Unit-I.

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PEDAGOGY OF MATHEMATICS

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PART-A

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1. Gagne's Theory:

b) Gagne's theory of psychology has eight types which are as follows.

* Signal learning
* Stimulus - Response
* Chaining
* Verbal learning
* Discrimination
* Concept learning
* Rule learning
* Problem Solving.

i) Signal learning:

Signal learning is one of the types of gagni's theory which deals with the signal learning by signal which means object learning.

The children at this stage learn numbers with objects. For example, one pencil, two pens, three bottle. In this the vocabulary with number learns at this stage.

click → Blink.

Rabidly it takes 0.05 to 0.1 second.

It deals with Pavlov's dog theory. The stimulate salivate after receiving bell sound it signalize to the dog.

Continuity: Signal learning has continue continuity for sequence proces in learning. It may exceed along with language and numbers.

Repetition: It is the mode of repetetive.

ii) Stimulus - Response:

It deals with Throndike theory and Skinner theory of Stimulus - Response. For example, the children with bottle its struggle to put with mouth the next time it kept correctly by learning of others.

It has three principles which are,

Law of effect: It depends upon directly to the learning of Stimulus-Response.

Continuity: Stimuls-Response has the sequence prouss in learning.

Repetition: It is mode of Repetitive

Observation → Exeution

iii) Chaining: Chaining is the continuity or sequential process of learning. It learn by step to step. For example, in a key opener the clock rotation, the clockwise rotation show changing or enduring.

continuity - Chaining is a continous process so the principle of continuity included.

iv) Verbal learning:

It is the aquisation process of laaguage ability along with numbers. Learning vocabulary, phrases, sentences may included in in Verbal learning.

For example, if the threee dimenision picture is shown the pupil in a group says tetrahedron. Tetrahedron is a verbal, so the learning of objects verbal is said to verbal learning.

Discrimination:

It is the process of learning of similarities between two things and differentiation between those things.

For example, In case of circle, ellipse the pupil able to know that circle is a round shape where

ellipse is an oval shape. So the differentiation and similarities of learning comes over discrimination learning.

Concept learning:

learning about the concept which mean the theme of subject or units or topics.

In case of triangle, rectangle, circles are the shapes which the student of single in a group said that is plaked figures. planed figures is the main concept of the learning. The learning of concept is Concept learning.

Rule learning:

Learning about rules, norms, formulas in the subject. Especially in mathematics the norms and rules are defaultly become high. The pupil should know the Rules and regulations of subject.

For example, 1+2, 3+5, 1+9 is 3, 8, 10 respectively. It is logical cone. NO one can the rules over this.

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problem Solving:

Problem Solving is a technique in mathematics. Gagné represent that problem solving is a basic weapon of mathematics. It is applicable in all situation.

Education simplification of Gagnés types of learning:

The Educational simplification of Gagné's types of learning under eight types plays a vital role in mathematics.

For example, $\angle ABC$ is a triangle $\angle B = 90°$ $AB = 7$ cm

i) Find out the triangle is right angled triangle. (signal learning)

ii) Finding $\angle B = 90°$ so it is right angled. Stimulus - Response

iii) Right angled triangle Verbal learning.

iv) Discriminate right triangle with other type of triangle. Discrimination

vi) Finding hypotenuse. Concept learning

vii) Phythogoras rule Rule learning

viii) Finding BC with phythogras theorem Problem Solving.

2. b) Factors influencing the learning of mathematics:

Factors influencing learning of mathematics have following patterns.

* Motivation
* Perception
* Attitude
* Aptitude

i) MOTIVATION:

Motivation is the first and best way which influence learning of mathematics. Motivation means that encourage or to stimulate the pupils in many ways.

ways of motivation:

* By giving novelty
* By giving history of mathematical units or authors the students may encourage.
* Depend on their mood and wealth.
* Interest making about the topics which should be teach.
* Making the topics without daring the pupils.
* Easily undrstand and applicable teaching techniques.

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Characteristics of motivation:

* Should be positive not as negative
* Should be how not apart from nature of mathematics.
* Recognise the qualities of subject and quantity of subject.
* Should be preparable by faith of the subject.

PERCEPTION:

Perception is the way of our own views. The virtue of our own thoughts related to subject show we see. The views depends upon each other the teacher., students. The following are some of the perception in which influence learning of mathematics.

