Choose the correct answer(s)

1. The main benefit of using a hybrid agent architecture.
    a) It can combine the advantages of reactive and deliberative agents, such as fast response and rational reasoning.
    b) It can decompose the agent's task into simpler subtasks, such as perception, action, and communication.
    c) It can incorporate different levels of abstraction and granularity, such as symbolic, sub-symbolic, and neural.
    d) All of the above.

2. What is the main challenge of designing a deliberative agent?
    a) How to represent the agent's knowledge and beliefs about the world
    b) How to generate and select the best plan or action for the agent's goals.
    c) How to cope with the complexity and uncertainty of the environment.
    d) All of the above.

3. What is the main difference between a reactive and a deliberative agent?
    a) A reactive agent acts based on its current perception, while a deliberative agent acts based on its internal representation of the world.
    b) A reactive agent acts based on a fixed set of rules, while a deliberative agent acts based on a flexible plan.
    c) A reactive agent acts based on a short-term goal, while a deliberative agent acts based on a long-term goal.
    d) All of the above.

4. The best formal definition of the environment of an agent is:
    a) The set of all possible states that the agent can encounter.
    b) The set of all possible actions that the agent can perform.
    c) The set of all possible percepts that the agent can receive.
    d) The set of all possible outcomes that the agent can achieve.

5. A vacuum cleaner agent in a $n \times m$ grid world, where each cell can be either clean or dirty. The agent can move to any adjacent cell and can suck the dirt from the current cell.
   The best *formal* definition of the environment state, e of the following problem is:
   a) $e = (x, y, d)$, where x and y are the coordinates of the agent's position and d is a Boolean value indicating whether the current cell is dirty or not.
   b) $e = (x, y, D)$, where x and y are the coordinates of the agent's position and D is a $n \times m$ matrix of boolean values indicating whether each cell is dirty or not.
   c) $e = (P, D)$, where P is a set of pairs of coordinates representing the possible positions of the agent and D is a set of pairs of coordinates representing the dirty cells.
   d) $e = (A, D)$, where A is the agent's position and D is the set of dirty cells.

6. What is the main characteristic of a reactive agent?
   a) It has no internal state or memory.
   b) It has a symbolic representation of its goals and plans.
   c) It has a layered architecture that combines different levels of reasoning.
   d) It has a learning mechanism that adapts to its environment.

7. What is the main difference between practical reasoning and theoretical reasoning?
   a) Practical reasoning is about what to do, while theoretical reasoning is about what to believe.
   b) Practical reasoning is about how to do something, while theoretical reasoning is about why to do something.
   c) Practical reasoning is about what is true, while theoretical reasoning is about what is good.
   d) Practical reasoning is about what is possible, while theoretical reasoning is about what is necessary.

8. What is the main difference between deliberation and means-ends reasoning in practical reasoning agents?
    a) Deliberation is about choosing goals, while means-ends reasoning is about choosing actions.
    b) Deliberation is about choosing actions, while means-ends reasoning is about choosing goals.
    c) Deliberation is about choosing beliefs, while means-ends reasoning is about choosing desires.
    d) Deliberation is about choosing desires, while means-ends reasoning is about choosing beliefs.

9. What is the main idea of speech act theory?
    a) Communication is not only about conveying information, but also about performing actions.
    b) Communication is not only about performing actions, but also about conveying information.
    c) Communication is not only about the literal meaning of words, but also about the context and intention of the speaker.
    d) Communication is not only about the context and intention of the speaker, but also about the literal meaning of words.

10. What is an agent communication language (ACL)?
    a) A formal language that defines the syntax and semantics of messages exchanged by agents.
    b) A natural language that allows agents to communicate with humans and other agents.
    c) A programming language that implements the logic and behavior of agents.
    d) A graphical language that represents the structure and interaction of agents.

11. What are the main components of an ACL message?
    a) Sender, receiver, content, and type.
    b) Performative, proposition, sender, and receiver.
    c) Content, context, intention, and effect.
    d) All of the above are equivalent ways of describing the same components.

12. What are the main types of communication protocols in multi-agent systems?
    a) Request, query, inform, and subscribe.
    b) Contract net, auction, voting, and negotiation.
    c) TCP, UDP, HTTP, and SMTP.
    d) All of the above.

13. An example of a speech act is:
    a) Saying "I promise to pay you back" to create an obligation.
    b) Saying "I apologize for being late" to express regret.
    c) Saying "I hereby declare you husband and wife" to change the status of the participants.
    d) All of the above.

14. An example of an ACL message is:
    a) (tell :sender Alice :receiver Bob :content (likes Alice chocolate))
    b) (request :sender Bob :receiver Alice :content (give Bob chocolate))
    c) (inform :sender Alice :receiver Bob :content (gave Alice chocolate Bob))
    d) All of the above.

15. What is coordination through joint intentions?
    a) A coordination approach that involves forming and maintaining mental attitudes that represent the mutual beliefs and commitments of a group of agents.
    b) A coordination approach that involves expressing and understanding the intentions and desires of other agents through natural language or gestures.
    c) A coordination approach that involves aligning and harmonizing the intentions and actions of agents through reinforcement learning or game theory.
    d) None of the above.

16. Given the following payoffs matrix for a two-player game, what is the best response of player 2 if player 1 chooses action A?

	B	C
A	3,2	1,4
B	2,3	4,1

    a) B
    b) C
    c) Both B and C
    d) Neither B nor C

17. What is a social welfare function?
    a) A function that measures the well-being of a society as a whole.
    b) A function that aggregates the preferences of individual agents into a collective preference order.
    c) A function that allocates resources or goods among agents according to some criterion of fairness.
    d) A function that determines the optimal actions or policies for a group of agents.

18. What is the plurality voting procedure?
    a) A voting procedure in which each agent votes for one alternative, and the alternative with the most votes wins.
    b) A voting procedure in which each agent ranks the alternatives from the most preferred to the least preferred, and the alternative with the highest average rank wins.
    c) A voting procedure in which each agent assigns a score to each alternative, and the alternative with the highest total score wins.
    d) A voting procedure in which each agent votes for a subset of alternatives, and the alternative with the most votes wins.