

ENTROPY 2019 - QUALIFICATION ROUND

Algorithm, Domain Knowledge

The questions will be multiple choice of 4 choices, 1 or more CORRECT ANSWER for each question.

If you have any questions, please contact ENTROPY's hotline: (028) 3724 6560 or 0937 367 366

Question 25

Which of the following statement is accurate to Grid search? (Here, N denotes the number of data points and D denotes the dimensionality)

A	Linear in D
B	Polynomial in D
C	Exponential in D
D	Linear in N

☒ A

☒ B

☒ C

☐ D

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Question 26

Let n be the input size of an algorithm $T(n)$ with the time complexity is given by:

$$T(n) = T(n-1) + 1/n \text{ if } n > 1$$

Then the order of this algorithm is

A	$\log(n)$
B	$n\log(n)$
C	n^2
D	$n^2\log(n)$

☐ A

☐ B

☒ C

☐ D

Question 27

Given two NLP packages written in python: “spaCy” and “gensim”, which of the following sentences is not TRUE:

A	spaCy and gensim can support word-embedding
B	spaCy can load word-embedding from gensim pretrained model
C	spaCy support tokenization, gensim does not support tokenization
D	spaCy does not support topic modeling, gensim support topic modeling

☐ A

☒ B

☐ C

☐ D

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Question 28

Bob writes down a character in the alphabet system between A and Z, without caring for the lowercase and uppercase. Mary must identify that character by asking yes/no questions of Bob. Mary knows that Bob always tells the truth. If Mary uses an optimal strategy, then she will determine the answer at the end of exactly how many questions in the best case?

A	26
B	13
C	52
D	676

☐ A☒ B☐ C☐ D

Question 29

Which is the accurate statement of the following for computational complexity of the Gradient descent? (N: number of data points, D: dimensionality)

A	linear in D
B	linear in N
C	polynomial in D
D	dependent on the number of iterations

☐ A☐ B☐ C☒ D

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Question 30

Which is the accurate statement of the following for the K-fold cross-validation?

A	linear in K
B	quadratic in K
C	cubic in K
D	exponential in K

☐ A

☐ B

☐ C

☒ D

Question 31

In Corporate Finance, the present value of \$100 expected in two years from today at a discount rate of 5% is

A	\$105
B	\$110.7
C	\$95
D	\$90.7

☐ A

☐ B

☐ C

☒ D

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Question 32

Last year, the sale department of Kakuta Company had sales of \$265 million in cash, including cash sales of \$25 million. If its average collection period was 36 days, its ending accounts receivable balance is closest to _____, with the assumption is that a year has 365 days.

A	\$26.1 million
B	\$23.7 million
C	\$7.4 million
D	\$18.7 million

☐ A☒ B☐ C☐ D

Question 33

One day you go to a decision to buy an ordinary annuity that will pay you \$4,000 a year for the next 20 years. You expect annual interest rates will be 8 percent over that time period. As a result, the maximum price you would be willing to pay for the annuity is closest to

A	\$32,304
B	\$39,272
C	\$40,122
D	\$81,225

☐ A☒ B☐ C☐ D

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Question 34

If the price of a stock of a potential company is \$100 at the moment, and you know beforehand that 40% chances that it would be \$95 and 60% chances that it would be \$115 the next year. What is the expected return?

A	5.5%
B	6%
C	7%
D	7.5%

- ☐ A
- ☒ B
- ☐ C
- ☐ D

Question 35

Suppose that you are an individual investor who own 100 shares that are currently worth \$50. Now assume you want to hold on to your shares, but are probably worried that the price of your shares might collapse. You definitely want to sell the shares if their price falls to \$25. What kind of order should you place?

A	A sell market order for 100 shares
B	A sell limit order for 100 shares at \$25
C	A stop loss order for 100 shares at \$25
D	A sell limit order for 100 shares at \$50

- ☐ A
- ☐ B
- ☐ C
- ☒ D

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Question 36

In supervised learning, the Support Vector Machine uses which loss function?

A	$L(y, f) = \max(0, 1 - yf)$
B	$L(y, f) = \log(1 + \exp(-yf))$
C	$L(y, f) = (y - f)^2$
D	$L(y, f) = y - f $

☒ A

☐ B

☐ C

☐ D

Question 37

Gradient of a continuous and differentiable function

A	is zero at a minimum
B	is non-zero at a maximum
C	is zero at a saddle point
D	decreases as you get closer to the minimum

☒ A

☐ B

☐ C

☒ D

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Question 38

Suppose we have the following dataset of there data points in 2D space: $A = (0, 2)$, $B = (0, 1)$ and $C = (1, 0)$, then we initialize the k-means algorithm considering the centers at A and B. Upon convergence, the two centers will be at

A	A and C
B	A and the midpoint of B & C
C	C and the midpoint of A & B
D	A and B

- ☐ A
- ☐ B
- ☐ C
- ☒ D

Question 39

In information theory, Entropy can be understood as _____

A	Average information per message
B	Information in a word
C	Amplitude of signal
D	The amount of uncertainty in a word

- ☒ A
- ☐ B
- ☐ C
- ☐ D

Question 40

Question 16	Easy
In channel coding theory, let denote $H(P)$ as the binary entropy function, which of the following is the capacity of a binary symmetric channel?	
A	$1 - H(P)$
B	$H(P) - 1$
C	$1 - H(P)^2$
D	$1 - \log H(P)$

☐ A☐ B☒ C☐ D

Page 4 of 6

BACK

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