

## EST I - Literacy Test II

**Student's Name** \_\_\_\_\_

**National ID** \_\_\_\_\_

**Test Center:** \_\_\_\_\_

**Duration:** 65 minutes

52 Multiple Choice Questions

**Instructions:**

- Place your answer on the answer sheet. Mark only one answer for each of the multiple choice questions.
- Avoid guessing. Your answers should reflect your overall understanding of the subject matter.

*The following edited passage is an excerpt from David Copperfield by Charles Dickens as David makes his way to Yarmouth.*

The carrier's horse was the laziest horse in the world, I should hope, and shuffled along, with his head down, as if he liked to keep people waiting to whom the packages were directed. I fancied, indeed, that he sometimes chuckled audibly over this reflection, but the carrier said he was only troubled with a cough. The carrier had a way of keeping his head down, like his horse, and of drooping sleepily forward as he drove, with one of his arms on each of his knees. I say 'drove', but it struck me that the cart would have gone to Yarmouth quite as well without him, for the horse did all that; and as to conversation, he had no idea of it but whistling.

Peggotty had a basket of refreshments on her knee, which would have lasted us out handsomely, if we had been going to London by the same conveyance. We ate a good deal, and slept a good deal. Peggotty always went to sleep with her chin upon the handle of the basket, her hold of which never relaxed; and I could not have believed unless I had heard her do it, that one defenceless woman could have snored so much.

We made so many deviations up and down lanes, and were such a long time delivering a bedstead at a public-house, and calling at other places, that I was quite tired, and very glad, when we saw Yarmouth. It looked rather spongy and soppy, I thought, as I carried my eye over the great dull waste that lay across the river; and I could not help wondering, if the world were really as round as my geography book said, how any part of it came to be so flat. But I reflected that Yarmouth might be

situated at one of the poles; which would account for it.

As we drew a little nearer, and saw the whole adjacent prospect lying a straight low line under the sky, I hinted to Peggotty that a mound or so might have improved it; and also that if the land had been a little more separated from the sea, and the town and the tide had not been quite so much mixed up, like toast and water, it would have been nicer. But Peggotty said, with greater emphasis than usual, that we must take things as we found them, and that, for her part, she was proud to call herself a Yarmouth Bloater.

When we got into the street (which was strange enough to me) and smelt the fish, and pitch, and oakum, and tar, and saw the sailors walking about, and the carts jingling up and down over the stones, I felt that I had done so busy a place an injustice; and said as much to Peggotty, who heard my expressions of delight with great complacency, and told me it was well known (I suppose to those who had the good fortune to be born Bloaters) that Yarmouth was, upon the whole, the finest place in the universe.

'Here's my Am!' screamed Peggotty, 'grewed out of knowledge!'

He was waiting for us, in fact, at the public-house; and asked me how I found myself, like an old acquaintance. I did not feel, at first, that I knew him as well as he knew me, because he had never come to our house since the night I was born, and naturally he had the advantage of me. But our intimacy was much advanced by his taking me on his back to carry me home. He was, now, a huge, strong fellow of six feet high, broad in proportion, and round-shouldered; but with a simpering boy's face and curly light hair that gave him quite a sheepish

look. He was dressed in a canvas jacket,  
90 and a pair of such very stiff trousers that  
they would have stood quite as well  
alone, without any legs in them. And  
you couldn't so properly have said he  
95 wore a hat, as that he was covered in a-  
top, like an old building, with something  
pitchy.

