COGNITIVE PSYCHOLOGY, LEARNING AND MEMORY (MPC-001)
TUTOR MARKED ASSIGNMENT (TMA)

Course Code: MPC-001
Assignment Code: MPC-001/ASST/TMA/July 2025-January 2026
Marks: 100

NOTE: All questions are compulsory.

SECTION – A

Answer the following questions in 1000 words each. 3 x 15 = 45 marks

1. Explain information processing in learning and memory.
2. Describe the meaning and stages of creativity. Explain the Investment and Confluence theory of creativity.
3. Explain Sternberg's triarchic theory of intelligence.

SECTION – B

Answer the following questions in 400 words each. 5 x 5 = 25 marks

4. Describe the Levels of processing model by Craik and Lockhart.
5. Explain the key issues in the study of cognitive psychology.
6. Describe the goals of research. Explain the research methods in cognitive psychology.
7. Describe the acquisition of second language.
8. Describe the perceptual, emotional and intellectual blocks to problem solving.

SECTION – C

Answer the following questions in 50 words each. 10 x 3 = 30 marks

9. Cognitive neuroscience
10. Relationship between creativity and intelligence
11. Vernon's hierarchical theory
12. Apraxia of speech
13. Functions of language
14. Limitations of Chomsky's theory of language acquisition
15. Means end analysis as a problem solving technique
16. Types of problems
17. Newell's approach to problem solving
18. Dyslexia

SECTION – A

Answer the following questions in 1000 words each.

Q.1) Explain information processing in learning and memory.

Introduction

The information processing approach to learning and memory views the human mind as a system that receives, processes, stores, and retrieves information, much like a computer. This model focuses on how information is encoded, stored, and retrieved, and how cognitive processes operate during learning. It emphasises the flow of information through a series of stages and the mental activities that transform sensory input into meaningful knowledge.

Stages of Information Processing

1. Encoding

Encoding is the process of transforming sensory input into a form that can be stored in memory.

- **Selective Attention**: Focusing on relevant stimuli while ignoring distractions.
- **Levels of Processing**:
    - **Shallow processing** (e.g., recognising shapes or sounds) leads to weaker memory.
    - **Deep processing** (e.g., associating meaning) enhances long-term retention.
- **Encoding Strategies**: Rehearsal, imagery, chunking, and elaboration improve the quality of encoding.

2. Storage

Storage refers to maintaining encoded information over time. It involves three main memory systems:

- **Sensory Memory**: Holds information for a brief moment (milliseconds to 2 seconds) to allow perception. Includes iconic (visual) and echoic (auditory) memory.
- **Short-Term Memory (STM)**: Temporarily stores limited information (7±2 items) for about 20–30 seconds. Rehearsal can extend this duration.
- **Long-Term Memory (LTM)**: Stores information relatively permanently and has a virtually unlimited capacity. It includes:
    - **Declarative Memory**: Facts and events (episodic and semantic).
    - **Procedural Memory**: Skills and habits.
    - **Implicit Memory**: Unconscious recall, such as priming.

3. Retrieval

Retrieval is accessing stored information when needed.

- **Recall**: Retrieving information without cues (e.g., essay questions).
- **Recognition**: Identifying previously learned information from options (e.g., multiple-choice questions).
- **Relearning**: Faster reacquisition of previously learned material.
  Retrieval is influenced by context, mood, and cues present at the time of learning.

Information Processing in Learning

Learning involves acquiring new information or modifying existing knowledge, behaviours, or skills through experience. In the information processing model, learning occurs when new input is effectively encoded, stored, and retrieved for application.

Key Aspects in Learning

1. **Attention and Perception**: Learning begins when the learner attends to relevant stimuli, filtering out unnecessary information.
2. **Working Memory**: Acts as a temporary workspace where new information interacts with prior knowledge from long-term memory.
3. **Schema Activation**: Prior knowledge frameworks (schemas) help organise new information for deeper understanding.
4. **Rehearsal and Practice**: Repetition strengthens neural connections, aiding storage in LTM.
5. **Feedback**: Provides correction and reinforcement to enhance accuracy and retention.

Information Processing in Memory

Memory is the backbone of learning. Effective information processing ensures that what is learned is retained and retrievable.

Factors Affecting Memory

- **Depth of Processing**: Meaningful processing improves retention.
- **Organisation**: Grouping related ideas aids recall.
- **Encoding Specificity**: Retrieval is easier when conditions match the encoding environment.
- **Interference**:
  - **Proactive**: Old information interferes with new learning.
  - **Retroactive**: New learning disrupts recall of old information.

