

Quiz Date: 4<sup>th</sup> April 2020

**Directions (1-7): Read the following passage carefully and answer the questions given below it. Certain parts are given in bold to answer some of the questions based on the passage.**

Cuttlefish are masters at **altering** their appearance to blend into their surroundings. But the cephalopods can no longer hide their inner thoughts, thanks to a technique that infers a cuttlefish's brain activity by tracking the ever-changing patterns on its skin. The findings, published in Nature on 17 October, could help researchers to better understand how the brain controls behaviour. The cuttlefish (*Sepia officinalis*) camouflages itself by contracting the muscles around tiny, coloured skin cells called chromatophores. The cells come in several colours and act as pixels across the cuttlefish's body, changing their size to alter the pattern on the animal's skin. The cuttlefish doesn't always conjure up an exact match for its background. It can also blanket itself in stripes, rings, mottles or other complex patterns to make itself less noticeable to predators. "On any background, especially a coral reef, it can't look like a thousand things," says Roger Hanlon, a cephalopod biologist at the Marine Biological Laboratory in Chicago, Illinois. "Camouflage is about deceiving the visual system."

To better understand how cuttlefish create these patterns across their bodies, neuroscientist Gilles Laurent at the Max Planck Institute for Brain Research in Frankfurt, Germany, and his collaborators built a system of 20 video cameras to film cuttlefish at 60 frames per second as they swam around their enclosures. The cameras captured the cuttlefish changing colour as they passed by backgrounds such as gravel or printed images that the researchers placed in the tanks. The recording began soon after the cuttlefish hatched and continued for weeks. Laurent's team developed video-processing techniques to identify tens of thousands of individual chromatophores on each cuttlefish, including cells that emerged as the animal grew larger over time. The team used statistical tools to determine how different chromatophores act in synchrony to change the animal's overall skin patterns. Previous studies have shown that each chromatophore is controlled by multiple motor neurons that reach from the brain to muscles in the skin, and that each motor neuron controls several chromatophores. These in turn group together into larger motor systems that create patterns across the cuttlefish's body.

The latest study maps how the animal links chromatophores together in different ways to create a pattern that mimics the geometry of its surroundings. The findings should allow the researchers to work backwards from the skin patterns to determine the pathways through which neurons in the cuttlefish's brain control its **camouflage**. The imaging technique "gives you amazing neural data by proxy", Laurent says. "It's just an amazing thing to work on animals that are so different from us and about which we have very little intuition about what makes them tick."

The ability to see the inner workings of the cuttlefish's brain reflected on its skin — without cutting the animal open, attaching electrodes to it or training it to behave in a certain way — could also help researchers to understand the links between brain activity and behaviour. Right now, Laurent says, the link between what the cuttlefish sees and what it sends to the motor

neurons is a mystery. The answer probably lies in the brain, which processes both input from the eyes and output to the chromatophores. It creates a geometrical pattern that resembles the cuttlefish's surroundings, instead of an exact copy. "There's got to be a neurobiological shortcut," says Hanlon, who was not involved in the study. "There's so much visual information available that it would take a supercomputer to manage it." Working out that computational shortcut could provide inspiration to researchers creating artificial neural networks with computers, Laurent says. These include programs that attempt to fill in a missing part of an image using information from pixels around it.

Laure Bonnaud-Ponticelli, a biologist at the National Museum of Natural History in Paris, is impressed by the researchers' statistical analyses of the chromatophore data. She suspects that other biological mechanisms, such as light-sensing proteins on the cuttlefish's skin, could help the brain to form these complex patterns. "It is the beginning of another story," she says.

Q1. Which of the following names haven't been used to refer to the cuttlefish?

- (i) Chromatophores
- (ii) Cephalopods
- (iii) Sepia Officinalis
- (a) (ii) and (i)
- (b) Only (ii)
- (c) (i), (ii) and (iii)
- (d) Only (i)
- (e) (i) and (iii)

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Q2. Which of the following, options correctly delineate the process through which cuttlefish camouflage themselves?

