30. Look at the four squares [_] that indicate where the following sentence can be added to the passage.

However, it was very expensive there because it had to be carried from China on camels and donkeys.

Where would the sentence best fit?

A. [A] B. [B]

C. [C] D. [D]

PASSAGE 4 – Questions 31-40

Louis Pasteur was arguably the greatest biologist of the 19th century. His immense contributions were among the most varied and beneficial in the field of science and industry. Pasteur's methods of conducting experiments illustrated brilliance, which started when he studied the crystal structure. He observed that tartrate, when created in a laboratory, was optically **inactive**. This is different from the tartrate from grapes because the artificial tartrate is composed of two optically asymmetric crystals. Pasteur succeeded in unraveling the asymmetric crystals from each other and showed that each regained optical activity.

He then theorized that living organisms only produce molecules that are of one specific objective and that these molecules are active at all times. This experiment contradicted 'Mitscherlich' who had observed only a single type of crystal. Later in his career, Pasteur was approached by the parent of one of his students, regarding a contamination problem in alcoholic fermentation. At the time, fermentation leading to the making of wine, or beer was thought to be a simple breakdown of sugar to the favored molecules. Yeast cells were believed to be either a useful ingredient in maintaining or simply a product of fermentation.

The manufacturers of alcohol were having economic problems related to fermentation. Wine would suddenly turn sour or into vinegar, or the quality and taste of beer would suddenly change. Therefore, the producers would have to start anew. Pasteur proved that yeast was an organism which did not **necessitate** oxygen for fermentation to occur. This proved to Justin Von Liebig, who had upheld that fermentation was purely chemical, that he was incorrect.

Pasteur was able to prove that the yeast was responsible for forming alcohol from sugar and that contaminating microorganisms

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turned the fermentations sour. Over the years, he segregated the organisms that were responsible for normal and abnormal fermentations when producing wine or beer. He demonstrated that if he heated them to mild temperatures, this would kill the microorganisms and prevent souring. This was a major discovery and Pasteur showed brewers how to refine the right organisms for good beer. He proposed that heating milk to a high temperature before bottling it would prevent souring. This is now known as pasteurization.

All this had given Pasteur an iconic status throughout the world. After his research on fermentation, he refuted the principle of spontaneous generation. The theory that maggots, beetles and microbes could arise spontaneously from matter had always been a matter of speculation. Pasteur carried out **ingenious** experiments wiping out every argument in favor of spontaneous generation. In his famous experiment using the '**swan neck flask**', fermented juice was put in a flask and after sterilization, the neck was heated, (this resembled the neck of a swan). The end of the neck was then sealed. If the flask was opened by pinching off the end of the neck, air would enter but dust would get trapped on the inside of the neck which was wet. The fluid, however, would still be germ free. If the flask was tipped over allowing the juice to touch the inside of the neck, microorganisms would grow instantly.

Pasteur's work with silkworm parasites and germs led to the proposal of the germ theory of disease. **After visiting the hospital wards, he became more aware of the infections being spread by physicians from sick patients to the healthy patients**. He compelled doctors to disinfect their instruments by boiling and steaming them. Surgeons were told to wash their hands and use disinfectant. At the time, countries were suffering from anthrax, which is a disease that affects cattle. He believed it was possible that If the animals were intentionally infected with a very mild case of the disease, this may be enough to prevent them from getting the disease later on. To prove this, he needed to test his theory on live animals.

[A] They recovered and, when placed with cattle that did have the disease, they remained immune. **[B]** Pasteur's last major research success was the development of a vaccine against rabies. **[C]** Institutes were built and people were treated for the disease in them. Pasteur was a national hero in France. **[D]** He died in 1895 and was given a state funeral.

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31. The word "inactive" in the passage is closest in meaning to_____.

A. motionless B. occupied

C. dangerous D. reactive

32. According to paragraph 2, what evidence contradicted the previous beliefs of 'Mitscherlich'?

A. Proof of the process of fermentation

B. Molecules being active at all times

C. Observed only a single type of crystal

D. Molecules produce all living organisms

33. According to Pasteur's experiments, what did he prove to be true?

A. The wine would change to vinegar because of fermentation.

B. Microorganisms were present in all alcoholic drinks.

C. Yeast was an organism that did not need oxygen to work.

D. The fermentation was a purely chemical process.

34. The word "necessitate" in the passage is closest in meaning to_____.

A. facilitate B. require

C. produce D. consume

35. According to paragraph 5, what did Pasteur publicly refute?

A. That fermentation contributed to spontaneous generation

B. That bottle-neck glasses can keep things germ-free

C. That maggots can form suddenly from matter without warning

D. That flies were created from the maggots on dead meat

36. Why does the author describe Pasteur's 'swan neck flask' experiment in the passage?

A. To explain the method of scientific experimentation

B. To demonstrate the correct way to do a scientific experiment

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C. To show how microbes contribute to spontaneous generation

D. To illustrate exactly how Pasteur determined his findings

37. The word "<u>ingenious</u>" in the passage is closest in meaning to_____.

A. original B. tremendous

C. controlled D. significant

38. Which of the following best expresses the essential information in the highlighted sentence? Incorrect answer choices change the meaning in important ways or leave out essential information.

A. Most patients became sick from being infected by doctors in the emergency room.

B. Hospital wards had become dirty and dangerous places due to the lack of proper training and space.

C. Pasteur learned that infections could be transmitted to healthy patients from dirty, non-sterile instruments doctors had used on previous patients.

D. Healthy patients could become infected by sick people, simply by the shake of a hand or sharing a drink.

39. According to the passage, which method was NOT used in Pasteur's experiments?

A. Sealed bottles under observation

B. Disinfection of materials and instruments

C. Heating to mild temperatures

D. Going into animal experimentation known to be scientifically unsound

40. Look at the four squares [_] that indicate where the following sentence can be added to the passage.

Pasteur was successful in producing a safe version of anthrax bacteria which he then injected into a population of cows.

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Where would the sentence best fit?

A. [**A**] B. [**B**]

C. [**C**] D. [**D**]

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