- **Forgetting**: Can result from decay, interference, or retrieval failure.

Models of Information Processing

1. **Atkinson-Shiffrin Model**
    - Proposes a three-stage flow: sensory memory → short-term memory → long-term memory.
    - Emphasises rehearsal for transferring information to LTM.
2. **Levels of Processing Theory (Craik and Lockhart)**
    - Suggests that memory retention depends on the depth at which information is processed—deep semantic processing produces better memory than shallow sensory processing.
3. **Baddeley's Working Memory Model**
    - Proposes STM is not a single store but an active system with:
        - **Phonological Loop**: Handles verbal/auditory information.
        - **Visuospatial Sketchpad**: Handles visual/spatial data.
        - **Central Executive**: Directs attention and integrates information.
        - **Episodic Buffer**: Links information across domains and connects to LTM.

Applications in Education and Learning Environments

- **Active Engagement**: Involving learners in problem-solving and discussions improves encoding.
- **Chunking Information**: Organising material into meaningful units aids STM and LTM transfer.
- **Use of Visuals and Examples**: Supports dual coding (verbal + visual processing), improving retention.
- **Distributed Practice**: Spacing study sessions promotes better long-term retention than massed practice.
- **Mnemonic Devices**: Acronyms, rhymes, and imagery enhance recall.
- **Contextual Learning**: Teaching in real-world contexts improves retrieval by matching learning and application environments.

Conclusion

The information processing model explains learning and memory as a sequence of encoding, storage, and retrieval, shaped by attention, organisation, and practice. Learning is most

effective when information is meaningfully processed and well-integrated with prior knowledge. Educational strategies that enhance attention, structure content, and provide opportunities for active rehearsal can significantly improve both learning and memory. By understanding these processes, educators, psychologists, and learners can create optimal conditions for acquiring and retaining knowledge.

Q.2) Describe the meaning and stages of creativity. Explain the Investment and Confluence theory of creativity.

Meaning of Creativity

Creativity is the ability to produce original, novel, and valuable ideas, solutions, or products by combining existing knowledge in new ways. It involves divergent thinking, imagination, and the capacity to go beyond conventional boundaries. Creativity is not limited to the arts—it is equally vital in science, technology, problem-solving, and daily life. Psychologists view creativity as a multidimensional construct that draws on cognitive processes, personality traits, motivation, and environmental influences.

Key aspects of creativity include:

- **Originality** – The idea must be unique and not a mere copy.
- **Usefulness** – It should have value or solve a problem.
- **Flexibility** – The ability to approach situations from multiple perspectives.
- **Fluency** – Generating many relevant ideas quickly.

Stages of Creativity

Several theorists, including Graham Wallas, have proposed stage models of the creative process. Wallas's **Four Stages of Creativity** remain influential:

1. **Preparation**
    - The problem is identified, and relevant information is gathered.
    - The individual studies the problem, collects resources, and develops a thorough understanding.
    - Example: A scientist reading research papers before designing an experiment.
2. **Incubation**
    - The mind subconsciously works on the problem after conscious effort is paused.
    - This stage involves relaxation, diversion, or engagement in unrelated activities, allowing ideas to combine in new ways.
    - Example: A poet taking a walk and suddenly getting an idea for a verse.

3. **Illumination**
    - The "Aha!" moment when the solution or creative insight suddenly appears.
    - It is often spontaneous and accompanied by excitement.
    - Example: Archimedes' famous cry of "Eureka!" upon discovering the principle of buoyancy.
4. **Verification**
    - The creative idea is evaluated, refined, and tested for feasibility and effectiveness.
    - This stage ensures that the idea is practical and meets the intended purpose.
    - Example: An inventor testing and improving a prototype before launching it.

While these stages are presented sequentially, in reality, creativity can be recursive, with movement back and forth between stages.

Investment Theory of Creativity

Proposed by: Robert Sternberg and Todd Lubart.

Core Idea: Creativity is like buying low and selling high in the world of ideas. Creative individuals "buy" ideas that are undervalued or unpopular, develop them into valuable contributions, and then "sell" them to gain recognition before moving on to the next novel idea.

Key Components:

1. **Intellectual Skills:**
    - Analytical ability to identify good ideas.
    - Synthetic ability to combine concepts in new ways.
    - Practical ability to persuade others of an idea's value.
2. **Knowledge:**
    - Sufficient domain knowledge to understand existing work and identify gaps.
3. **Thinking Style:**
    - Preference for novel approaches and willingness to defy conventional thinking.
4. **Personality:**
    - Openness to new experiences, risk-taking, perseverance, and tolerance for ambiguity.

