UNIT-8: SPACE AND TIME

UNIT STRUCTURE

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8.1 LEARNING OBJECTIVES

After going through this unit you will be able to

- Explain Categories of knowledge
- Discuss the concept of Space
- Discuss the concept of Time
- Explain the origin of Space and Time
- Distinguish the subjectivity and objectivity of Space and Time

8.2 INTRODUCTION

This unit introduces to you the concept of Space and time which are categories of knowledge. The simplest form of knowledge is judgment. A judgment consists of subject and predicate. Different judgments have different predicates .There are certain predicates which are universally present in all judgments. These universal notions involved in all judgments are called categories of knowledge. The word "category" means what predicated or affirmed of something in thinking of it. Now, in thinking of a

thing, we think of it as a substance having somewhere in space at certain point of time. These concepts of substance, space, time etc. are categories of knowledge. Different philosophers have given different lists of categories. Aristotle mentions ten categories, E.g., substance, quantity, relation, where (space), when (time), position, possession, action and passion. Kant gives list of twelve categories under quantity, quality, relation and modality. Hegel mentions seventy categories. Schopenhauer reduces all categories to causality. But most are agreed in regarding space, time substance and causality as the fundamental categories of knowledge. Among these four categories space and time are discussed in this unit.



LET US KNOW

The universal notions involved in all judgments are called categories of knowledge. The word "category" means what predicated or affirmed of something. Aristotle mentions ten categories, Kant gives twelve categories, Hegel mentions seventy categories and Schopenhauer reduces to only one category of knowledge. But most are agreed in regarding space, time substance and causality as the fundamental categories of knowledge.

8.3 CONCEPT OF SPACE

The idea of space is a fundamental element in our conception of the world. Space is characterized by such relations as above, below, inside outside, nearness, distance etc. When we look towards the world outside us, we perceived it as a system of physical things each of which has some extension. A thing may move from where it was placed to another point, but wherever it move, it must move in space or it must exist in a certain place. Each and every material body occupies some place. Thus, space is conceived by us a condition which makes possible the simultaneous existence of finite or physical things; finite things, to be finite must be distinct

from one another. Again, space is understood by us as the condition which makes the movement of things possible. It is also viewed as the underlying 'continuum' which holds all finite things and indicates their mutual relations. The material objects bear to each other the relations of above, below, to the right, to the left etc. These relations would not be possible if there is no space. The relations between objects are spatial relations. Thus the concept or category of space is indispensable in the realm of physical or finite things. Further, space is conceived by us as either filled or empty, occupied or unoccupied, plenum or vacuum.

Generally, we regard space as a container or receptacle in which all things are contained. The relation between space and material things is that of a container and contained. Space is a great void in which things exist and through which they move. It is generally regarded as infinite. The limit of space cannot be conceived. There is either something or nothing but void beyond the limit. If there is something, it must be in space, and if there is no object, it must be empty space. So, space cannot be conceived as limited, it is infinite.

8.4 PERCEPTUAL AND CONCEPTUAL SPACE

Space which is perceived is perceptual space. Portions of space are perceived by us by vision or touch, or movement. They are many and different from one another. What we perceive is only limited space, parts of space. Our sensibility reveals that the objects visualized are extended or exist in space. The space we actually perceive through sense is perceptual or empirical space. The different patches of space perceived by us either through vision or touch, or movement are perceptual spaces that have individual characteristics by which they are distinguishable from one another. These perceptual spaces vary in dimension according to the dimension of the objects contained by them. For example desk occupies particular space and a bench occupies another. Thus, different objects occupy different spaces.

From these many perceptual spaces a concept of space gradually framed by generalization. It is idealized extension. It is an abstract idea from which particular things of perception are eliminated. It is a ground of co- existence of things. Things are perceived as mutually external to one another and co- existing together in space. Conceptual space has following characteristics:-

1. Space is one; particular spaces are all parts of one space.
2. Space is infinite; for if it were not so, it would have a limit.
3. Space is also infinitely divisible. If it were not so, it would have no parts and no particular figure would be drawn on it. However space is not a mere sum total of finite parts. I t is a single whole, out of which particular spaces are drawn by limitation.
4. Space is continuous; the parts of space are continuous with one another. If there were gap between two spaces, we would think of its being filled by space.
5. Space is three dimensional - length, breadth and depth or distance. For example linear space has only length; superficial space has both length and breadth; and solid space has length, breadth and depth.
6. Things exist in space. Co- existence is the most essential and differentiating attribute of space.