- (a) Contracting from the original size and then completely regaining the original size of the muscles around chromatophores, but not increasing further.
- (b) Expanding from the original size and then completely coming back to the original size of the muscles around chromatophores, but not decreasing further.
- (c) Through continuous contraction of the muscles around chromatophores.
- (d) Through continuous expansion of the muscles around chromatophores.
- (e) None of the above.

Q3. Why did Roger Hanlon say, '*Camouflage is about deceiving the visual system*'?

- (a) To announce the idiosyncrasy of the skin cells which come in several colours and act as pixels across the cuttlefish's body, changing their size to alter the pattern on the animal's skin.
- (b) To justify the idiosyncrasy of the cuttlefish which is to not attempt to become alike of its background but attempts to have resemblance to its surroundings.
- (c) To discourage the ability of the cuttlefish to blanket itself in stripes, rings, mottles or other complex patterns to make itself less noticeable to predators.
- (d) To conceal a characteristic of the cuttlefish to not look like a thousand things on any background especially a coral reef.
- (e) None of the above

Q4. What does the Hanlon mean by '*There's got to be a neurobiological shortcut*'?

- (a) Hanlon talks about the process by which cuttlefish creates complex geometrical pattern on its skin.
- (b) Hanlon tried to explain that cuttlefish creates a geometrical pattern that resembles it's surrounding instead of an exact copy.
- (c) Hanlon tried to explain the ability of the cuttlefish to create complex geometrical pattern. According to him, the brain of the cuttlefish takes input from the eyes and processes it and then, send the processing to the chromatophores.
- (d) According to Hanlon, the ability of the cuttlefish to create complex geometrical patterns is due to some process which is currently unknown and doesn't involve the lengthy process of sending signals from sensory organs to brain and then instructing the chromatophores to create patterns based on the processing of the brain.
- (e) None of the above

Q5. What is/are the utility(/ies) of the research, intending to understand the camouflaging ability of the cuttlefish, for humans as mentioned in the given passage?

- (i) It could help us to better understand how cuttlefish create patterns, that resembles their surrounding but still aren't the exact copies, across their bodies.
  - (ii) It could help researchers to better understand how the brain controls behave.
  - (iii) It could provide inspiration to researchers creating artificial neural networks with computers.
- (a) Only (i)
  - (b) Both (i) and (ii)
  - (c) Both (ii) and (iii)
  - (d) Both (i) and (iii)
  - (e) All of (i), (ii) and (iii)

Q6. Which of the following hypothesis, if proved correct, could inspire the researchers creating artificial neural networks with computers?

- (a) The cuttlefish (*Sepia officinalis*) camouflages itself by contracting the muscles around tiny, coloured skin cells called chromatophores.
- (b) The cuttlefish doesn't always conjure up an exact match for its background.
- (c) The cuttlefish create complex pattern on its skin across its body by first taking information as input signal from the eyes about its surrounding, then sending the signal back to the brain for processing and then the brain decides what action is to be taken and instruct the motor neuron to direct the chromatophores to behave in a certain way (and hence, creating a particular pattern).
- (d) The cuttlefish create complex pattern on its skin across its body through a process which shouldn't involve or have minimum involvement of sending signals and receiving instructions from brain.
- (e) None of the above

Q7. Which of the following words has a meaning which is SIMILAR to the meaning of the word '**altering**'?

- (a) transmuting

- (b) decimating
- (c) contending
- (d) refuting
- (e) waning



Directions (8-12): Given below are six sentences (A) (B) (C) (D) (E) and (F). Answer the following questions after rearranging the following sentences into a coherent paragraph.

(A) The tirade Mike Pence launched against China last week doubled down on that commitment.

(B) This may turn out to be Mr Trump's most significant mark on the world. America's new adversarial posture towards China is overdue, popular and probably irreversible.

(C) Where its predecessors lauded the merits of co-operation with the emerging superpower, Mr Trump's document promised competition and resistance to Chinese trade and other abuses.

(D) The National Security Strategy released by President Donald Trump's administration last year augured a major change in China-US relations.

