Q) Which element in agent is used for selecting external actions? --> Performance
Q) How many things are concerned in design of a learning element? --> 3
Q) What will take place as the agent observes its interactions with the world? --> Learning
Q) A key element of AI is a/an _________. which is a rule of thumb --> Heuristics
Q) How many agents are there in artificial intelligence? --> 4
Q) Which agent deals with happy and unhappy states? --> Utility based agent
Q) Who is considered as the father of artificial intelligence? --> John McCarthy
Q) The characteristics of the computer system capable of thinking, reasoning and learning is known as ________ --> Artificial intelligence
Q) The ________ is the main part of the neuron that contains neurotransmitter receptors (i.e. receives incoming messages), and the ________ is the main conductor of the action potential along the neuron’s length. --> Dendrite, axon
Q) During its resting state, the electrical charge inside the neuron is _____ compared to the outside. --> Negative (-70mV)
Q) An AI technique that allows computers to understand associations and relationships between objects and events is called --> Patternmatching
Q) Which particular generation of computers is associated with AI? --> fifth
Q) The field that investigates the mechanics of human intelligence is --> Cognitive science
Q) The area of AI that investigates methods of facilitating communication between people and computers is: --> Natural language processing
Q) ________ is a computer program typically used to provide some form of Artificial Intelligence. --> Production System
Q) The ________ of expert systems contains both factual and heuristic knowledge. --> Knowledge base
Q) One definition of AI focuses on problem solving methods that process --> Symbols
Q) ________ is the major example of a fourth generation programming language supporting the declarative programming paradigm. --> Prolog
Q) Expert system whose knowledge is represented in rule form is called ________ based system. --> Rule
Q) How many types of AI tasks --> 2
Q) A college student who suffered a head injury due to falling off a ladder has experienced difficulty performing higher mental functions like thinking and planning. The student has suffered an injury to the ________ --> cerebral cortex
Q) The highest intellectual functions occur in the ________ --> association cortex
Q) The central nervous system is comprised of the brain and ________ --> spinal cord
Q) Clusters of neurons that are interconnected to process information are ________ --> neural networks
Q) The area of the brain through which most neural input from the cerebral cortex passed is the ________ --> Thalamus
Q) The loosely connected network of structures under the cerebral cortex that is important in both memory and emotion is the ________ --> limbic system
Q) A person has just sensed the pain of a knife cut. Which type of nerves transmitted this message? --> Afferent nerves
Q) A college student has just jumped out of the shower because he accidentally turned off the hot water. The sensation of cold and the student’s response are transmitted by the ________ nervous system. --> Somatic
Q) The function of axons is to ____________________→ carry information away from the cell body
Q) Which neurotransmitter primarily stimulates the firing of neurons? → Acetylcholine
Q) A part of the brain which will concern with balance and coordination → Hindbrain
Q) The lobe of the brain involved in smell and sound is the ____________________ lobe. → Temporal lobe
Q) AI can be defined as → A branch of computer science concerned with creating computer systems exhibiting intelligence.
Q) Procedural knowledge is → Knowledge about steps
Q) The highest level of the brain is the ______________ → Forebrain
Q) The lobe of the brain involved in vision is the ______________ → Occipital lobe
Q) The parts of neurons that receive and orient information toward the cell body are __________. → Dendrites
Q) The layer of fat cells that encases and insulates most axons and speeds neural transmission is the ______________ → Myelin sheath
Q) The brief wave of electrical charge that sweeps down an axon is the ______________ → Action potential
Q) Neurotransmitters transmit messages from neuron to neuron by flowing across __________. → Synapses
Q) A dyadic relation has __________ no. of incoming arcs and __________ no. of outgoing arcs from a relation → 1,1
Q) Restrict graph formation operator → Modifies a graph by replacing type label of a concept
Q) Simplify graph formation operator → Eliminates one of the two identical concepts
Q) __________ → Every cat is on a mat
Q) Conceptual graphs are used for → Representing concepts
Q) What are the names of the two kinds of nodes in a conceptual graph? → Concepts and relations
Q) Intelligence can be defined as → Ability to acquire, understand, and apply knowledge
Q) Declarative knowledge is → Passive knowledge expressed as statements or facts
Q) Knowledge can be defined as → Possession of facts and principles gathered for a specific task
Q) Meta knowledge is → Knowledge about knowledge
Q) In a human brain there is __________ no. of neurons consisting of __________ no. of synaptic connections per neuron. → $10^{11}, 10^4$
Q) ______________ acts as a storage device which sense signals from receptors and gives an output → central nervous system
Q) Hodgkin-Huxley is a __________ based neuron model. → conductance
Q) The lipid layer in Hodgkin-Huxley is an excellent capacitor and has a capacitance of about ______________ → 10 pf/m
Q) The size of neuron is about ______________ → 100 m
Q) ______________ are the pathways, columns, and topographic maps which present the idea of division of brain into different parts → inter regional circuits
Q) The conversion of pre-synaptic electrical signal into a chemical signal and then into a post synaptic signal is handled by ______________ → Synapses
Q) The accuracy of neural micro circuits is calculated in ________ seconds, the smallest size is
calculated in _______ seconds. --> milli, micro