Thus conceptual space is infinite, boundless and one whole containing limited spaces of perception. It is an abstract idea from which things of perception are eliminated. The Geometrical concept of point, line etc are concept about space. There is no real difference between perceptual and conceptual space.

8.5 ORIGIN OF THE IDEA OF SPACE

There are different views with regards to the idea of origin of space.Two extreme views have been held with regard to this: -

1. Empirical, experimental, genetic or a posteriori theory.
2. Intuitional, rational, naturalistic or a priori theory.

1. The empirical view

(i) Non- evolutional: The supporters of this are empiricist philosophers like Hume, Mill, Bain, Berkley, Locke and other empiricist. They hold that the idea of space is derived from motor experience or experience connected with the movement of our limbs. They maintained that the complete idea of space either occupied or unoccupied is gained from muscular feeling. We experience muscle - feelings of different kinds and degrees through the movements of our limbs, and from these experiences we abstract a general idea of possibility of movement. Empty space is nothing more than the possibility of free movement or unimpeded muscular activity. Occupied space implies resisted movement or impeded muscular activity. Hume says, "The idea of space is conveyed to the mind by two senses, the sight and touch." Thus according to this view, Spatial attribute is an abstraction from muscular experience.

(ii) Evolutional: The theory of Spencer and his followers is essentially empirical; however it is modified by their doctrine of evolution. They hold that the idea of space originally derived by our ancestors from motor experience. The accumulated experience of our ancestors has been transmitted to posterior generation by heredity. Consequently the idea becomes innate and a priori in us. Thus the idea of space though inborn to us, is actually the result of collective experience of our ancestors transmitted to us according to the law of heredity.

(iii) James, Ward and their followers have tried to derive the idea of space from the quality of extensity, massiveness or voluminousness that is found explicitly in all sensation. According to James, the extensity, discernible in each and every, is the original sensation of space out of which all the exact knowledge about space that we afterwards come to have is woven by process of discrimination, association and selection.

Criticism: According to empirical theory of Mill and Bain, the idea of space is derived from the experience of movement. But we can have no understanding of movement as such without an antecedent idea of space.

Movement means change of position and is thus intelligible only in relation to space. Motion always presupposes space. Thus the empirical theory involves "vicious circle".

Again, the evolutionary theory is also not acceptable for the same reason. Moreover, the particular quality of extensity spoken by James is no doubt generally due to the extension in space of external causes of the sensations in which the quality is found. However, to understand this as such we must have already some idea of space and extension.

The truth is that the idea of space is a necessary condition of our thinking the material world. The material world can never be understood except by reference to the idea of space. The finite things can be conceived existing external to one another and limiting one another in space. Thus the empirical explanations are not satisfactory. Therefore we should consider the rational theory.

2. The A priory or Rational theory

(i) Phenomenalistic Rationalism: Kant and his followers hold that the notion of space is not derived from experience, since experience presupposes it. According to these thinkers, the idea of space is a priori, evolved by thinking mind from within and applied to the sense- materials presented to it from within. Space is a priori form perception. Movement does not explain space; space explains movement. Kant proves the apriority of space by following arguments.

First, Space is not an abstract idea derived from experience by generalization. Kant contends that the perception of the outwardness of things already involves the idea of space. Space is the presuppositions of all experiences. We may imagine space containing no objects, but we can never imagine object without space.

Secondly, the notion of space is a priori. Space is a priori forms of perception according to which we arrange the manifold of impressions

produced by things- in-themselves in our mind into spatial and temporal world. The world of things-in-themselves is neither spatial nor temporal. Thirdly, space is infinite; and what is infinite cannot be experienced. Hence we know it a priori.