1. In the first paragraph, the driver's unnecessary presence to get the cart moving is similar to
  - A. a farmer driving a tractor.
  - B. a man riding a horse.
  - C. a pilot driving a plane on auto-pilot.
  - D. a child driving a car.
2. The author uses the phrase in line 2, "I should hope," set off by commas to
  - A. acknowledge a limit in familiarity.
  - B. insert much needed information.
  - C. add a momentary pause.
  - D. confuse the reader of the author's intentions.
3. The main idea of the passage is to
  - A. focus on Am's character and his interaction with the main character.
  - B. introduce the main character's inner thoughts and perceptions of the people and environment around him.
  - C. emphasize the laziness of the horse and his driver.
  - D. describe Yarmouth and its wetlands.
4. As used in line 13, "struck" most nearly means
  - A. hit.
  - B. ignited.
  - C. affected.
  - D. came to mind.
5. Which of the following best describes Am's character?
  - A. soft and kind
  - B. patient and naive
  - C. daunting and sturdy
  - D. mysterious and intriguing
6. Which choice best provides evidence for the answer to the previous question?
  - A. Lines 77-82 ("I ... me.")
  - B. Lines 82-84 ("But ... home.")
  - C. Lines 86-89 ("but ... look.")
  - D. Lines 92-96 ("And ... pitchy.")
7. As used in line 36, "carried" most nearly means
  - A. swayed.
  - B. bore.
  - C. transferred.
  - D. moved.
8. Which of the following can be inferred about Peggotty?
  - A. She is a disrespectful woman from the village.
  - B. She is a simple woman of low education.
  - C. She is an old woman of strong character.
  - D. She is a stubborn woman with many innovative ideas.
9. Which choice best provides evidence for the answer to the previous question?
  - A. Lines 19-22 ("Peggotty ... conveyance.")
  - B. Lines 24-29 ("Peggotty ... much.")
  - C. Lines 66-72 ("Peggotty ... universe.")
  - D. Lines 73-74 (" 'Here's ... knowledge!' ")

10. Which of the following best describes the main character's secondary reaction to Yarmouth?
- A. He was shocked to find it so flat.
  - B. He was uncomfortable with how damp and wet the environment was.
  - C. He decided that Yarmouth was unlivable.
  - D. It seemed to him that he had misjudged Yarmouth.

*The following edited passage is taken from History of Egypt, Chaldea, Syria, Babylonia, and Assyria in the Light of Recent Discovery by L.W. King and H.R. Hall on the flints of the Palaeolithic days.*

The idea was that in Palaeolithic days, contemporary with the Glacial Age of Northern Europe and America, the climate of Egypt was entirely different from that of later times and of to-day. Instead of dry desert, the mountain plateaus bordering the Nile valley were supposed to have been then covered with forest, through which flowed countless streams to feed the river below. It was suggested that remains of these streams were to be seen in the side ravines, or wadis, of the Nile valley, which run up from the low desert on the river level into the hills on either hand. These wadis undoubtedly show extensive traces of strong water action; they curve and twist as the streams found their easiest way to the level through the softer strata, they are heaped up with great water-worn boulders, they are hollowed out where waterfalls once fell. They have the appearance of dry watercourses, exactly what any mountain burns would be were the water-supply suddenly cut off for ever, the climate altered from rainy to eternal sun-glare, and every plant and tree blasted, never to grow again.

Acting on the supposition that this idea was a correct one, most observers have concluded that the climate of Egypt in remote periods was very different from the dry, rainless one now obtaining. To provide the water for the wadi streams, heavy rainfall and forests are desiderated. They were easily supplied, on the hypothesis. Forests clothed the mountain plateaus, heavy rains fell, and the water rushed down to the Nile, carving out the great watercourses which remain to this day, bearing testimony to the truth. And the flints, which the Palaeolithic inhabitants of the plateau-forests made

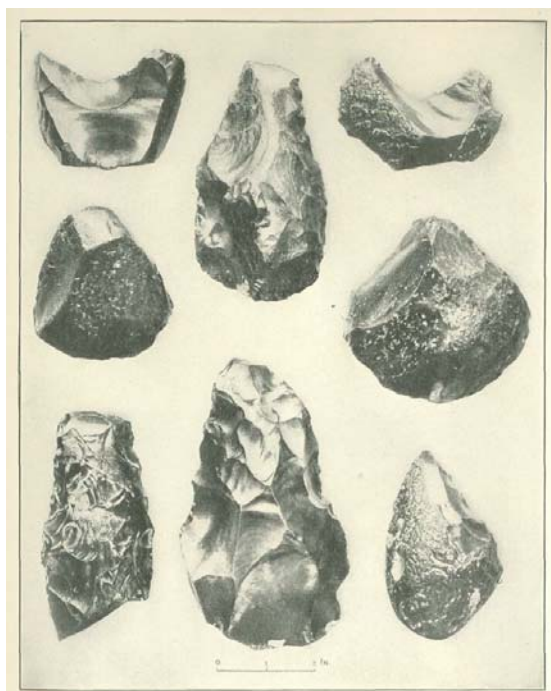
and used, still lie on the now treeless and sun-baked desert surface.