Q) Dendritic trees are the sub units in a neuron and are formed by grouping of ________ -->
neural micro circuits

Q) A group of neurons which are having same or varying features is called _______ --> local

circuits

\[ Q = f(\text{net}) = \frac{2}{1 + \exp(-\lambda \text{net})} - 1 \]
is an output of ---------- activation function --> Bipolar
sigmoid

Q) Which of the following represent a hyper plane equation? --> \( \hat{w}^T \hat{y} = 0 \)

Q) A single layer perceptron will converge at n = _______________ --> 

Q) Minimum ________ no. of layers are required for multilayer perceptron --> 3

Q) Single layer continuous perceptron model uses ________ algorithm --> Steepest descent

Q) Dichotomizer is a classifier with __________ no. of classes --> 2

Q) In an artificial neural network architecture vertices represent ________ and the edges represent --> Neurons, synaptic links

Q) Neural architecture is inspired by the structure of ______________ of the brain. --> Cerebral
cortex

Q) ______________ is a quantitative description of an object, event or phenomenon --> Pattern

Q) Which of the following is the temporal pattern? --> ECG signals

Q) In perceptron learning process, first step required to set the learning rate \( \alpha \) between _______. -->
> 1.5 to 1

Q) In perceptron ________ is the formula to change the bias --> \( \hat{b}_{\text{new}} = \hat{b}_{\text{old}} + \varepsilon \)

Q) Error can be minimized by taking ________ of weights --> partial derivatives

Q) AND problem can be solved by ________ --> single layer perceptron

Q) When \( \hat{w}(\hat{k}_n) = \hat{w}(\hat{k}_n + 1) = \hat{w}(\hat{k}_n + 2) = \) --> converged

Q) LMS algorithm is to ________ the error --> minimize

Q) Automatic removal of error is known as ________ filtration --> adaptive

Q) Perceptron is a ________ type of learning process --> supervised

Q) Perceptron was developed by __________. --> Frank Rosenblatt

Q) Single layer perceptron is used for ________ --> linear separability

Q) ________ is the task of learning or constructing a function that generates
approximately the same outputs from input vectors as the process being modeled, based on
available training data --> function approximation

Q) In the organization of brain ________ is the element between neurons and neural micro
circuits --> Dendritic trees

Q) In Hodgkin Huxley neuron model current through the capacitance \( C_m --> \)
\( I_m = I_{\text{na}} + I_{\text{k}} + I_{\text{leak}} + I_{\text{ext}} \)

Q) The gating variables \( \alpha, \beta \) in Hodgkin Huxley neuron model vary depending on ________ --> Voltage

Q) The cost function in steepest descent is minimized using ________ method --> Newtons

Q) The Gauss-Newton method is applicable to a cost function that is expressed as sum of
______ --> Error squares

Q) ________ is the process of dividing space into several connected regions. --> vector quantization
Q) Least mean square algorithm is also known as ____________ --> delta rule
Q) XOR problem can be solved by ____________ --> multi layer perceptron
Q) ________ is the process of presenting an input sample trigger the generation of a specific output pattern. --> pattern association

Q) Length of weight adjustment vector in single layer discrete perceptron model -->
Q) Perceptron convergence theorem is proved based on ________________ --> Negative steepest descent algorithm
Q) In a 2-hidden layer network, local features are extended in __________ layer to make the approximation process more manageable --> First hidden layer
Q) In __________ procedure, all the weights in the multilayer perceptron are treated equally -->