(E) In a speech delivered at the Hudson Institute, a short walk from Congress and the ongoing Kavanaugh brouhaha, the vice-president castigated the Chinese for bullying investors, buying allies with cheap loans, "tearing down crosses" and much else.

(F) It was disorientating to witness such tawdry politics at such a potentially momentous moment.

Q8. If sentence (A) 'The tirade Mike Pence launched against China last week doubled down on that commitment.' is the THIRD sentence of the coherent paragraph, then which of the following sentences doesn't fit into the paragraph, formed after rearranging other sentences?

- (a) C
- (b) F

- (c) D
- (d) E
- (e) B

Q9. Which of the following pairs fall correctly as it is in the final coherent sequence of the sentences, formed after rearrangement?

- (a) C-B
- (b) B-C
- (c) A-D
- (d) C-A
- (e) E-D

Q10. Considering the statement (A) " as the THIRD sentence of the rearranged paragraph, identify the correct sequence of the sentences to form a coherent paragraph (excluding the incoherent one)?

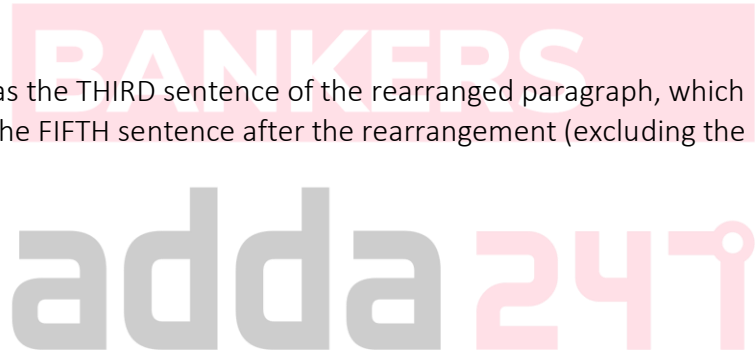
- (a) FCAEB
- (b) BCADE
- (c) DCAEB
- (d) FEABD
- (e) EBACD

Q11. Considering the statement (A) " as the THIRD sentence of the rearranged paragraph, which of the following statement should be the FIFTH sentence after the rearrangement (excluding the incoherent sentence)?

- (a) B
- (b) A
- (c) F
- (d) D
- (e) C

Q12. Considering the statement (A) " as the THIRD sentence of the rearranged paragraph, which of the following statement should be the FIRST sentence after the rearrangement (excluding the incoherent sentence)?

- (a) F
- (b) B
- (c) E
- (d) C
- (e) D





### Solutions:

S1. Ans. (d)

Sol. Among the suggested names, two names 'Cephalopods' and 'Sepia Officinalis' have been used to refer to the 'cuttlefish'. For the usage of 'Cephalopods', kindly read the second sentence of the first paragraph '*But the cephalopods can no longer hide their inner thoughts, thanks to a technique that infers a cuttlefish's brain activity by tracking the ever-changing patterns on its skin*'.

For the usage of 'Sepia Officinalis', kindly read the fourth sentence of the first paragraph '*The cuttlefish (Sepia officinalis) camouflages itself by contracting the muscles around tiny, coloured skin cells called 'Chromatophores''*.

Clearly, 'Chromatophores' are the names attributed to the skin cells of cuttlefish.

Hence, the option (d) is the correct answer.

S2. Ans. (e)

Sol. The answer to the question can be derived from the fourth and fifth sentences of the first paragraph. '*The cuttlefish (Sepia Officinalis) camouflages itself by contracting the muscles around tiny, coloured skin cells called chromatophores. The cells come in several colours and act as pixels across the cuttlefish's body, changing their size to alter the pattern on the animal's skin.*'

The sentences above use the term 'contraction'. So, the options (b) and (d) are incorrect.

Now, could it be possible that the *muscles around chromatophores always contract, but do not regain their original size*? In that case, a time would come, when the size of the muscles around chromatophores would be zero, which is meaningless. So, the option (c) is also incorrect.