This is certainly a very weak conclusion. In fact, it seriously damages the whole argument, the water-courses to the contrary notwithstanding. The palaeoliths are there. They can be picked up by any visitor. There they lie, great flints of the Drift types, just like those found in the gravel-beds of England and Belgium, on the desert surface where they were made. Undoubtedly where they were made, for the places where they lie are the actual ancient flint workshops, where the flints were chipped. Everywhere around are innumerable flint chips and perfect weapons, burnt black and patinated by ages of sunlight. We are taking one particular spot in the hills of Western Thebes as an example, but there are plenty of others, such as the Wadi esh-Shzkh on the right bank of the Nile opposite Maghagha, whence Mr. H. Seton-Karr has brought back specimens of flint tools of all ages from the Palaeolithic to the Neolithic periods.

The Palaeolithic flint workshops on the Theban hills have been visited of late years by Mr. Seton-Karr, by Prof. Schweinfurth, Mr. Allen Sturge, and Dr. Blanckenhorn, by Mr. Portch, Mr. Ayrton, and Mr. Hall. The weapons illustrated were found by Messrs. Hall and Ayrton, and are now preserved in the British Museum. Among these flints shown we notice two fine specimens of the pear-shaped type of St. Acheul, with curious adze-shaped implements of primitive type to left and right. Below, to the right, is a very primitive instrument of Chellean type, being merely a sharpened pebble. Above, to left and right, are two specimens of the curious half-moon-shaped instruments which are characteristic of the Theban flint field and are hardly known elsewhere. All have the beautiful brown patina, which only ages of sunburn can give. The "poignard" type

to the left, at the bottom of the plate, is broken off short.

95 In the smaller illustration we see some remarkable types: two scrapers or knives with strongly marked “bulb of percussion” (the spot where the flint-knapper struck and from which the flakes flew off), a very regular *coup-de-poing* 100 which looks almost like a large arrowhead, and on the right a much weathered and patinated scraper which must be of immemorial age. This came from the top plateau, not from the slopes 105 (or subsidiary plateaus at the head of the *wadis*), as did the great St. Acheulian weapons.



*Palaeolithic Implements of the Quaternary Period*  
Source: L.W. King and H.R. Hall

11. The main idea of the passage is to
- A. give details of the types of flints from Ancient Egypt.
  - B. present the history of the Ancient Egyptian flint based on a refutation.
  - C. introduce a premise on the transformation of the desert.

D. refute the transformation of the forest to a desert in Egypt.

12. What reasoning do the authors use when they refer to a “weak conclusion” in line 46?
- A. The flint left behind were a result of a flint working space, not because the area was once covered in trees.
  - B. The flint was moved from the forest to the dry desert surface.
  - C. The flint was marked black by the sun, meaning they have been there for centuries.
  - D. The flint shops had to be moved once the dry spell started.
13. Which choice best provides evidence for the answer to the previous question?
- A. Lines 41-45 (“And ... surface.”)
  - B. Lines 55-58 (“Undoubtedly ... chipped.”)
  - C. Lines 58-61 (“Everywhere ... sunlight.”)
  - D. Lines 70-75 (“The ... Mr. Hall.”)
14. As used in line 10, “feed” most nearly means
- A. cook for.
  - B. graze.
  - C. consume.
  - D. supply.
15. How credible do the authors perceive the description of Ancient Egypt to be in the first two paragraphs?
- A. It is an assumption that has not been taken seriously.
  - B. It is a confirmed hypothesis with concrete evidence.
  - C. It is only an assumption that historians and scientists built hypotheses upon.
  - D. It is a credible conclusion based on historical texts found in Egypt that spanned centuries.