Weight decay
Q) The shape of a negative gradient multidimensional error surface --> Bowl
Q) The updated weight vector in single layer continuous perceptron model -->

\[
W_{k+1} = W_k + \eta \frac{1}{2} (\mu_k - \alpha_k) \left(1 - \alpha_k^2\right) y
\]
Q) __________ Biological neuron model will capture all the important properties of cortical neurons. --> Integrate and Fire
Q) Firing of a neuron is prevented in __________ period in integrate and fire neuron model --> Refractory time period
Q) The main disadvantage of integrate and fire neuron model is --> Memory problem
Q) In the classification model __________ will reduce the dimensionality --> Feature extractor

Q) The basic equation for gradient descent training is ________________ -->
Q) In the back propagation learning algorithm the local minimum may be overstretched and possibly not found if the learning rate is __________ --> Large
Q) The Back-Propagation (BP) algorithm is __________ learning algorithm. --> Supervised
Q) If the learning rate is very small, _______ number of updates are necessary in back-propagation training --> Large
Q) The Back-Propagation (BP) propagates back the error signal from the __ to the ______ --> Output unit(s), Hidden units
Q) The Back-Propagation (BP) algorithm is not associated with __________ --> McCulloch-Pitts
Q) To achieve target ________ is propagated back in the back propagation learning algorithm. --> Error
Q) The Back-Propagation (BP) algorithm performs _______ on the error function of the output neuron --> Gradient descent
Q) The Back-Propagation (BP) algorithm is often used for training _______ neural networks --> Feed forward
Q) The preferred activation function in back-propagation networks is __________ --> Non-linear
Q) The basic structure of an RBF networks involves __________ different layers --> Three
Q) In RBF networks hidden units are known as __________ --> Radial centers
Q) In RBF networks hidden layer is __________ --> Non-linear
Q) In RBF networks output layer is __________ --> Linear
Q) __________ is a standard technique that is used to speed up convergence and maintain generalization performance of back-propagation training algorithm. --> Momentum
Q) Back-propagation training is a way of creating desired values for __________ layers --> Hidden
Q) The _____ determines the step size of each weight update towards the local minimum in the back-propagation training. --> Learning Rate
Q) The major limitation of the Back-Propagation (BP) algorithm is __________ --> Slow convergence
Q) The Back-Propagation (BP) algorithm cannot be used for __________ application --> Pattern classification
Q) The Back-Propagation learning time is ______ if weights are chosen large initially. --> Reduces
Q) RBF networks solve classification problems by transforming the problem into __________ --> Higher dimensional space
Q) The number of RBF neurons used is ______ --> Less than or equal to the number of data points
Q) The 'curse of dimensionality' refers to the relationship between the ______ --> Number of the neurons and the input dimension
Q) Assuming number of neurons are same as input points in RBFN, the weight solution, \( w = \left( \Phi + \mu I \right)^{-1} d \), for most valuation of \( \mu \) represents a set of equations which are __________ --> Over determined
Q) In the original RBF networks, one neuron is created for each input point. Is this likely to lead to a situation where the complexity of the network is ______ --> \( \leq \) the inherent complexity of the data
Q) Radial Basis Function (RBF) networks suffer from ______ --> Curse of dimensionality
Q) The radial distance \( d_i \) between the input vector \( u \) and the center of the basis function \( c_i \) is computed for each unit \( i \) in the RBFN hidden layer as ______ --> \( ||u - c_i|| \)
Q) In RBFN the activation function of the hidden unit computes the ______ --> Euclidean distance
Q) All hidden units in the RBF network have the ___ degree of sensitivity to inputs. --> Same
Q) In RBFN the weights into the hidden layer basis units are usually set ___ the second layer of weights is adjusted --> Before
Q) The activation functions used in a Hopfield network are ______ --> Threshold
Q) The Hopfield networks have ___________ hidden layers. --> Zero
Q) Which of the following neural network is used for time series prediction ______ --> Hopfield network
Q) The Hopfield network has no crosstalk when ______ --> The stored patterns are orthogonal
Q) The Hopfield network is a ______ --> Recurrent network
Q) The number of neurons in the Hopfield network is equal to ______ --> Dimension of the output pattern
Q) The solution to the weights in RBFN can be performed by ______ --> Linear least squares
Q) The dimension of the hidden unit space in RBFN should be ______ compared to the dimension of the input space. --> Higher dimensional space
Q) In the RBFN learning strategy where fixed centres are chosen randomly, the standard deviation is specified as \( \sigma = \frac{1}{\sqrt{2M}} \)
Q) Standard RBF networks have ______ hidden layer --> One
Q) If a 10 bit pattern is to be reproduced correctly with 99% probability, the maximum number of patterns may be stored in a Hopfield network are ______ --> 2
Q) The Hopfield network consists of ______ --> Single layer
Q) The Continuous Hopfield networks use ______ --> Differential equations
Q) The Hamming distance between the vectors [1 -1 -1] and [-1 1 -1] is ______ --> 2
Q) The theoretical maximum number of patterns that could be stored by a Hopfield network is given as, \( p_{\text{max}} = \frac{N}{2 \pi(N)} \)
Q) The Hopfield network utilizes ______ weight matrix --> Symmetric
Q) The diagonal terms in weight matrix are normally set to zero in the Hopfield network to reduce ______ --> Number of spurious attractors
Q) The Hopfield networks are primarily used as ______ during recall --> Associative memories
Q) The Hopfield network minimizes ______ during recall --> Energy function
Q) The Discrete Hopfield networks use ______ --> Difference equations
Q) Genetic Algorithm is a ______ algorithm --> Stochastic
Q) A ______ is the GAs representation of a single factor --> Gene
Q) Genetic Algorithms mostly use ______ rules --> Probabilistic
Q) Genetic Algorithms are intelligent exploitation of ______ search used in optimization problems --> Random
Q) Genetic Algorithm search is highly ______ process --> Parallel
Q) Genetic Algorithms are not guaranteed to find ______ solution to a problem --> Global optimum
Q) Genetic Algorithm is a ______ --> Search algorithm
Q) Genetic Algorithms are inspired by ______ theory --> Darwin
Q) Genetic Algorithms are based on the principle of ______ --> Evolution
Q) In the Genetic Algorithms (GAs), all the genes are usually stored on the ___ chromosomes --> Same
Q) Binary encoding gives many possible chromosomes with a ______ number of alleles --> Smaller
Q) ______ encoding is mainly used for evolving program expressions for genetic programming --> Tree
Q) The permutation encoding represents a ______ --> Order
Q) Chromosome 1 in hexadecimal encoding is ______ --> 9CE7
Q) Permutation encoding can be used for ______ problems --> Ordering
Q) In value encoding every chromosome is a ______ --> String of values
Q) Search space is defined as ________ --> Space of all feasible solutions
Q) In GAs _______ is a process of representing individual genes --> Encoding
Q) The most common way of encoding is ________ --> Binary
Q) Every bit string is a __________ --> Solution
Q) The fitness indicates ______ --> How good the solution
Q) _______ corresponds to how close the chromosome is to the optimal one --> Fitness
Q) The fitness is applied on the ______ --> Chromosome
Q) The ______ the fitness is the better the solution --> Higher
Q) For calculating fitness, the chromosome has to be first ______ --> Decoded
Q) The objective function has to be evaluated for calculating ______ --> Fitness
Q) Hexadecimal encoding uses string made up of ______ --> 0-9, A-F
Q) Octal encoding uses string made up of ______ --> 0-7
Q) The fitness of an individual in a GA is the value of an ______ for its phenotype -->