Fourthly, the proof of apriority of the idea of space is furnished by geometry. As geometry is deal with figure, it is the science of space. Geometrical truths are universal and necessary in character. So, if the of space is derived from experience, the truth of geometry would not be universal and necessary. Hence the notion of space must be regarded as an a priori from perception.

Thus, according to Kant, space is an a priori form of perception which can be applied phenomena or appearance only. Only in this sense, space has empirical reality. It does not apply to noumena. Space is empirically real and transcendentally ideal.

(ii) Realistic Rationalism or Intuitionalism: The thinkers of Common sense school e.g. Reid, Martineau etc. hold this view. According to these thinkers, there is space outside of us and we intuitively discern its experience. They maintain that, corresponding to the idea of space within, there is real space without.

Popular Dogmatic Realism holds that our idea of space is an exact copy of real space outside of us. This real space will exist all the same whether there is any mind to perceive it or not and whether there are things to feel it or not. They even thought that if all the objects in space be annihilated, space itself will remain wholly unaffected.

Criticism: After what has been said above, it is clear that empirical theories are not at all satisfactory. Now a little refection to a priori theory shows that it is to same extent satisfactory. Kant is right in holding space as form of perception in human minds. The notion of space is essentially inherent in the nature of the thinking principle and 'read into' the sense-materials instead of being taken out of them. Thus the notion of space is essentially a priori.

Now the question arises: Has experience nothing to do with our notion of space. In reply to this question it is said that experience does not create the idea, but unfold it. But if space is empirically real, as Kant holds, how do we then perceive things in space? Why the impressions produced by things-in-themselves submit to the forms of our perception? This problem was left unsolved by Kant. But it was Hegel who solved the problem in his theory of objective idealism. Hegel holds that space and time are not only a priori forms of finite minds, but also forms of Devine Mind of which nature is an objective expression. The Devine Mind or Absolute evolves the world according to the forms of space and time. The world and finite minds are expressions of the Absolute, so space is form of our mind as well as forms of outer world. This makes it possible for us to perceive things of the world in space. Space is ideal in the sense that we have the idea in our minds a priori, but it has also a real spatio-temporal order in the objective world. Thus space is both mental in origin and objectively real.



LET US KNOW

Generally, we regard space as a container or receptacle in which all things are contained. Space is a great void in which things exist and through which they move .Thus, space is conceived by us as either filled or empty, occupied or unoccupied, plenum or vacuum. Space which is perceived is perceptual space. Conceptual space is one, infinite, infinitely divisible, continuous and three dimensional. There are different views with regards to the idea of origin of space. .Two extreme views have been held with regard to this: Empirical and Rational. According to empirical view, concept of space is derived from experience. Rationalistic view hold that the idea of space is a priori, evolved by thinking mind from within and applied to the sense-materials presented to it from within.



CHECK YOUR PROGRESS

Q 1: What does the word "Category" means?

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Q 2: How many categories are there according to Kant?

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Q 3: What is conceptual space?

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Q 4: "The idea of space is conveyed to the mind by two senses, the sight and touch."- Who said this?

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Q 5: According to who space is an a priori form of perception which can be applied phenomena or appearance only?

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ACTIVITY8.1

Q 1: Whether space is perceptual or conceptual?

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8.6 CONCEPT OF TIME

Time is generally conceived as the underlying 'continuum' which holds events and indicates their mutual relations .In our everyday life we experience changes in the external world as well as in the mind. The fact of time makes it possible for us to take note of changes and movement in objects. Time is condition of events in the order of succession. Time is the ground of order of succession among events. Therefore the category of time is basic to all things and beings. We conceive time as duration, interval and succession. Thus we speak of an event as enduring for a certain length of time, i.e., as occupying a certain portion of time; and we also speak of an interval i.e., the length of time elapsing between one event and another. We also understand that one event is succeeded or followed by another event in time. The relation of such precedence, duration and succession and the like obtaining between events is known as temporal relation. Commonly we think of time as infinite or unlimited.

8.7 PERCEPTUAL AND CONCEPTUAL TIME

Perceptual time is the specious present which is grasped by perception. In the external world one object changes and makes for the appearance of another object. In the mental region also thoughts are constantly changing. From the experience of these changes we become conscious of the relation of succession obtaining among the events and consequently, experience finite bits of time. Time is the meeting point of immediate future; it emerges from the immediate past and grows into immediate future. It is not a mathematical instant but a duration of time filled with an event that is grasped by a single act perception. The past is known by memory and future is known expectation.