16. Which choice best provides evidence for the answer to the previous question?
- A. Lines 1-5 (“The ... to-day.”)
  - B. Lines 10-15 (“It ... hand.”)
  - C. Lines 29-33 (“Acting ... obtaining.”)
  - D. Lines 36-37 (“They ... hypothesis.”)
17. As used in line 41, “bearing” most nearly means
- A. transporting.
  - B. withstanding.
  - C. exhibiting.
  - D. fostering.
18. When mentioning the names in lines 72-75, the authors assume that the reader
- A. will be impressed by their knowledge.
  - B. is familiar with explorers and professionals who have investigated Ancient Egypt.
  - C. will be introduced to significant figures in history by means of their work.
  - D. will become confused by the list of unknown figures.
19. How do the first two paragraphs relate to the rest of the passage?
- A. The first two paragraphs introduce the authors’ position and the rest of the passage supports it.
  - B. The first two paragraphs give background information that supports a contradictory hypothesis in the rest of the passage.
  - C. The first two paragraphs present a hypothesis followed by supporting details in the rest of the passage.
  - D. The first two paragraphs introduce a premise followed by a rebuttal and supporting details in the rest of the passage.
20. The purpose of the graphic with respect to the passage is to
- A. provide illustrative evidence of the flints found in the Theban hills.
  - B. give evidence that contradicts the information presented on the flints of the Theban hills.
  - C. disprove the existence of flints in the Theban hills.
  - D. support the notion of Ancient Egyptian flints being showcased in a British museum.

*The first passage is from The Minds and Manners of Wild Animals: A Book of Personal Observation by Hornaday discussing a bear's mental traits.*

*Passage 2 taken from Anecdotes of the Habit and Instinct of Animals by Mrs. R. Lee discusses bears in their natural habitat.*

### Passage 1

5 Considered as a group, the bears of the world are supremely interesting animals. In fact, no group surpasses them save the Order Primates, and it requires the enrollment of all the apes, baboons and monkeys to accomplish it.

10 From sunrise to sunrise a bear is an animal of original thought and vigorous enterprise. Put a normal bear in any new situation that you please, he will try to make himself master of it. Use any new or strange material that you please, of wood, metal, stone or concrete, and he will cheerfully set out to find its weakest points and destroy it. If one board in a wall happens to be of wood a little softer than its fellows, with wonderful quickness and precision he will locate it. To tear his way out of an ordinary wooden cage he asks nothing better than a good crack or a soft knot as a starting point.

25 Let him who thinks that all animals are mere machines of heredity and nothing more, take upon himself the task of collecting, yarding, housing and KEEPING a collection of thirty bears from all over the world, representing from ten to fifteen species. In a very short time the believer in bear knowledge by inheritance only, will begin to see evidences of new thought.

35 In spite of our best calculations, in twenty-two years and a total of about seventy bears, we have had three bear escapes. The species involved were an Indian sloth bear, an American black bear

and a Himalayan black bear. The troublesome three laboriously invented processes by which, supported by surpassing acrobatics, they were able to circumvent our overhanging bars. Now, did the mothers of those bears bequeath to them the special knowledge which enabled them to perform the acrobatic mid-air feat of warping themselves over that sharp-pointed overhang barrier? No; because none of their parents ever saw steel cage-work of any kind.

50 The bears of the world are distributed throughout Asia, Borneo, the heavy forests of Europe, all North America, and the northwestern portion of South America. In view of their wonderfully interesting traits, it is surprising that so few books have been written about them. The variations in bear character and habit are almost as wide as the distribution of the species.

60 There are four books in English that are wholly devoted to American bears and their doings. These are "The Grizzly Bear" and "The Black Bear," by William H. Wright, of Spokane (Scribner's), "The Grizzly Bear," by Enos A. Mills, and "The Adventures of James Capen Adams." In 1918 Dr. C. Hart Merriam published as No. 41 of "North American Fauna" a "Review of the Grizzly and Brown Bears of North America" (U.S. Govt.). This is a scientific paper of 135 pages, the product of many years of collecting and study, and it recognizes and describes eighty-six species and sub-species of those two groups in North America. The classification is based chiefly upon the skulls of the animals.

80 It is unfortunate that up to date no bear student with a tireless pen has written The Book of Bears. But let no man rashly assume that he knows "all about bears."



## Passage 2

Among the Carnivora, or flesh-eating animals, Bears take the first place; for their characters and habits link them in some degree with the preceding order, the Insectivora. Both principally live on fruit, grains, and insects, and only eat flesh from necessity, or some peculiarity of life, such as confinement, or education.