* Individual's spatial ability.
* Thought of subject which is easier than others influence greater in learning mathematics.
* Self-idea and self-concept about the subject.
* Individuality perception depend upon level of aspiration and power of assimilation.
* Special ability like gifted children percept the subject in different way.

* The level of understanding and Intellegence as awardance with perception.

* Subject knowledge should also be taken into account.

ATTITUDE:

The attitude of the papils means that gestures of about subject. Get excite over the subject of mathematis. Some of attitude which influence the learning of mathematis.

* The behavioural endureance over the subject of mathematics.

* The Intrest shown to the subject.

* The participation in all activites which related to mathematics.

* The attitude gestures over the subject like intresting or exciting.

* Atitude depends upon their psychological level of thinking. which exhibit in physical manner.

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APTITUDE:

Aptitude deals with the level of Intellegence and knowledge which has greatest influence in learning mathematics. Aptitude depends the intellegence or esp of psychological level rather than physical. Some of the factors which influence level of learning mathematics.

* Depend upon their previous knowledge.

* Depend upon their Intellegence power in subject.

* Skilled or well-verse in the subject.

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These are all the some factors which influence learning of mathematics.

PART-B.

2. Curriculum:

According to Crow and Crow curriculum is the organised and structurised that included the learners mentality develop them in morally, physically, spiritually in the education process.

principles of curriculum:

* principle of child centredness
* principle of community centeredness
* Principle of Flexibility
* Principle of Utility
* Teacher's point of view
* Principle of modernisation.

i) principle of child centredness:

Curriculum is for learners, so the curriculum should be age, interest, aptitude of the child should be taken into account. One should know that curriculum is for child not child is for curriculum.

ii) principle of community centredness:

The social needs and the local should clastify to the child. The childs social needs should be taken into account.

iii) principle of Flexibility:

The curriculum gives enough time and experience to the children. So it should be Flexible and elasticity.

iv) principle of utility:

Education is to learn and live for and to the society. So the making utility should be successfully planned while Constructing mathematics curriculum, hence they survive fruitful life.

v) Principle of teacher's point of view:

The curriculum should be organised by well-verse teacher who survived of surviving should know the positive things in mathematics subject. Knows about the difficulties in the subject.

vi) Principle of modernisation:

The curriculum should be updated according to the new model of teaching techniques and teaching aids.

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1. Piaget's stages of development:

Jean piaget has delivered some special reference related to learn mathematics. which is considered to be psychological level. It has some stages of development.

i) Schemas:

The building structure which has as by innate. The basic structure of knowledge.

ii) Assimilation:

Making use of schemas to the present or current situation.

iii) Acomodation:

Modyfying or changing assimilation to the current situation

iv) Equilibrium:

Making useof or balance of Assimilation and acomodation.

v) Disequilibrium:

Making none use of this development.

There are some stages of development in jean peaget

* Sensorimotor
* Pre-Operational
* Concrete opreational
* Formal operational.

Sensorimotor:

Sensorimotor is the aquisation of objects which calso considered as egocentrism. The object permanance with orelation to numbers.

Pre-Operational:

It is the acquisation of unlogical, thought. For example, in dish the is filled with liquid the last one is filled with diss liquid unknown of the dish is large and wide. Not have any logic.

Concrete Operational:

It is stage of acquisation of language and numbers. The size length, shape must be understood. For example the filled liquid is large dish.

Formal operational:

It is stage of acquisation of logical thought.

For example, $x+2x=9$ in Algebra. Ram ate apple, her sister ate double of Ram and is totally mine.

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5. Gifted children:

The children who have the knowledge by innate is said to the gifted children.

Characteristics of Gifted children:

i) General characteristics:

i) Knowledge and Intellegence in nature.

ii) Should have the similarity and difference in the subject.

iii) Creativity in nature.

iv) Logical thinking and abstract thinking.

ii) Special characteristics:

i) Having knowledge in puzzles and riddles.

ii) Should self idea of their own in activities.

iii) Have Aptitude and attitude in the different way.

iv) Reasoning knowledge is nature.

Some Enrichment programme to the gifted children.

→ Giving some special guidance related to their knowledge.

→ Giving Aptitude test and send to national level competetion.

→ Parcipation of competetion should be the greatest enrichment programme for gifted children.

→ NCERT conduct test NBET called as National Board of Education Test.

9. Dyscalculia:

Dyscalculia is the learning difficulty in which the students have difficulty in Arimetic numbers, symbols, codes etc.,

The disability in learning mathematics is known as dyscalculia. It has various reason to dyscalculia. Some of the causes are as follows.

