculator is not allowed.**

PART – II
(SECTION – A)

Q. 2. (a) Differentiate between a star and a planet. What is the magnitude of a star and how the color of stars is correlated with their temperatures? (5)

(b) "Semiconductors are the Brains of Modern Electronics". Explain in detail what this quotation means. (5)

(c) Briefly describe the most popular and accepted theory about the origin of the Universe. (5)

(d) What are the advantages and limitations of renewable energy resources? Briefly explain the prospects of non-conventional energy resources in Pakistan. (5)**(20)**

Q. 3. (a) Explain with examples the relationship between cells, tissues and organs. (5)

(b) Explain the differences in structure & function between a cell wall and a cell membrane. (5)

(c) What is meant by transpiration? Explain in detail the significance of leaf structure in the process of transpiration. (5)

(d) What is meant by the term double circulation? Briefly describe how the heart is adapted to keep blood flowing in a double circulation. (5)**(20)**

Q. 4. (a) What is the sequence of strata of atmosphere and on what factors does it depends? (5)

(b) Describe water cycle and briefly explain the major processes involved in water cycle? (5)

(c) What is the Difference between asthenosphere and lithosphere? Explain various components of lithosphere. (5)

(d) Differentiate between food contaminants and food adulterants. (5)**(20)**

Q. 5. (a) Define the term "malnutrition". Elaborate its major causes and consequences. (5)

(b) Explain how a slice of bread after few days decomposes due to the growth of fungi. (5)

(c) What is a computer memory? Describe its units and discuss various types of memories. (5)

(d) Differentiate between natural and artificial satellites. Briefly describe the working of communication satellites with some applications. (5)**(20)**

(SECTION – B)

Q. 6. (a) A man is now 3 times as old as his son. In ten (10) years time, the sum of their ages will be 76. How old was the man when his son was born? (5)

(b) How many tiles of $20cm^2$ will be required to have a footpath 1m wide carried around the outside of grassy plot 24m long and 14m broad? (5)

(c) Mr. Faheem has dinner with his family at a restaurant which offers a 10% discount on food. The marked price of the food that they order was Rs.15000/-. Given that there was a service charges of 10% and GST is 17%, calculate the total amount of money he has to pay. (5)

(d) Mr. Khawaja walked for 45 minutes at the rate of 3km/h and then ran for half an hour at a certain speed. At the end of that time he was 6km away from the starting point. How fast did he run? (5)**(20)**

GENERAL KNOWLEDGE-I (GENERAL SCIENCE & ABILITY)

Q. 7 (a) A child went 90m towards East, and then he turned Right and went 20m. Subsequently he turned Right and after going 30m he reached his uncle's house. From there he went 100m to his North. Determine how far he is from his starting point. (5)

(b) The average of 11 numbers is 63, that of the first 6 numbers are 60 and that of the last 6 numbers are 65. Find the 6^{th} number. (5)

(c) The following table shows some values of 'x' and the corresponding values of 'y' where, $y = x^3 - 3x - 10$. (5)

x	-3	-2	-1	0	1	2	3	4
y	-28			-10			8	42

Complete the table and draw a graph between 'x' and 'y' to find the value of 'y' when x=1.8 and value of 'x' when y=10.

(d) Mr. Raheel invests Rs.60000/- in an account that earns simple interest. At the end of 5 years, the investment is worth Rs.85000/-. Calculate the rate of simple interest per year. (5)**(20)**

Q. 8. (a) Find out the correct word from the given jumbled spellings. (5)

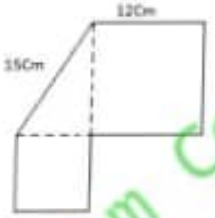
(i) UORSEIS (ii) REGAHT (iii) TYLEAL (iv) RAMYR (v) RYUHR

(b) Find the number of triangles in the following two images. (5)

(i) 

(ii) 

(c) Calculate the total area and perimeter of the given shape. (5)



(d) Find the missing numbers in the given series. (5)**(20)**

(i) 4, 18, ?, 100, 180, 294 (ii) 15, 31, 63, 127, ? (iii) 1, 8, 27, 64, 125, ?

(iv) 132, 156, ?, 210, 240, (v) 8, 24, 12, 36, 18, 54, ?

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