Now, is it necessary that after contraction of the muscle, completely regaining the original size is necessary? No such information is present in the passage. So, the option (a) is also incorrect.

Hence, the option (e) is the correct answer.

S3. Ans. (b)

Sol. The answer to the question can be derived from the last four sentences of the first paragraph, '*The cuttlefish doesn't always conjure up an exact match for its background. It can also blanket itself in stripes, rings, mottles or other complex patterns to make itself less noticeable to predators. "On any background, especially a coral reef, it can't look like a thousand*

things,” says Roger Hanlon, a cephalopod biologist at the Marine Biological Laboratory, Illinois. “Camouflage is about deceiving the visual system.”

The above sentences inform us that the focus of the cuttlefish while camouflaging isn't to look alike or become an exact match for its background, the focus is to have similar resemblance to its surrounding to tricks especially its predators. The justification, as given by Roger Hanlon, is that the objective of camouflaging is to deceive the visual system (of others) but isn't to *look alike* or become an *exact copy* of ones surrounding.

Among the given options, only option (b) is the correct answer.

The sentences prior to the last-fourth sentence talks about the elements of the cuttlefish body and the process through the cuttlefish changes the pattern and/or colour of its skin.

S4. Ans. (d)

Sol. The correct answer is the option (d).

The answer to the question can be derived from the last paragraph. Kindly re-read the following sentences of the paragraph ‘*Right now, Laurent says, the link between what the cuttlefish sees and what it sends to the motor neurons is a mystery. The answer probably lies in the brain, which processes both input from the eyes and output to the chromatophores. It creates a geometrical pattern that resembles the cuttlefish's surroundings, instead of an exact copy. “There’s got to be a neurobiological shortcut,” says Hanlon, who was not involved in the study. “There’s so much visual information available that it would take a supercomputer to manage it.” Working out that computational shortcut could provide inspiration to researchers creating artificial neural networks with computers, Laurent says. These include programs that attempt to fill in a missing part of an image using information from pixels around it.*

What is a usual process for any behavior of a living being? Sensory organs interact with the surroundings, generates signals and then send it to the brain. The brain processes the signals, decides what to do, how to do it and then, send signals through the motor neurons to the motor organs to perform an action.

‘Cuttlefish creates a geometrical pattern that **‘resembles its surroundings, instead of an exact copy’**. Why doesn't the brain create an exact copy if it receives information about its surrounding through eyes? Hanlon is suggesting that instead of signal from the sensory organs going to brain to get processed, there may be a shortcut. This assertion gets further consolidated upon reading the sentence ‘*Working out that **computational shortcut** could provide inspiration to researchers creating artificial neural networks with computers, Laurent says. These include **programs that attempt to fill in a missing part of an image using information from pixels around it.***

Hence, the correct answer is the option (d).

S5. Ans. (c)

Sol. The alternative (i) is not the utility, but the **objective/intention** of the research.

Understanding how cuttlefish creates pattern across their bodies which resembles their surrounding but aren't the exact copies could help researchers to better understand how the brain controls behavior (third sentence of the first paragraph), and could also inspire the researcher to artificial neural networks with computers (last fifth sentence of the last paragraph).

Hence, both alternatives (ii) and (iii) are correct, and the option (c) is the correct answer.



S6. Ans. (d)

Sol. The information presented in the options (a) and (b) are mentioned in the first paragraph. These aren't hypothesis but established facts.

The correct answer to the question can be derived from the following sentences of the last paragraph '*Right now, Laurent says, the link between what the cuttlefish sees and what it sends to the motor neurons is a mystery. The answer probably lies in the brain, which processes both input from the eyes and output to the chromatophores. It creates a geometrical pattern that resembles the cuttlefish's surroundings, instead of an exact copy. "There's got to be a neurobiological shortcut," says Hanlon, who was not involved in the study. "There's so much visual information available that it would take a supercomputer to manage it." Working out that computational shortcut could provide inspiration to researchers creating artificial neural networks with computers, Laurent says. These include programs that attempt to fill in a missing part of an image using information from pixels around it.*

Now, kindly re-read the information presented in the option (c). The information informs about a process which is already known to be the case in many living species, but the process is relatively lengthy and time consuming.