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Causes of Dyscalculia:

i) Lack of attention:

Lack of attention which means lack of concentration or focus may not occur there, so the learning difficulty occured over there.

ii) Lack of previous knowledge:

In case of teaching the topic the previous knowledge about the same should not there so the puzzle occur in problem solving steps.

iii) Lack of Attendance:

The irregular attendance leads to irregular class in mathematics. While entering the class irregularly the difficulties may occur in problems of mathematics.

iv) Lack of psychological things:

Some psychological or mental problems for the pupils may happend it takes remedies in concern with physician.

v) Due to confusion:

Not having clear idea about the similarities and differentian. It make confusion. Write symbol of plus instead of minus.

11. Slow learners in mathematics:

There are some children who have slow learning in mathematics. They are poor in knowledge, lack of language, reading and writing disability. Some of the remedial measures for the slow learners are as follows.

i) Spesial guidance:

Educator should take care of spesial guidance with the children who are in slow learning in mathematics. Make understand them by long period of time.

ii) Shows differentiation:

Slow learners have poor in differiante one from other. So the similarities and difference between one topic to other or between one problem to other should be shown to slow learners.

iii) Suitable teaching methods:

The Educator must take or change the method of teaching in case of any mistakes over that. The teachings methods like Inductive and deductive and Haurstic method should be taken into account.

6) Use of the textbook in the classroom as a mathematics teacher:

→ The use of textbook organised with pupils oriented. The motivation present in the textbook explained.

→ The derived or workouted problems may not clear to pupils which are in textbook it make clearance without any doubt.

→ The application problem given in the textbook explained clearly to the students.

→ The vocabulary in the questions which present in textbook should explained clearly.

→ The Exercises problems which are slightly different or difficult feel to pupils must explained by educator.

→ The Examples sums given to the textbook also gives importance.

→ The content organised by orderly so the burden of selecting appropriate questions to solve is less.

8. Individual differences in teaching mathematics:

→ By the attention and Intersent of pupils. The interest plays the most important role in individual difference in mathematics.

→ By testing the evaluation basis individual difference will catred.

→ Level of understanding and knowledges shows the greatest Individuality difference.

→ Differentiating quick learners and slow learners.

→ The approaches of understanding should taken inbe account.

→ Attitude towards class while teaching mathematics.

→ Individual difference depend on age, interest, may occur in mathematics

part-C.

1. Differences in topical and Spiral approaches:

TOPICAL	SPIRAL
i) Should be organised by topical wise	Should be organise as spiral which mean rolling.
ii) leads the unknown to known	known to unknown.
iii) Topic comes as unit which comes as exercise	It will leads to known to unknown. Eg: Algebra Solving linear equation, from one variable, two variable.

2. Importance of Mathematics library:

→ Should be effective of use of pupils.

→ Should be the effective of teaching time.

→ Should be appointed effective educator.

→ The cost of books should be low price.

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2) Advantages of multimedia Selection in teaching of Mathematics:

i) The pupils have more eager and curiosity in multimedia selection of teaching, then the attension is more

ii) Instead of using colter teaching from multimedia become bore. Multimedia teaching aids create more interest. Easy to used for educators.

4. Discovery learning:

Discovering learning is the learning which students clear themselves with their knowledge.

For example, the project method, exhibition.

The learning takes care of student centred.

6) Dysgraphia:

Dysgraphia is the type of learning difficultis in which have difficulty in writing.

write the phrase, word or sentence not clearly.

Eg: God written as god.
bog written as dog.

7. Attitude	Aptitude
Physiological things.	psychological things.
Physical behaviour deals with attitude.	Intellengence and knowledge deals with aptitude.
Physically known.	Mentally known

8. Four characters of dyslexia:

i) Difficulty in reading.

ii) Omission of word or sentence while reading.

iii) Mispronounciation of word or pharse.

iv) Stammering while reading.

v) Repetetion while reading the sentence.

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10. Identification of slow learners:

* Having poor knowledge.

* Having poor reading and writing knowledge.

* Lack of Interest and attention.

* Confusion may occur in subjects

* Having Learning difficulties.

In above way or key will identi use to identify the slow learners.

9. Some suggestion for Mathematics exhibition:

* Giving Guidance knowledge.

* Giving some idea about how exhibition conduct how present exhibition regarded that.

* Giving topic explanation which pupils want to do.

* Giving knowledge about organisation of mathematics exhibition.