Conceptual time is constructed out of the data of perceptual times. It is an abstract general idea generalized from the perceived succession of impressions and ideas. It is the ground of sequence of events. Conceptual time has following characteristics:

1. Time is one. Particular times are all parts of one time.
2. Time is infinite in both directions. If it were not so, it would have a beginning and end. Both would be points of time, and would consequently be within time and out of it. It is not made up of its parts or moments added together; for mere addition of finite parts, however indefinitely carried out, cannot give what is infinite. Therefore, time is a single whole out of which particular times are derived by limitation.
3. Time is also infinitely divisible; otherwise there would have been no parts or moments of time. Moments are the indivisible units of time, which co-exist with one another.
4. Time is continuous; if there were a gap between one part of time and another part of it, it would be filled with time.
5. Time has only one dimension. Time is continuous from the past to the present and from present to future. It is irreversible.
6. Time is filled with events. They occur in time. We cannot think of time apart from succession of events, outer or inner.

Hence from the standpoint of knowledge, perceptual time precedes the conceptual time, though the two are at bottom identical.

8.8 ORIGIN OF THE IDEA OF TIME

There are different views with regard to the origin of the idea of time.

1. Empirical or a posteriori view

According to the upholders of Pure Empiricism, such as Hume, Mill, Bain, the notion of time is an abstract idea generalized from the experience of successive events through memory and anticipation. We experience events occurring successively. We remember events that are no longer anticipate those that are not yet. Thus on the basis of that, we get the distinction between no longer, now, and not yet- between past, present and future.

The evolutionists like Spacer and his followers hold empirical view but it is modified by their theory of evolution. According to them, the idea of time is undoubtedly an abstraction from the experiences of successive events; but it is not the experiences of the individual mind from which the idea is abstracted. The idea is derived from the accumulated experience of innumerable generalizations of our ancestors and has been transmitted to posterior generation by heredity.

Criticism: The empiricist's view is not acceptable as the idea of time cannot be general idea derived from particular experience of succession among events. Succession is on the contrary, explained on the supposition of time. Again, the evolutionist's view though modified yet, the inherent difficulty of empiricism is not removed by an appeal to ancestral experience. The arguments that were advanced against the empirical view can equally be applied against the evolutionist's view.

2. The Rational or A Priori Theory

The advocate of Phenomenalistic Rationalism such as Kant and his followers hold that the notion of time is inherent in the nature of the thinking principle and applied to successive experiences presented to it. It is a necessary one, supplied by mind from within. Kant proves that priority of the notion of time by the following arguments.

First, the idea of time cannot be derived experience, for all experience presupposes the notion of time Experience comes either successively or simultaneously and the ideas of succession and simultaneity imply the idea of time. Therefore, it must come from within the mind itself.

Secondly, we can think away one event after another in time, but we cannot annihilate time in thought. So the notion of time is a priori.

Thirdly, time is infinite in both direction and as such cannot be perceived or experienced. Therefore, time is a priori.

Fourthly, Kant prove a priority of time though Arithmetic. Arithmetic is the science of duration, the successive moments of which constitute the number. Arithmetical truths are universal and necessary in character. But they would not be so unless the notion of time is a priori.

The advocates of Realistic Intuitionism maintain that, corresponding to our idea of time, there is a real time outside of us. This real tie can be known intuitively. Popular Dogmatic Realism supposes that our notion of time is an exact copy of the real objective time which exists without any concrete events occurring in it.

Criticism: Rationalistic theory of the origin of time is not totally acceptable. The temporal scheme in which we view events is imposed upon by us. Again, time cannot be conceived as existing apart from concrete events occurring in it. Moreover, the occurrence of events in time implies a permanent unity of consciousness which compares and distinguishes them, and gives them temporal relations. Now this consciousness cannot be the consciousness of finite minds, for finite minds have their origin in time. It must therefore, be a higher unity of intelligence which is not in time, but makes time; which is unchangeable but makes change possible. In other words, the world of related things and events in space and time implies the existence of an all- embracing Absolute self- consciousness. Thus like space, time is also mental in origin and absolutely real.