5. **Motivation:**
    - Primarily intrinsic—driven by curiosity and personal interest rather than external rewards.
6. **Environment:**
    - A supportive setting that encourages experimentation, values creativity, and allows for mistakes.

Strength: Provides a practical analogy and highlights the interplay between cognitive, motivational, and environmental factors.
Limitation: Does not detail the exact cognitive processes involved in generating ideas.

Confluence Theory of Creativity

Proposed by: Sternberg and Lubart as an extension of the Investment Theory.

Core Idea: Creativity results from the **confluence (combination)** of multiple resources. It is not a product of a single factor but emerges when several critical elements intersect.

Key Resources in the Confluence Model:

1. **Intellectual Abilities:**
    - Analytical, synthetic, and practical skills are essential.
2. **Knowledge:**
    - Broad and deep understanding of a domain, balanced with openness to new learning.
3. **Thinking Styles:**
    - Legislative style (preference for creating one's own rules) encourages innovation.
4. **Personality Attributes:**
    - Willingness to overcome obstacles, take sensible risks, and tolerate ambiguity.
5. **Motivation:**
    - Intrinsic motivation is vital for sustained creative engagement.
6. **Environment:**
    - External support from mentors, peers, and institutions that foster creative expression.

Explanation:
The confluence theory emphasizes that lacking even one resource may significantly reduce creative output. For example, a person with excellent skills but no supportive environment

may not realize their creative potential. Creativity is thus the outcome of these factors coming together in harmony.

Comparison: Investment Theory vs Confluence Theory

Aspect	Investment Theory	Confluence Theory
Main Focus	Creativity as "buying low, selling high" in ideas	Creativity as the combination of multiple resources
Emphasis	Strategy of idea selection and promotion	Integration of abilities, traits, and environment
Originators	Sternberg & Lubart	Sternberg & Lubart
Strength	Memorable analogy, practical application	Holistic, multi-factor explanation
Limitation	Less detailed about underlying processes	More complex to measure and apply

Conclusion

Creativity is a dynamic and multifaceted process involving preparation, unconscious processing, sudden insights, and rigorous evaluation. The **Investment Theory** explains creativity in terms of strategic engagement with undervalued ideas, while the **Confluence Theory** offers a broader, integrative view, highlighting the necessity of multiple interacting resources. Together, these perspectives provide valuable insight into how creativity develops and how it can be nurtured—through cultivating cognitive skills, intrinsic motivation, supportive environments, and the courage to challenge conventional thinking.

Q.3) Explain Sternberg's triarchic theory of intelligence.

Robert J. Sternberg proposed the **Triarchic Theory of Intelligence** as an alternative to traditional IQ-based concepts, emphasising that intelligence is not limited to academic skills measured by tests but also includes practical and creative abilities required for real-life success. His theory integrates cognitive processes, environmental adaptation, and the application of knowledge. The word *triarchic* means "three-part," referring to the three interrelated components of intelligence: **Analytical, Creative, and Practical**.

Sternberg also highlighted that intelligence is goal-directed, involves purposeful adaptation to the environment, and can be improved through instruction and experience.

1. Analytical Intelligence (Componential Subtheory)

Definition:
Analytical intelligence refers to the ability to analyse, evaluate, compare, and contrast information. It is the type of intelligence most often measured by standardised IQ tests and is closely related to academic problem-solving skills.

Key Processes Involved:

- **Metacomponents:** Higher-order processes used to plan, monitor, and evaluate problem-solving strategies. For example, deciding how to approach a mathematics problem.
- **Performance Components:** Processes used to carry out the actual task, such as performing calculations or applying rules.
- **Knowledge-Acquisition Components:** Processes involved in learning new information and integrating it with existing knowledge.

Role in Life:
Analytical intelligence helps in academic success, logical reasoning, and structured problem-solving. It is useful in situations that require careful analysis and accuracy, such as solving puzzles, conducting research, or diagnosing technical issues.

Example:
A student preparing for an exam analyses previous papers, identifies patterns in questions, and applies learned formulas to solve problems effectively.

2. Creative Intelligence (Experiential Subtheory)

Definition:
Creative intelligence involves the ability to deal with novel situations and to generate new ideas by combining existing knowledge in innovative ways.

Key Aspects:

- **Novelty:** The ability to respond to unfamiliar situations without relying solely on learned strategies.
- **Automation:** The capacity to perform familiar tasks effortlessly, freeing cognitive resources for new challenges.

Role in Life:
This type of intelligence enables people to think outside the box, adapt to new environments, and create unique solutions. It plays a key role in innovation, artistic expression, and entrepreneurship.