The Carnivora are divided by naturalists into three tribes, the characters for which are taken from their feet and manner of walking. Bears rank among the Plantigrada, or those which put the whole of their feet firmly upon the ground when they walk. They are occasionally cunning and ferocious, but often evince good humour, and a great love of fun. In their wild state they are solitary the greater part of their lives; they climb trees with great facility, live in caverns, holes, and hollow trees; and in cold countries, retire to some secluded spot during the winter, where they remain concealed, and bring forth their young. Some say they are torpid; but this cannot be, for the female bears come from their retreats with cubs which have lived upon them, and it is not likely, that they can have reared them and remained without food; they are, however, often very lean and wasted, and the absorption of their generally large portion of fat, contributes to their nourishment. The story that they live by sucking their paws is, as may be supposed, a fable; when well-fed they always lick their paws, very often accompanying the action with a peculiar sort of mumbling noise. There are a few which will never eat flesh, and all are able to do without it. They are, generally speaking, large, clumsy and awkward, possessing large claws for digging; and often walk on their hind-feet, a facility afforded them by the peculiar formation of their thigh-bone. They do not often attack in the first instance, unless impelled by hunger or danger; they are, however, formidable opponents when excited. In former times

130 there were few parts of the globe in which they were not to be found; but like other wild animals, they have disappeared before the advance of man.

21. In Passage 1, the author alludes to which of the following?
- A. A bear's intelligence is not purely innate.
  - B. A bear's main trait is aggression.
  - C. A bear simply functions based on genetic traits.
  - D. A bear has hidden acrobatic skills.
22. Which choice best provides evidence for the answer to the previous question?
- A. Lines 11-15 ("Use ... it.")
  - B. Lines 23-29 ("Let ... species.")
  - C. Lines 29-32 ("In ... thought.")
  - D. Lines 57-59 ("The ... species.")
23. Which of the following is NOT used as evidence of a bear's intelligence in Passage 1?
- A. A bear seeks to find fault in any material.
  - B. When placed in a situation, a bear is sure to dominate it.
  - C. A bear will locate the barest of faults in captivity in order to escape.
  - D. A bear will attack when threatened.
24. The tone of Passage 1 compared to Passage 2 can best be described as
- A. indifference versus passion.
  - B. awe-inspired versus neutral.
  - C. reverence versus subjectivity.
  - D. detachment versus objectivity.
25. As used in line 8 "original" most nearly means
- A. earliest.
  - B. innovative.
  - C. genuine.
  - D. untouched.

26. According to Passage 2, which of the following best describes a bear's character?
- A. sluggish and lazy
  - B. lovely and withdrawn
  - C. playful yet defensive
  - D. isolated yet social
27. Which choice best provides evidence for the answer to the previous question?
- A. Lines 90-93 ("The ... walking.")
  - B. Lines 96-98 ("They ... fun.")
  - C. Lines 98-100 ("In ... lives;")
  - D. Line 105 ("Some ... torpid;")
28. Which of the following points in Passage 2 would the author in Passage 1 agree with?
- A. Bears are complex creatures.
  - B. Bears are good-humoured.
  - C. Bears tend to isolate in winter.
  - D. Bears are clumsy and awkward.
29. In Passage 1, the author states in lines 80-81 "But let no man rashly assume that he knows "all about bears" implying that
- A. men are quick to believe they know everything.
  - B. bears are constantly evolving.
  - C. bears are mysterious creatures that need a team of experts in order to understand their character.
  - D. knowledge on bears is not to be taken for granted and anyone who assumes otherwise is unwise.
30. As used in line 122, "possessing" most nearly means
- A. dominating.
  - B. haunting.
  - C. having.
  - D. holding.
31. Which of the following statements best summarizes Passage 2?
- A. Bears possess a mix of traits and are known to hibernate in the winter and lose a lot of fat.
  - B. Bears are strange animals that tend to be aggressive and clumsy.
  - C. Bears are part of the Carnivora and Insectivora.
  - D. Bears tend to attack when hungry and are found all over the globe.