However, it should be remembered that, though experience is not the source of the idea of time, yet it helps the elaboration, explication or development of the idea.

8.9 SUBJECTIVITY AND OBJECTIVITY OF SPACE AND TIME

Regarding the question whether space and time are subjective and objective opinions are different among different philosophers. According to some thinkers space and time are subjective forms of perception and according to some others they are not dependent on subjective mind, but

they have external independent existence. Again according to some others space and time are both subjective and objective.

Objective View: Common people regard space and time has an objective existence outside and independent of our mind. Greek Atomist Leucippus and Democritus admitted the independent existence of space and time. According to them, they are like two infinite substances which like receptacles contain all things and events. This view is also supported by Galileo and Newton. They conceive of space and time as frame works of physical order in which material objects move and change from one state to another. In Indian Philosophical system, The Nyaya and Vaisesika philosophers regard space and time i.e. dik and kala, to be two eternal and all- pervading substances.

Descartes, the father of modern philosophers identifies space with extension, and regard it as attribute of matter. It is not regarded as real substances. To be material is to be extended, matter without extension is impossible and extension without matter is impossible. There is no empty space. Space is filled or plenum. Hence space or extension is objective and independent of mind. Spinoza also supports this view.

In recent times Prof. Alexander regards space and time as the ultimate cosmic reality. They are fundamental dynamic principle of the world. Space and time is matrix from which motion, matter, and even life and mind have emerged. Space and time are not two different realities; they have no existence apart from each other. If by space we mean the co- existence of several points, the points then must be arranged in successive order. Therefore, the idea of space includes that of succession or time. Similarly conception of time means succession of events. If one event succeeds another event, both of them must be existent in space. Therefore the idea of time includes the idea of space.

But the view that space and time are independent of knowing mind is untenable. A thing outside and independent of the thinking mind is unthinkable.

Subjective view: Leibnitz regards space and time as an objective entity, but as confused perception, on our part, of the co- existence of monads. According to Leibnitz, monads are the ultimate constituents of universe. They are non- extended spiritual atoms. If monads are non-extended, then space cannot be objectively real. Again, time is also a confused perception on our part. In our attempt at explaining the changes happening in nature, we imagine the monads influencing one another. Exerting influence on one another is possible only in time. Hence space and time are purely relative, space being an order of co-existence and time being an order of succession.

The empiricist philosophers Berkley, Lock, Hume, Mill and others regard space as purely an abstract idea or a concept generalized from the idea co-existence derived from tactuo-muscular sensations. Similarly time is also an abstract concept of mind generalized from the ideas of succession of events. Therefore space and time are only subjective ideas of the mind. Subjective and Objective: According to Kant, Space and time are neither an objective entity, independent of mind, nor an abstract concept generalized from motor experience. Space and time cannot be derived from experience since experience presupposes them. Space and time are a priori form of mind, a form of perception. They are our way of representing things in their mutual externality to each other. The very idea of movement and co-existence involves presupposes the notion of space. Again, the apprehension of events in order of 'before' and 'after' presupposes the notion of time. Human mind is so constituted that it provides the impressions produced by thing-in-themselves in space and time. Space and time, as forms of the mind, apply to phenomena or appearances. They have thus empirical reality. But they do not apply to noumena or thing-in-themselves.

According to Hegel, space is not only an a priori from of the finite mind, but also a form of the Divine Mind of which nature is an objective expression. God has evolved the world according to the form of space. The human minds are finite reproductions of the God; so the finite minds also interpret the world according to the form of space. Hence space has not

only a subjective existence in the finite minds, but also an objective existence in nature.

In recent times another theory of space and time has been advocated by Einstein. This theory has come to be known as Space-Time Relativity. According to this view, space and time are not two distinct and separate realities; they are two sides of same reality viz., motion. A thing in motion must be both in space and time. According to this theory, space and time are wholly relative to the motion of the observer. But though space and time are relative to the motion of the observer, they are objective or real characteristics of the objects. Thus they are both subjective and objective.