Example:
An entrepreneur facing a sudden drop in sales designs an unconventional marketing campaign using social media trends to reach new audiences.

3. Practical Intelligence (Contextual Subtheory)

Definition:
Practical intelligence is the ability to adapt to, shape, or select environments to meet one's goals. Sternberg often described it as "street smarts" — the know-how to handle everyday tasks and challenges effectively.

Key Elements:

- **Adaptation:** Changing oneself to fit the environment (e.g., learning new workplace norms).
- **Shaping:** Changing the environment to suit one's needs (e.g., reorganising a workspace for efficiency).
- **Selection:** Choosing a new environment when adaptation or shaping is not possible (e.g., switching to a job better aligned with one's skills).

Role in Life:
Practical intelligence is crucial for navigating social situations, managing resources, and making sound decisions in real-life contexts.

Example:
A manager handling a workplace conflict uses interpersonal skills and diplomacy to resolve disputes, ensuring team harmony.

Interrelationship of the Three Intelligences

While each type of intelligence is distinct, they work together in most real-life situations. For example, starting a new business may require:

- **Analytical intelligence** to prepare a business plan.
- **Creative intelligence** to design innovative products or services.
- **Practical intelligence** to manage daily operations and adapt to market changes.

Sternberg emphasised that balanced use of all three leads to what he calls *successful intelligence* — the ability to achieve goals in personal and professional life.

Applications of the Triarchic Theory

1. **Education:**
   The theory suggests teaching methods should nurture analytical, creative, and practical skills. For instance, students could be assessed not just on theoretical knowledge but also on real-world problem-solving and innovation.
2. **Workplace:**
   Employers can benefit from recognising that high job performance often depends on a blend of analytical, creative, and practical abilities, not just formal qualifications.

3. **Personal Development:**
   Individuals can consciously develop weaker areas to achieve a more balanced intelligence profile, enhancing adaptability and effectiveness.

Strengths of the Theory

- **Broader Concept of Intelligence:** Goes beyond traditional IQ tests, recognising diverse talents.
- **Real-World Relevance:** Highlights the importance of practical skills in everyday life.
- **Educational Impact:** Encourages varied teaching strategies to address different intelligence types.
- **Flexibility:** Acknowledges that intelligence can be developed over time.

Limitations of the Theory

- **Measurement Challenges:** It is difficult to design reliable tests that equally assess all three types of intelligence.
- **Cultural Variations:** Practical intelligence is context-specific; what works in one culture may not be valued in another.
- **Overlap with Other Theories:** Some critics argue the theory overlaps with existing concepts like Gardner's multiple intelligences.

Conclusion

Sternberg's Triarchic Theory of Intelligence expands the traditional understanding of human intellect by recognising that success in life depends not only on analytical skills but also on creative thinking and practical problem-solving. It emphasises that intelligence is dynamic, context-dependent, and improvable. By encouraging a balanced development of all three components — analytical, creative, and practical — individuals can achieve *successful intelligence*, enabling them to adapt, innovate, and thrive in diverse life situations.

SECTION – B

Answer the following questions in 400 words each.

Q.4) Describe the Levels of processing model by Craik and Lockhart.

Craik and Lockhart (1972) proposed the *Levels of Processing (LoP) Model* as an alternative to the traditional multi-store models of memory. Instead of focusing on separate memory stores like sensory, short-term, and long-term memory, this model emphasizes the *depth of information processing* as the key determinant of how well information is retained.

Core Idea

The model suggests that memory retention depends on the *level* (depth) at which information is processed, not on the time it is stored or the number of rehearsals. Deeper, more meaningful processing leads to better and longer-lasting memory traces, while shallow processing results in weaker memory.

Levels of Processing

1. **Shallow Processing**
    - Involves surface-level analysis of information.
    - Focus is on *physical or perceptual features* without considering meaning.
    - Memory from this level fades quickly because it is not linked to deeper understanding.
    - **Example:** Noticing whether a word is written in capital letters or identifying its font style.
2. **Intermediate (Phonemic) Processing**
    - Focuses on *sound-based encoding* rather than meaning.
    - The item may be remembered slightly longer than with shallow processing, but retention is still limited.
    - **Example:** Thinking about how a word sounds or rhymes with another word.
3. **Deep (Semantic) Processing**
    - Involves analyzing the *meaning* of information and relating it to existing knowledge.
    - Strongest and most durable memory traces are formed at this level.
    - **Example:** Relating a new concept to personal experiences or understanding its application in real life.