The information presented in the option (d) covertly talks about a short-cut, a neurobiological shortcut which required less involvement of brain. Working out or finding out about these computational shortcuts could provide inspiration to researchers creating artificial neural networks with computer.

Hence, the correct answer is the option (d).

S7. Ans. (a)

Sol. alter [verb] means '*change in character or composition, typically in a comparatively small but significant way*';

Transmute [verb] means '*change in form, nature, or substance*';

Decimate [verb] means '*kill, destroy, or remove a large proportion of*';

Contend [verb] means '*struggle to surmount (a difficulty)*';

Refute [verb] means '*deny or contradict (a statement or accusation)*';

Wane [verb] means '*(of a state or feeling) decrease in vigour or extent; become weaker*';

From above, we can understand that the option (a) is the correct answer.

S8. Ans. (b)

Sol. The sentence (F) doesn't gel well with any of the sentences. The sentence (F) seems to be an opinion of a person about the righteousness of the events happening while the sentences (A) to (E) provides facts about what actions have been taken and possible effects of the actions taken.

Hence, the sentence (F) is the **incoherent sentence**.

The correct sequence of the coherent paragraph is 'DCAEB'.

The sentence (D) introduces the theme of the passage which is 'the National Security Strategy released last year by President Donald Trump's administration auguring a major change in the China-US relations'. So, the sentence (D) should be the FIRST sentence of the coherent paragraph.



The sentence (C) informs a reader about the idiosyncrasy of the National Security Strategy and about how does the present strategy is different from the strategy of the predecessors of the US. The sentence (A) introduces a new sub-topic of the coherent paragraph which is '*the tirade which Mike Pence launched against China*' while the sentence (E) elaborates the new sub-theme. So, the sentence (E) must immediately follow the sentence (A) to give us a coherent sub-sequence 'AE'. This sub-sequence 'AE' complements the information provided in the sentence (C). So, the sub-sequence 'AE' must follow the sentence (C), and the sentence (C) must be the SECOND sentence of the coherent paragraph.

The sentence (B) provides a possible conclusion to the paragraph which is about the possible effect of the new security strategy released by Trump. So, the sentence (B) should be the LAST sentence of the coherent paragraph, making the sub-sequence 'AE' to immediately follow the second sentence 'C' of the coherent paragraph.

Hence, the final sequence is 'DCAEB'.

Hence, the option (b) is the correct answer.

S9. Ans. (d)

Sol. The sub-sequence which would occur in the final coherent sequence is 'C-A'.

The correct sequence of the coherent paragraph is 'DCAEB'.

The sentence (D) introduces the theme of the passage which is 'the National Security Strategy released last year by President Donald Trump's administration auguring a major change in the China-US relations'. So, the sentence (D) should be the FIRST sentence of the coherent paragraph.

The sentence (C) informs a reader about the idiosyncrasy of the National Security Strategy and about how does the present strategy is different from the strategy of the predecessors of the US. The sentence (A) introduces a new sub-topic of the coherent paragraph which is '*the tirade which Mike Pence launched against China*' while the sentence (E) elaborates the new sub-theme. So, the sentence (E) must immediately follow the sentence (A) to give us a coherent sub-sequence 'AE'. This sub-sequence 'AE' complements the information provided in the sentence (C). So, the sub-sequence 'AE' must follow the sentence (C), and the sentence (C) must be the SECOND sentence of the coherent paragraph.

The sentence (B) provides a possible conclusion to the paragraph which is about the possible effect of the new security strategy released by Trump. So, the sentence (B) should be the LAST sentence of the coherent paragraph, making the sub-sequence 'AE' to immediately follow the second sentence 'C' of the coherent paragraph.

Hence, the final sequence is 'DCAEB'.

Hence, the option (d) is the correct answer.

