1. What is “data mining”?
    - Exploring data with computational tools to reach a better human understanding of the problem;
2. In Networks-on-chip, routing means:
    - An algorithm that determines the path that packets follow as they travel from source to destination ;
3. A processing element from a multiprocessor emits, on average, 2 data packets once every 1 millisecond. What is the probability that 8 packets are emitted in 1 millisecond?
    - 2/315*e(-2)miliseconds
4. Which of the following statements best describe a cyber-physical system?
    - A networked embedded system that observes, models, and controls physical processes.
5. Indicate 3 characteristics which pertain to network embedded systems but NOT to Cyber-physical systems:
    - Do not imply in the computational paradigm of either software or hardware
    - Refer to hierarchies of master/slave sets of processors and sensors communicating among them and base stations;
    - Build computational modules for specific embedded applications
6. The 3 challenges for Cyber-physical systems are:
    - Robustness
    - Security
    - Modeling
7. Indicate the 3 typical areas for machine learning:
    - Problems that are too complex for conventional approaches
    - Problems where we don’t have(efficient) algorithms
    - Fluctuating(high variance) environments
8. The characteristic which does not pertain to a mesh network is:
    - Implemented by the SPIN network project
9. What best describes the Internet of Things?
    - Smart ways of gathering data from real word independently of humans
10. Indicate which of the following is not a network attribute:

- Memory consumption

11. Indicate the 3 examples of bad data which can seriously hamper the machine learning effectiveness:
    - Irrelevant features used for learning
    - Non-representative data for learning
    - Missing data samples
12. Indicate the 3 characteristics of underfitting:
    - The model is too simple for the problem and data
    - Predictions are inaccurate even for the training data
    - The complexity of the real world is much too complex in comparison with the machine learning model
13. You have data on a large group of people consisting of median income, housting status, job status, medical status, political affiliation, and your task is to find the distinct groups/communities. You have some community/ group labels but, in your database, they are assigned only for a limited number of people. What is the correct machine learning approach?
    - Semi-supervised learning
14. Cyber-Physical Systems requires software skills in:
    - Real-time analysis
    - Software engineering
    - Formal verification
15. A 2D mesh accommodates a maximum of:
    - 16 cores
16. Indicate the 3 characteristics of overfitting:
    - The machine learning model is too complex
    - The algorithm performs very well on training data but not so well new data
    - Overgeneralization from training data
17. Which of following definitions best describes the regression problem:
    - A supervised algorithm to predict some target value of some features
18. Indicate the 3 physiological signals:
    - Heart beat rate
    - Body temperature

- Signal from a sensor placed on the human body that detects abdomen movement

19. Indicate the 3 complex systems from the following:
    - A cat
    - The Earth's climate
    - A human crowd
20. The 3 theoretical tools for physical process mining are:
    - Statistical physics
    - Mathematics of dynamics systems
    - Fractals
21. In multiprocessor systems, the simplest interconnection network is:
    - The bus
22. In the Nostrum network, the internal structure of the switch provides a:
    - Fully connected network between the input and output ports
23. Scientific processors are:
    - Homogenous
24. Indicate the 3 possible applications of unsupervised learning:
    - Clustering
    - Dimensionality reduction
    - Anomaly detection
    - Visualization
25. The 3 most significant characteristics of a System-on-chip are:
    - Are complete digital systems built on a single chip
    - They are driven by the need for cost reduction in embedded systems
    - They are more reliable than similar systems build on Printed Circuit Boards(PCBs)
26. In Network-on-chip adaptive routing means:
    - Adjustment of packets route based on current network conditions
27. Indicate the 3 specific characteristics of batch learning:
    - Must be trained using the entire set of data
    - Incapable of learning incrementally
    - Uses a lot of computational resources
28. Indicate the proper magnitude of data quantity for machine learning approaches of complex problems:

- Millions

29. Indicate the 3 characteristics of instance-based learning:
    - Very difficult and requires huge resources
    - Works if all instances are labeled, or some instances are labeled and some measure of similarity between instances is defined
    - Works best if all instances are already labeled
30. The 3 specific constraints of embedded multiprocessors with respect to scientific processors are:
    - They must provide real-time performance that is predictable
    - They have to be cost-effective
    - They must run at low energy and power levels
31. Cyber Physical Systems requires hardware skills:
    - Embedded Systems Design
    - Computer Aided Design
    - Computer Architecture
32. The 3 characteristics of complex systems are:
    - Large-scale
    - Fat-tailed distributions
    - Complex Interactions
33. Indicate the 3 CPS application from:
    - Military unmanned aerial vehicle
    - Smart power grid
    - Autonomous, self driving car
34. The artificial pancreas application pertains to the field of:
    - Cyber physical systems
35. Indicate the 3 supervised learning algorithms:
    - K-nearest neighbours
    - Decision trees
    - Linear regression
36. In Networks-on-chip, buffer allocation pertains to:
    - Flow control
37. You have a database of your Facebook friends with data about their friendship lists and their hobbies. You are asked to detect the specific communities of friends, e.g., high school friends who love football, or

hometown friends with a specific interest in folk music. What type of machine learning algorithm will you use?

- Clustering

38. What is the definition of machine learning?
    - The science-engineering art of programming computers so that they actually learn from data
39. The dominant paradigm for embedded processors is:
    - Multiple Instruction Stream Multiple Data Stream – MIMD
40. Indicate 3 requirements that particularity pertain to the field of CPS from:
    - Interoperability
    - Safety
    - Performance
41. Classification is a problem that pertain to:
    - Supervised learning
42. In Network on chip the allocation of virtual channels pertain to:
    - Flow control
43. Indicate the 3 testing and validating rules for machine learning:
    - Use 80% of your data for training, keep 20%for testing
    - Crossvalidation use a supplementary validation test with new data
    - There is no model which is a priori better
44. You have data from monitoring several medical parameters in a population (hypertension, obesity, fatigue, waist circumference) and you are asked to create a predictor for blood sugar level. For each individual, we know the blood glucose level. What is the right machine learning approach?
    - Regression – because we have all the labels
45. Streaming data is not specially characterized by:
    - Bits per flit
    - Average number of occurrences
    - The bus
46. The two correct methods for calculating the fractal dimension are:
    - Box-counting
    - The fractal between the algorithm of the number of self similar pieces and the logarithm of the magnification factor.
47. In network on chip wormhole routing means:

- That the header flit determines the route and the remained flits in the packet will follow

48. The 3 characteristics of a crossbar are
    - Offers support for multicast and broadcast
    - Provides fully connectivity between any input and any output port
    - Its switching points can be buffered
49. Indicate what processing elements are not
    - The units which, in an embedded multiprocessor, should be identical
50. You get data from 5 weather sensors(temperature, wind, light) and you are asked to predict the weather for the next day. What are the 3 machine learning approaches that are right in this context?
    - Time series analysis
    - Regression
    - Online learning
51. The 3 types of components from the architecture of a generic multiprocessor are:
    - Processing element
    - Memory element
    - Interconnection network
52. Indicate the 3 supervised learning algorithms:
    - Random forests
    - Support vector machines(SVMs)
    - Neural networks
53. Indicate the 3 examples of unsupervised learning:
    - Anomaly detection
    - Dimensionality reduction
    - Association rule
54. Indicate the 3 representative unsupervised learning algorithms:
    - Visualization
    - Clustering
    - Dimensionality reduction
55. What is the difference between batch and online learning:
    - Online learning means incrementally(on the fly) learning from a stream of data; batch learning means learning from static data

56. A processing element from a multiprocessor emits, on average, 3 data packets once every 1 millisecond. What is the probability that 3 packets are emitted in 1 millisecond?
    - ?????????
57.