Factors Enhancing Deep Processing

- **Elaboration:** Adding details or creating associations between new and old information.
- **Distinctiveness:** Noting unique features of the material.
- **Personal Relevance:** Connecting information to one's own life.

Evidence Supporting the Model

Craik and Tulving (1975) demonstrated that participants who engaged in semantic processing (e.g., deciding if a word fits into a sentence) remembered more words than those who focused on shallow features (e.g., counting letters in a word).

Criticism of the Model

- *Lack of clear definition:* "Depth" is difficult to measure objectively.
- *Circular reasoning:* Information remembered well is assumed to have been processed deeply, which can be tautological.
- Ignores the role of retrieval processes and individual differences in memory strategies.

Conclusion

The Levels of Processing model highlights the importance of *how* we engage with information rather than where it is stored. By encouraging deep, meaningful, and elaborative processing, learners can significantly improve retention and understanding. Despite some criticisms, the model remains influential in cognitive psychology and educational practice.

Q.5) Explain the key issues in the study of cognitive psychology.

Cognitive psychology is the scientific study of mental processes such as perception, attention, memory, language, problem-solving, and decision-making. It focuses on how people acquire, process, store, and retrieve information. In studying these processes, researchers encounter several **key issues** that guide theory, research, and application.

1. Nature vs. Nurture

A central issue is the extent to which cognitive abilities are shaped by genetics (nature) versus environment and experience (nurture). While biological factors like brain structure and neurotransmitters influence cognition, cultural background, education, and personal experiences also play a critical role. Modern perspectives recognize that both interact dynamically.

2. Serial vs. Parallel Processing

This issue concerns whether cognitive processes occur in a step-by-step sequence (**serial processing**) or simultaneously (**parallel processing**). For example, reading might involve processing letters one at a time or recognizing whole words instantly. Research in attention and neural networks suggests the brain often processes multiple streams of information in parallel.

3. Conscious vs. Unconscious Processing

Cognitive psychology explores which mental activities are conscious and deliberate versus

automatic and unconscious. For instance, solving a math problem requires conscious effort, whereas recognizing a familiar face happens automatically. Understanding the balance between these processes is crucial for studying expertise, habits, and decision-making.

4. Domain-Specific vs. Domain-General Mechanisms
Some cognitive functions may be specialized for particular tasks (domain-specific), such as language processing, while others apply broadly across different tasks (domain-general), such as working memory. This distinction influences how researchers design experiments and interpret cognitive abilities.

5. Representation of Knowledge
A key issue is how knowledge is mentally represented – whether as mental images, symbolic codes, propositions, or neural patterns. The **mental imagery debate** and research on semantic networks address how concepts are stored and accessed in the mind.

6. Modularity of Mind
This refers to whether the mind consists of independent, specialized modules for different cognitive tasks or operates as an integrated system. Evidence from brain lesions, neuroimaging, and developmental disorders helps clarify this question.

7. Ecological Validity
Cognitive psychology must balance laboratory control with real-world applicability. Some critics argue that highly controlled experiments may not reflect everyday cognitive functioning. This raises the issue of designing studies that capture authentic, context-dependent thinking.

8. Theoretical vs. Applied Focus
Another issue is whether cognitive psychology should primarily develop theories of mental processes or apply findings to areas such as education, artificial intelligence, mental health, and human-computer interaction. Most contemporary research integrates both.

In summary, the study of cognitive psychology involves navigating complex questions about the origins, structure, processes, and applications of human thought. Addressing these issues helps researchers create more accurate theories and practical solutions for understanding and improving cognitive functioning.

Q.6) Describe the goals of research. Explain the research methods in cognitive psychology.

Goals of Research

Research in psychology, including cognitive psychology, aims to systematically investigate behaviour and mental processes to increase understanding and solve problems. The main goals are:

1. **Description**
    - To accurately describe phenomena, behaviours, or mental processes.
    - In cognitive psychology, this may involve describing how memory works or how people perceive visual patterns.
2. **Explanation**
    - To identify causes and mechanisms underlying mental processes.
    - For example, explaining why short-term memory capacity is limited.
3. **Prediction**
    - To forecast future behaviour or mental outcomes based on established relationships.
    - For instance, predicting learning performance based on attention span.
4. **Control or Application**
    - To use research findings to influence, modify, or enhance behaviour and cognitive functioning.
    - Examples include designing better educational tools or therapies for memory loss.

Research Methods in Cognitive Psychology

Cognitive psychology investigates processes like perception, memory, problem-solving, and language. Its research methods combine experimental control with real-world application.