*The following edited passage is taken from History of the Plague in London by Daniel Defoe on the plague in the 1800's.*

It is true, people used all possible precaution. When any one bought a joint of meat in the market, they would not take it out of the butcher's hand, but took  
5 it off the hooks themselves. On the other hand, the butcher would not touch the money, but have it put into a pot full of vinegar, which he kept for that purpose. The buyer carried always small money to  
10 make up any odd sum, that they might take no change. They carried bottles for scents and perfumes in their hands, and all the means that could be used were employed; but then the poor could not do  
15 even these things, and they went at all hazards.

Innumerable dismal stories we heard every day on this very account. Sometimes a man or woman dropped  
20 down dead in the very markets; for many people that had the plague upon them knew nothing of it till the inward gangrene had affected their vitals, and they died in a few moments. This caused  
25 that many died frequently in that manner in the street suddenly, without any warning: others, perhaps, had time to go to the next bulk or stall, or to any door or porch, and just sit down and die, as I have  
30 said before.

These objects were so frequent in the streets, that when the plague came to be very raging on one side, there was scarce any passing by the streets but that several  
35 dead bodies would be lying here and there upon the ground. On the other hand, it is observable, that though at first the people would stop as they went along, and call to the neighbors to come out on  
40 such an occasion, yet afterward no notice was taken of them; but that, if at any time we found a corpse lying, go across the way and not come near it; or, if in a narrow lane or passage, go back again,  
45 and seek some other way to go on the

business we were upon. And in those cases the corpse was always left till the officers had notice to come and take them away, or till night, when the bearers  
50 attending the dead cart would take them up and carry them away. Nor did those undaunted creatures who performed these offices fail to search their pockets, and carry off what they could get.

55 But to return to the markets. The butchers took that care, that, if any person died in the market, they had the officers always at hand to take them up upon handbarrows, and carry them to the next  
60 churchyard; and this was so frequent that such were not entered in the weekly bill, found dead in the streets or fields, as is the case now, but they went into the general articles of the great distemper.

65 But now the fury of the distemper increased to such a degree, that even the markets were but very thinly furnished with provisions, or frequented with buyers, compared to what they were  
70 before; and the lord mayor caused the country people who brought provisions to be stopped in the streets leading into the town, and to sit down there with their goods, where they sold what they  
75 brought, and went immediately away. And this encouraged the country people greatly to do so; for they sold their provisions at the very entrances into the town, and even in the fields, as  
80 particularly in the fields beyond Whitechapel, in Spittlefields. Note, those streets now called Spittlefields were then indeed open fields; also in St. George's  
85 Fields in Southwark, in Bunhill Fields, and in a great field called Wood's Close, near Islington. Thither the lord mayor, aldermen, and magistrates sent their officers and servants to buy for their  
90 families, themselves keeping within doors as much as possible; and the like did many other people. And after this method was taken, the country people came with great cheerfulness, and brought provisions of all sorts, and very seldom

95 got any harm, which, I suppose, added  
also to that report of their being  
miraculously preserved.

As for my little family, having thus, as I  
have said, laid in a store of bread, butter,  
100 cheese, I took my friend and physician's  
advice, and locked myself up, and my  
family, and resolved to suffer the  
hardship of living a few months without  
flesh meat rather than to purchase it at the  
105 hazard of our lives.

32. The passage is written from which  
point of view?

- A. a man who witnessed and survived the plague
- B. a historian making an account of the plague
- C. a victim and recoveree of the plague
- D. an observer of the plague

33. Which of the following did the author  
claim to have happened during the  
plague?

- A. If one did not buy meat, he or she would be safe from the plague.
- B. The plague only affected the poor.
- C. People would drop dead in the street suddenly.
- D. The dead were left in the streets to rot.

34. When the author talks about death in  
the second paragraph, what best  
describes the tone?

- A. grave yet detached
- B. emotional and sensitive
- C. furious yet reserved
- D. accepting and aloof

35. What was the initial reaction of the  
people of the town when a person was  
found dead in the streets?

- A. They would avoid the body.
- B. They would take notice and inform others.
- C. They would call the authorities.
- D. They would steal their clothes.

36. Which choice best provides evidence  
for the answer to the previous  
question?

- A. Lines 36-41 (“On ... them;”)
- B. Lines 41-43 (“but ... it;”)
- C. Lines 43-46 (“or ... upon.”)
- D. Lines 51-54 (“Nor... get.”)