LET US KNOW

Time is generally conceived as the underlying 'continuum' which holds events and indicates their mutual relations. Perceptual time is the specious present which is grasped by perception. Conceptual time is one, infinite, infinitely divisible, continuous and one dimensional. Two extreme views have been held with regard to this: Empirical and Rational.

Some thinkers hold that space and time are subjective, according to some they are objective and some conceived them as both subjective and objective. Common people regard space and time has an objective existence outside and independent of our mind. In Indian Philosophical system, The Nyaya and Vaisesika philosophers regard space and time i.e. dik and kala, to be two eternal and all- pervading substances. According to empiricist philosopher space time are subject ideas of mind. Kant and Hegel maintain space time as both subjective and objective. In recent times another theory of space and time has been advocated by Einstein. This theory has come to be known as Space-Time Relativity.



CHECK YOUR PROGRESS

Q 6: What is the only dimension of time?

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Q 7: Is space and time objective according to common people?

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Q 8: Which philosophical system hold space and time i.e. dik and kala as eternal and all-pervading?

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Q 9: Who advocates space time relativity theory of space and time?

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ACTIVITY8.2

Q 1: Whether space and time subjective or objective?

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8.10 LET US SUMS UP

In this unit we have discussed space and time as categories of knowledge. The most important points are:

- The word "category" means what predicated or affirmed of something.
- Space, time substance and causality are regarded as the fundamental categories of knowledge.
- Generally, we regard space as a container or receptacle in which all things are contained.
- Space is one, infinite, infinitely divisible, continuous and three dimensional
- Time is generally conceived as the underlying 'continuum' which holds events and indicates their mutual relations.
- Time is one, infinite, infinitely divisible, continuous and one dimensional.
- There are different theories regarding the origin of space and time.
- Opinions differ regarding the subjectivity and objectivity of space and time.
- In recent times space and time is regarded as both subjective and objective.



8.11 FURTHER READING

1) Sinha. J.N.:(1985) Introduction to Philosophy, New Central Book Agency, Calcutta -9
2) Chatterji P.B. (1962) Outlines of General Philosophy, Beadon Street, Calcutta -6
3) Chaterjee. S.C. (1964) The Problems of Philosophy, University of Calcutta

8.12 ANSWER TO CHECK YOUR PROGRESS

Ans to Q 1: The word "category" means what predicated or affirmed of something in thinking of it.

Ans. to Q.2: Kant gives list of twelve categories under quantity, quality, relation and modality.

Ans. to Q. 3: Conceptual space is one, infinite, infinitely divisible, continuous and three dimensional. Conceptual space is infinite, boundless and one whole containing limited spaces of perception. It is an abstract idea from which things of perception are eliminated. The Geometrical concept of point, line etc are concept about space.

Ans. to Q.4: David Hume.

Ans. to Q.5: Kant holds that space is an a priori form of perception which can be applied phenomena or appearance only.

Ans. to Q.6: The only dimension of time is continuous. Time is continuous from the past to the present and from present to future. It is irreversible.

Ans. to Q.7: Yes, space and time are objective according to common people.

Ans. to Q.8: In Indian Philosophical system, The Nyaya and Vaisesika philosophers regard space and time i.e. dik and kala, to be two eternal and all- pervading substances.

Ans. to Q.9: The Space-Time Relativity advocated by Einstein.

8.13 MODEL QUESTIONS

A. Very short Questions

Q1: What are three dimension of space?

Q2: Is space infinitely divisible?

Q3: Is time the ground of order of succession among events?

B. Short Questions (Write in about 100-150 words)

Q1: Write notes on:

(a) Perceptual space

(b) Conceptual space

(g) Perceptual time

(d) Conceptual time

Q2: What is Space- Time Relativistic theory

C. Long Questions (Write in about 300-500 words)

Q1: Explain the concept of space?

Q2: Explain the concept of time?

Q3: Explain briefly the empirical theory of the origin of space?

Q4: Discuss briefly the rationalistic theory of the origin of space?

Q5: Discuss briefly the theories of the origin of time?

Q6: Is time subjective or objective? Explain.

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