1. Experimental Method

- **Description**: Manipulates one or more independent variables and measures effects on dependent variables under controlled conditions.
- **Purpose**: Establish cause-and-effect relationships.
- **Example**: Testing how varying study times affects recall accuracy.

2. Quasi-Experimental Method

- **Description**: Similar to experiments but lacks random assignment to groups.
- **Purpose**: Useful when randomisation is impractical or unethical.
- **Example**: Comparing memory performance between different age groups in natural settings.

3. Observational Method

- **Description**: Systematic recording of behaviour without interference.
- **Purpose**: Describes natural behaviour patterns.
- **Example**: Observing reading strategies used by children in classrooms.

4. Case Study Method

- **Description**: In-depth examination of an individual or small group.
- **Purpose**: Useful for rare phenomena or unique cognitive impairments.
- **Example**: Studying a patient with exceptional memory or brain injury.

5. Survey Method

- **Description**: Uses questionnaires or interviews to collect self-reported data.
- **Purpose**: Gathers large-scale information on cognitive habits and attitudes.
- **Example**: Surveying students on their study techniques.

6. Neuropsychological Methods

- **Description**: Uses brain imaging (fMRI, PET, EEG) and lesion studies to link brain activity with cognitive functions.
- **Purpose**: Understands neural mechanisms of cognition.
- **Example**: Mapping brain regions active during problem-solving.

Conclusion

The goals of research—description, explanation, prediction, and control—guide cognitive psychologists in selecting suitable methods. By combining experimental precision with observational and neuropsychological tools, researchers can deepen understanding of mental processes and apply findings to education, therapy, and technology.

Q.7) Describe the acquisition of second language.

Acquisition of Second Language

The acquisition of a second language (L2) refers to the process through which individuals learn a language other than their native or first language (L1). This process can occur in both naturalistic and instructional settings and involves complex interactions of cognitive, social, and environmental factors.

Stages of Second Language Acquisition

1. **Pre-Production Stage (Silent Period)**
    - Learners have minimal comprehension and may not speak much.
    - They focus on listening, internalising vocabulary, and understanding basic structures.
2. **Early Production Stage**
    - Learners begin using short words and phrases.
    - Speech may be grammatically incorrect, but basic communication starts.
3. **Speech Emergence Stage**
    - Vocabulary expands, sentences become longer and more complex.
    - Learners can initiate conversations and express simple ideas.
4. **Intermediate Fluency Stage**
    - Improved grammar, expanded vocabulary, and better comprehension.
    - Learners can discuss ideas and give opinions with fewer errors.
5. **Advanced Fluency Stage**
    - Near-native proficiency in vocabulary, grammar, and pronunciation.
    - Learners can participate in complex conversations and academic discourse.

Factors Influencing Second Language Acquisition

1. **Age**
    - Younger learners often acquire pronunciation and fluency more naturally, while older learners may progress faster in grammar due to cognitive maturity.
2. **Motivation**
    - Integrative motivation (desire to connect with the target culture) and instrumental motivation (practical needs like jobs or exams) influence learning success.
3. **Exposure**

- Frequency, quality, and context of exposure determine the speed and depth of acquisition.

4. **First Language Influence**
    - L1 can aid learning through positive transfer (similarities) or cause errors through negative transfer (differences).
5. **Cognitive Abilities**
    - Memory, attention, and problem-solving skills impact how learners process and store new language information.

Theoretical Perspectives

1. **Behaviourist Perspective**
    - Language is learned through imitation, repetition, and reinforcement.
2. **Nativist Perspective (Chomsky)**
    - Humans have an innate language acquisition device (LAD) that helps them acquire any language, including L2.
3. **Interactionist Perspective**
    - Social interaction and communicative practice are key to developing L2 competence.
4. **Cognitive Perspective**
    - Emphasises the mental processes of learning, such as information processing, memory, and schema building.

Conclusion

Second language acquisition is a gradual, multi-stage process shaped by individual, social, and cognitive factors. Effective L2 learning requires sufficient exposure, meaningful communication, and supportive environments that balance accuracy and fluency development.

Q.8) Describe the perceptual, emotional and intellectual blocks to problem solving.

Introduction

Problem solving is a core cognitive process that allows individuals to identify solutions, make decisions, and adapt to novel situations. However, various blocks can interfere with effective problem solving. These blocks are often categorized as **perceptual, emotional, and**

intellectual, each influencing thinking in distinct ways. Understanding these barriers helps in designing strategies to overcome them and enhance creativity and decision-making.

1. Perceptual Blocks

Perceptual blocks occur when an individual's **perception of the problem is limited or distorted**, preventing them from seeing the situation objectively.