37. As used in line 18, “account” most  
nearly means

- A. importance.
- B. record.
- C. financial record.
- D. customer.

38. According to the passage, what helped  
keep the plague under control?

- A. The increase in deaths controlled the plague outbreak.
- B. Avoiding the dead bodies helped curb the plague.
- C. Markets were redirected to the outskirts of town.
- D. Money was untouched by butchers.

39. Which choice best provides evidence  
for the answer to the previous  
question?

- A. Lines 5-8 (“On ... purpose.”)
- B. Lines 31-36 (“These ... ground.”)
- C. Lines 41-43 (“But ... it;”)
- D. Lines 91-97 (“And ... preserved.”)

40. The main idea of the passage is to

- A. condemn the poor for not taking proper preventative measures.
- B. address the corruption of the state during the plague.
- C. draw attention to the fact that people were dying in the streets.
- D. give a personal account of how the plague passed from person to person and the preventative measures taken.

41. What is the purpose of the second to last paragraph?
- A. It presents an account of the hardship of being a merchant during the plague.
  - B. It explains the anger and frustration of having to sell products on the outskirts of town.
  - C. It explains how the change in market location helped protect people from the plague.
  - D. It makes clear the area where products were sold.
42. As used in line 61, “bill” most nearly means
- A. invoice.
  - B. banknote.
  - C. draft law.
  - D. public notice.

*The following edited passage is taken from The Chemistry, Properties and Tests of Precious Stones by John Mastin on the presence of heat-rays and light-rays on different stones.*

Another method of isolating certain stones is by the action of heat-rays. Remembering our lessons in physics we recall that just as light-rays may be refracted, absorbed, or reflected, according to the media through which they are caused to pass, so do heat-rays possess similar properties. Therefore, if heat-rays are projected through precious stones, or brought to bear on them in some other manner than by simple projection, they will be refracted, absorbed, or reflected by the stones in the same manner as if they were light-rays, and just as certain stones allow light to pass through their substance, whilst others are opaque, so do some stones offer no resistance to the passage of heat-rays, but allow them free movement through the substance, whilst, in other cases, no passage of heat is possible, the stones being as opaque to heat as to light. Indeed, the properties of light and heat are in many ways identical, though the test by heat must in all cases give place to that by light, which latter is by far of the greater importance in the judging and isolation of precious stones. It will readily be understood that in the spectrum the outer or extreme light-rays at each side are more or less bent or diverted, but those nearest the centre are comparatively straight, so that, as before remarked, these central rays are taken as being the standard of light-value. This divergence or refraction is greater in some stones than in others, and to it the diamond, as an example, owes its chief charm. In just such manner do certain stones refract, absorb, or reflect heat; thus amber, gypsum, and the like, are practically opaque to heat-rays, in

contrast with those of the nature of fluorspar, rock-salt, &c., which are receptive. Heat passes through these as easily as does light through a diamond, such stones being classed as diathermal (to heat through). So that all diathermal stones are easily permeable by radiant heat, which passes through them exactly as does light through transparent bodies.

Others, again, are both single and double refracting to heat-rays, and it is interesting to note the heat-penetrating value as compared with the refractive indexes of the stone. In the following table will be found the refractive indexes of a selection of single and double refractive stones, the figures for "Light" being taken from a standard list. The second column shows the refractive power of heat, applied to the actual stones, and consisting of a fine pencil blowpipe-flame, one line (the one twelfth part of an inch) in length in each case. This list must be taken as approximate, since in many instances the test has been made on one stone only, without possibility of obtaining an average; and as stones vary considerably, the figures may be raised or lowered slightly, or perhaps even changed in class, because in some stones the least stain or impurity may cause the heat effects to be altered greatly in their character, and even to become singly or doubly refracting, opaque or transparent, to heat-rays, according to the nature of the impurity or to some slight change in the crystalline structure, and so on.