S10. Ans. (c)

Sol. The correct sequence of the coherent paragraph is 'DCAEB'.

The sentence (D) introduces the theme of the passage which is 'the National Security Strategy released last year by President Donald Trump's administration auguring a major change in the China-US relations'. So, the sentence (D) should be the FIRST sentence of the coherent paragraph.

The sentence (C) informs a reader about the idiosyncrasy of the National Security Strategy and about how does the present strategy is different from the strategy of the predecessors of the US. The sentence (A) introduces a new sub-topic of the coherent paragraph which is '*the tirade which Mike Pence launched against China*' while the sentence (E) elaborates the new sub-theme. So, the sentence (E) must immediately follow the sentence (A) to give us a coherent sub-sequence 'AE'. This sub-sequence 'AE' complements the information provided in the sentence (C). So, the sub-sequence 'AE' must follow the sentence (C), and the sentence (C) must be the SECOND sentence of the coherent paragraph.

The sentence (B) provides a possible conclusion to the paragraph which is about the possible effect of the new security strategy released by Trump. So, the sentence (B) should be the LAST sentence of the coherent paragraph, making the sub-sequence 'AE' to immediately follow the second sentence 'C' of the coherent paragraph.

Hence, the final sequence is 'DCAEB'.

Hence, the option (c) is the correct answer.

S11. Ans. (a)

Sol. The FIFTH sentence of the coherent paragraph is the sentence (B).

The correct sequence of the coherent paragraph is 'DCAEB'.

The sentence (D) introduces the theme of the passage which is 'the National Security Strategy released last year by President Donald Trump's administration auguring a major change in the China-US relations'. So, the sentence (D) should be the FIRST sentence of the coherent paragraph.

The sentence (C) informs a reader about the idiosyncrasy of the National Security Strategy and about how does the present strategy is different from the strategy of the predecessors of the US. The sentence (A) introduces a new sub-topic of the coherent paragraph which is '*the tirade which Mike Pence launched against China*' while the sentence (E) elaborates the new sub-theme. So, the sentence (E) must immediately follow the sentence (A) to give us a coherent sub-sequence 'AE'. This sub-sequence 'AE' complements the information provided in the sentence (C). So, the sub-sequence 'AE' must follow the sentence (C), and the sentence (C) must be the SECOND sentence of the coherent paragraph.

The sentence (B) provides a possible conclusion to the paragraph which is about the possible effect of the new security strategy released by Trump. So, the sentence (B) should be the LAST sentence of the coherent paragraph, making the sub-sequence 'AE' to immediately follow the second sentence 'C' of the coherent paragraph.

Hence, the final sequence is 'DCAEB'.

Hence, the option (a) is the correct answer.

S12. Ans. (e)

Sol. The first sentence of the coherent paragraph is the sentence (D).

The correct sequence of the coherent paragraph is 'DCAEB'.

The sentence (D) introduces the theme of the passage which is 'the National Security Strategy released last year by President Donald Trump's administration auguring a major change in the China-US relations'. So, the sentence (D) should be the FIRST sentence of the coherent paragraph.

The sentence (C) informs a reader about the idiosyncrasy of the National Security Strategy and about how does the present strategy is different from the strategy of the predecessors of the US. The sentence (A) introduces a new sub-topic of the coherent paragraph which is *'the tirade which Mike Pence launched against China'* while the sentence (E) elaborates the new sub-theme. So, the sentence (E) must immediately follow the sentence (A) to give us a coherent sub-sequence 'AE'. This sub-sequence 'AE' complements the information provided in the sentence (C). So, the sub-sequence 'AE' must follow the sentence (C), and the sentence (C) must be the SECOND sentence of the coherent paragraph.

The sentence (B) provides a possible conclusion to the paragraph which is about the possible effect of the new security strategy released by Trump. So, the sentence (B) should be the LAST sentence of the coherent paragraph, making the sub-sequence 'AE' to immediately follow the second sentence 'C' of the coherent paragraph.

Hence, the final sequence is 'DCAEB'.

Hence, the option (e) is the correct answer.

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