Characteristics:

- **Rigid Thinking:** Individuals may focus on familiar patterns, ignoring alternative perspectives.
- **Problem Definition Bias:** Misidentifying the problem or its scope due to preconceptions.
- **Stereotyping and Assumptions:** Relying on generalized beliefs that limit creative possibilities.

Example:
A manager may assume a drop in sales is solely due to poor marketing, overlooking issues in product quality or customer service.

Overcoming Perceptual Blocks:

- Break habitual thinking patterns.
- Use techniques like brainstorming or reframing the problem.
- Seek diverse perspectives to expand understanding.

2. Emotional Blocks

Emotional blocks arise from **personal feelings, fears, or attitudes** that inhibit rational and flexible thinking.

Characteristics:

- **Fear of Failure:** Anxiety about making mistakes can prevent risk-taking and experimentation.
- **Lack of Confidence:** Doubting one's abilities reduces persistence and effort.
- **Overattachment to Past Solutions:** Emotional investment in previous methods may prevent exploring new approaches.

Example:
A student might avoid attempting a complex problem in mathematics because they fear giving the wrong answer.

Overcoming Emotional Blocks:

- Encourage self-confidence and resilience.

- Create a safe environment for trial and error.
- Practice stress-reduction and emotional regulation techniques.

3. Intellectual Blocks

Intellectual blocks are **cognitive limitations or rigid thinking patterns** that hinder effective problem solving.

Characteristics:

- **Lack of Knowledge:** Insufficient domain knowledge restricts idea generation.
- **Convergent Thinking:** Over-reliance on conventional logic prevents lateral or creative approaches.
- **Functional Fixedness:** Difficulty in seeing alternative uses for objects or ideas.
- **Premature Closure:** Accepting the first solution without considering better options.

Example:
A designer might only think of a chair as something to sit on, ignoring potential uses in multifunctional furniture designs.

Overcoming Intellectual Blocks:

- Encourage divergent thinking and flexibility.
- Provide training and exposure to new information.
- Use problem-solving frameworks to explore multiple solutions systematically.

Conclusion

Effective problem solving requires recognizing and addressing **perceptual, emotional, and intellectual blocks**. Perceptual blocks limit how we view problems, emotional blocks influence motivation and confidence, and intellectual blocks restrict cognitive flexibility. By cultivating awareness, adopting creative strategies, and fostering supportive environments, individuals can overcome these barriers, leading to more innovative, effective, and adaptive solutions.

SECTION – C

Answer the following questions in 50 words each.

Q.9) Cognitive Neuroscience

Cognitive neuroscience is the interdisciplinary study of how brain structures and neural processes underlie mental functions such as perception, memory, language, attention, and problem-solving. It combines methods from psychology, neuroscience, and computational modeling to understand cognition. Techniques like functional magnetic resonance imaging (fMRI), electroencephalography (EEG), positron emission tomography (PET), and lesion

studies help researchers map specific cognitive functions to brain regions. Cognitive neuroscience also investigates how brain damage, neurodegenerative diseases, or developmental disorders affect thinking and behavior. By integrating biological and psychological perspectives, it provides insights into both normal and abnormal cognitive functioning and informs clinical interventions, educational strategies, and artificial intelligence applications.

Q.10) Relationship Between Creativity and Intelligence

Creativity and intelligence are related yet distinct cognitive constructs. **Intelligence** involves reasoning, problem-solving, and knowledge acquisition, while **creativity** refers to generating novel, original, and useful ideas. High intelligence can facilitate creativity by providing cognitive tools and analytical skills, but it is not sufficient on its own. Creativity also depends on divergent thinking, flexibility, and openness to experience. Studies suggest a threshold effect: individuals with below-average intelligence often struggle to be creative, whereas higher intelligence provides a foundation for creative thought. Both traits interact in learning, innovation, and problem-solving, and understanding their relationship helps educators and psychologists design strategies to enhance cognitive potential and inventive thinking.

Q.11) Vernon's Hierarchical Theory

Vernon's hierarchical theory of intelligence proposes a multi-level model in which general intelligence (g) sits at the top, influencing broad ability clusters, which in turn affect specific skills. The model distinguishes two main factors: **verbal-educational ability (v:ed)**, encompassing language, verbal reasoning, and academic skills, and **practical-mechanical ability (k:m)**, including spatial, mechanical, and perceptual skills. Below these broad clusters are narrow abilities, representing specialized talents like memory, arithmetic, or spatial orientation. Vernon's hierarchical approach integrates Spearman's general intelligence with Thurstone's primary mental abilities, offering a comprehensive structure to explain individual differences in cognitive performance across domains, and it informs educational assessment and vocational guidance.