In some of the specimens the gypsum showed a heat-penetration index of 0.001, and amber of 0.056, but mostly not within the third point. In all cases the heat-penetration and refraction were shown by electric recorders. These figures are the average of those obtained from tests made in some cases on several stones of the same kind, and also

on isolated specimens. Not only does the power of the stone to conduct heat vary in different stones of the same kind or variety, as already explained, but there is seen a remarkable difference in value, according to the spot on which the heat is applied, so that on one stone there is often seen a conductivity varying between 0.15 to 4.70.

This is owing to the differences of expansion due to the temporary disturbance of its crystalline structure, brought about by the applied heat. This will be evident when heat is applied on the axes of the crystal, on their faces, angles, lines of symmetry, etc., each one of which gives different results, not only as to value in conductivity, but a result which varies in a curious degree, out of all proportion to the heat applied. In many cases a slight diminution in applied heat gives a greater conductivity, whilst in others a slight rise in the temperature of the heat destroys its conductivity altogether, and renders the stone quite opaque to heat-rays.

This anomaly is due entirely to the alteration of crystalline structure, which, in the one case, is so changed by the diminution in heat as to cause the crystals to be so placed that they become diathermal, or transparent to heat-rays; whilst, in the other instance, the crystals which so arrange themselves as to be diathermal are, by a slightly increased temperature, somewhat displaced, and reflect, or otherwise oppose the direct passage of heat-rays, which, at the lower temperature, obtained free passage.

*Selection of Singly refracting stones. Indexes of Rays of*

	LIGHT.	HEAT.	
Fluorspar	1.436	4.10	varies
Opal	1.479	2.10	"
Spinel	1.726	1.00	
Almandine	1.764	1.00	
Diamond	2.431	6.11	double

*Selection of Doubly refracting stones. Indexes of Rays of*

	Light.	Heat.	
Quartz	1.545	4.7	single and double
Beryl	1.575	1.0	varies considerably
Topaz	1.635	4.1	" "
Chrysoberyl	1.765	1.1	" "
Ruby	1.949	5.1	single and double

*Source: John Mastin*

43. Which of the following best describes the overall structure of the passage?
- scientific narrative
  - expository article
  - untold fable
  - hypothetical report
44. As used in line 18, "passage" most nearly means
- excerpt.
  - development.
  - walkway.
  - movement.
45. According to the passage, how do light rays compare or contrast to heat rays?
- Light rays are better absorbed and refracted than heat rays.
  - Depending on the medium, both heat rays and light rays are refracted, absorbed, or reflected.
  - Depending on the medium, heat rays do not hold properties similar to light rays.
  - The stones that allow light rays to pass through do not allow heat rays.

46. As used in line 89, “obtained” most nearly means
- A. held.
  - B. applied.
  - C. acquired.
  - D. earned.
47. According to the passage, why is the diamond special?
- A. It is a diathermal stone.
  - B. A diamond absorbs heat with high intensity.
  - C. When compared to other stones, it has a high level of refraction when light-rays pass through.
  - D. A diamond does not allow light or heat to be absorbed or refracted.
48. Which choice best provides evidence for the answer to the previous question?
- A. Lines 29-36 (“It ... light-value.”)
  - B. Lines 36-40 (“This ... charm.”)
  - C. Lines 40-41 (“In ... heat;”)
  - D. Lines 46-49 (“Heat ... through.”)
49. According to the passage, what could be said about the data presented in the graphics?
- A. It is accurate.
  - B. Actual numbers may vary.
  - C. It is completely inaccurate.
  - D. No information is found in the passage.
50. The stone’s heat conductivity varies depending on
- A. where the heat is applied.
  - B. its initial crystalline structure.
  - C. the temperature of the heat.
  - D. the light-rays present at the time the heat is applied.
51. Which choice best provides evidence for the answer to the previous question?
- A. Lines 92-100 (“Not ... 4.70.”)
  - B. Lines 101-104 (“This ... heat.”)
  - C. Lines 114-118 (“whilst ... rays.”)
  - D. Lines 119-125 (“This ... heat-rays;”)
52. Which of the following is NOT mentioned in the tables?
- A. The diamond has the highest number of light rays among both the singly and doubly refracting stones.
  - B. The highest numbers of heat rays passing through doubly refracting stones is the Ruby.
  - C. The Quartz and Beryl stone have a similar number of light rays.
  - D. Spinel and Almandine have a different number of heat rays.