Objective function
Q) Fitness computation time of a single solution is ______ --> Extremely high
Q) All the genetic information gets stored in the ______ --> Chromosomes
Q) Randomly pick strings to make the next generation is ______ --> Reproduction
Q) Which operator can introduce new genetic information into the population? --> Reproduction
Q) Generally the chance of crossover is between _____ --> 0.6 1.0
Q) _______ is a dumb process on the chromosome of the genotype --> Reproduction
Q) _______ form basis of sexual reproduction --> Meiosis
Q) Good coding leads to ______ of a GA --> Fast convergence
Q) In many cases many possible chromosomes do not code for ______ solutions --> Feasible
Q) Design objectives relate to ______ --> Fitness
Q) The reproduction refers to ______ --> Selection
Q) The commonly used reproduction operator is the ______ reproductive operator -->

Proportionate
Q) The traditional genetic algorithm uses ______ crossover --> Single point
Q) Genetic Algorithms (GAs) stand up as a powerful tool for solving ______ problems -->

Optimization
Q) There is no exchange of information in ______ --> Mitosis
Q) ______ is used to decrease the fitness of individuals that are too similar to other members of the population --> Sharing
Q) ______ may describe a possible solution to a problem --> Genes
Q) Generally the change of mutation is ______ --> 0.001
Q) _______ are the basic instructions for building a Generic Algorithms --> Genes
Q) ______ randomly change a small part of some strings --> Mutation
Q) ______ randomly combine the genetic information from two strings --> Crossover