Q.12) Apraxia of Speech

Apraxia of speech (AOS) is a motor speech disorder caused by brain damage, often in the left hemisphere, affecting the ability to plan and program the movements needed for speech. Individuals with AOS understand language and know what they want to say, but struggle to produce sounds correctly, resulting in inconsistent errors, distorted speech, and difficulty with articulation. It differs from dysarthria, which involves muscle weakness, and aphasia, which affects language comprehension or expression. AOS can result from stroke, traumatic brain injury, or neurodegenerative conditions. Therapy focuses on repetitive speech practice, motor planning exercises, and compensatory strategies to improve intelligibility and communication effectiveness.

Q.13) Functions of Language

Language serves several essential functions in human life:

1. **Communication**: Transmitting ideas, emotions, and information between individuals.
2. **Cognitive Functioning**: Supports thought processes, problem-solving, and memory.
3. **Social Interaction**: Facilitates relationship building, cooperation, and cultural transmission.
4. **Expression of Identity**: Reflects personal, cultural, and social identity.
5. **Emotional Expression**: Conveys feelings and attitudes.
6. **Regulation and Control**: Influences behaviour of self and others through instructions, rules, or persuasion.
   Language enables humans to interact, learn, plan, and innovate, forming the foundation of culture, education, and society.

Q.14) Limitations of Chomsky's Theory of Language Acquisition

Chomsky's theory, especially the concept of an innate Language Acquisition Device (LAD) and universal grammar, revolutionized understanding of language learning. However, it has several limitations. First, it underestimates the role of **social interaction and environmental input**, giving minimal importance to learning through imitation or reinforcement. Second, it lacks **empirical evidence**, as LAD is theoretical and not directly observable. Third, it does not explain **variations in language development**, such as delayed acquisition or bilingualism. Finally, the theory focuses mainly on syntax and grammar, ignoring pragmatic and semantic aspects of language. Despite these limitations, it remains influential in highlighting the biological basis of language acquisition.

Q.15) Means-End Analysis as a Problem Solving Technique

Means-end analysis is a heuristic strategy used in problem solving, where the problem solver reduces the difference between the current state and the goal state. The process involves identifying the **largest discrepancy** and selecting an action or "means" to reduce it. If a direct solution is not possible, subgoals are created to systematically approach the main goal. This technique is widely used in cognitive psychology and artificial intelligence for tasks like planning and reasoning. For example, when solving a puzzle, a person may first focus on placing the edge pieces (subgoal) before completing the whole picture. It emphasizes stepwise, goal-directed problem solving.

Q.16) Types of Problems

Problems can be classified based on their structure and solution approach:

1. **Well-Defined Problems**: Clear initial state, goal, and rules. Examples include mathematical equations or puzzles.

2. **Ill-Defined Problems**: Ambiguous goals or constraints; solutions are not straightforward. Examples include planning a career or resolving social conflicts.
3. **Convergent Problems**: Require a single correct solution, often solved through logical reasoning.
4. **Divergent Problems**: Allow multiple possible solutions, fostering creativity.
5. **Insight Problems**: Solutions emerge suddenly after reinterpreting the problem. Understanding problem types helps in selecting appropriate strategies and cognitive approaches for effective problem solving.

Q.17) Newell's Approach to Problem Solving

Allen Newell, along with Herbert Simon, proposed a **symbolic, computational approach** to problem solving. They suggested that problems can be represented as **states and operators**, with the solver moving from an initial state to a goal state using rules or strategies. Their **General Problem Solver (GPS)** model uses means-end analysis, search trees, and heuristics to simulate human problem solving. Newell emphasized that cognitive processes can be formalized and studied computationally, bridging psychology and artificial intelligence. This approach highlights the role of mental representations, systematic strategies, and problem-solving algorithms, providing a framework to understand both simple and complex problem-solving behaviour in humans and machines.

Q.18) Dyslexia

Dyslexia is a specific learning disorder characterized by **difficulties in reading, spelling, and word recognition**, despite normal intelligence and educational opportunities. It involves problems with **phonological processing**, making it hard to map letters to sounds. Dyslexia may also affect writing and, in some cases, comprehension. Causes include genetic factors, differences in brain regions involved in language, and atypical neural connectivity. Early identification and intervention, such as **multisensory instruction, phonics-based training, and individualized support**, improve outcomes. Dyslexia does not affect intelligence; many individuals with dyslexia excel in creativity, problem-solving, and visual-spatial skills. Awareness and supportive strategies enable affected individuals to achieve academic and professional success.