SECTION III

Time—35 minutes

23 Questions

Directions: Each group of questions in this section is based on a set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. Choose the response that most accurately and completely answers each question and blacken the corresponding space on your answer sheet.

Questions 1–5

From among eight candidates, four astronauts will be selected for a space flight. Four of the candidates—F, J, K, and L—are experienced astronauts and four—M, N, P, and T—are inexperienced astronauts. F, M, P, and T are geologists whereas J, K, L, and N are radiobiologists. The astronauts must be selected according to the following conditions:

Exactly two experienced astronauts and two inexperienced astronauts are selected.

Exactly two geologists and two radiobiologists are selected.

Either P or L or both are selected.

1. Which one of the following is an acceptable selection of astronauts for the space flight?

   (A) F, J, N, and T
   (B) F, L, M, and P
   (C) F, M, N, and P
   (D) J, L, M, and T
   (E) K, L, N, and T

2. If F and P are selected for the space flight, the other two astronauts selected must be

   (A) a radiobiologist who is an experienced astronaut and a radiobiologist who is an inexperienced astronaut
   (B) a radiobiologist who is an experienced astronaut and a geologist who is an inexperienced astronaut
   (C) a radiobiologist and a geologist, both of whom are experienced astronauts
   (D) two radiobiologists, both of whom are experienced astronauts
   (E) two radiobiologists, both of whom are inexperienced astronauts

3. If F and J are selected for the space flight, which one of the following must also be selected?

   (A) K
   (B) L
   (C) M
   (D) N
   (E) T

4. If M and T are selected for the space flight, which one of the following could be, but need not be, selected for the flight?

   (A) F
   (B) J
   (C) L
   (D) N
   (E) P

5. If N is selected for the space flight, which one of the following must also be selected?

   (A) F
   (B) J
   (C) L
   (D) M
   (E) T

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Questions 6–12

A showroom contains exactly six new cars—T, V, W, X, Y, and Z—each equipped with at least one of the following three options: power windows, leather interior, and sunroof. No car has any other options. The following conditions must apply:

V has power windows and a sunroof.
W has power windows and a leather interior.
W and Y have no options in common.
X has more options than W.
V and Z have exactly one option in common.
T has fewer options than Z.

6. For exactly how many of the six cars is it possible to determine exactly which options each one has?

(A) two
(B) three
(C) four
(D) five
(E) six

7. Which one of the following must be false?

(A) Exactly five of the six cars have leather interiors.
(B) Exactly five of the six cars have sunroofs.
(C) Exactly four of the six cars have leather interiors.
(D) Exactly four of the six cars have power windows.
(E) Exactly four of the six cars have sunroofs.

8. If all the cars that have leather interiors also have power windows, which one of the following must be false?

(A) T has power windows.
(B) T has a sunroof.
(C) V has power windows.
(D) Z has power windows.
(E) Z has a sunroof.

9. If Z has no options in common with T but has at least one option in common with every other car, then which one of the following must be false?

(A) T has power windows.
(B) Z has a sunroof.
(C) Exactly four of the six cars have power windows.
(D) Exactly four of the six cars have leather interiors.
(E) Exactly four of the six cars have sunroofs.

10. Suppose that no two cars have exactly the same options as one another. In that case, each of the following could be true EXCEPT:

(A) Exactly three of the six cars have power windows.
(B) Exactly four of the six cars have power windows.
(C) Exactly three of the six cars have sunroofs.
(D) Exactly four of the six cars have sunroofs.
(E) Exactly four of the six cars have leather interiors.

11. If exactly four of the six cars have leather interiors, and exactly four of the six cars have power windows, then each of the following must be true EXCEPT:

(A) T and V have no options in common.
(B) T and Y have no options in common.
(C) T and Z have exactly one option in common.
(D) W and Z have exactly one option in common.
(E) Y and Z have no options in common.

12. Suppose that the condition requiring that X has more options than W is replaced by a new condition requiring that X and W have exactly two options in common. If all of the other original conditions remain in effect, which one of the following must be false?

(A) T and X have no options in common.
(B) V and X have exactly one option in common.
(C) V and X have exactly two options in common.
(D) X and Z have no options in common.
(E) X and Z have exactly two options in common.

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Questions 13–17

Quentin, Robert, Shiro, Tony, and Umeko are the only members of the Kim family who attend an opera. Each of them sits in a separate seat in either row G or row H, and each sits in a seat numbered 1, 2, or 3. Consecutively numbered seats within each row are adjacent.

Each member of the Kim family sits in a seat adjacent to, and in the same row as, at least one other member of the family.
Tony and Umeko sit in row H.
Shiro and Umeko sit in lower numbered seats than does Tony.
Robert sits in the same row as Quentin or Shiro or both.
Robert sits in a seat numbered 2.

13. Which one of the following statements could be true?

(A) Seat G3 is empty.
(B) Seat H2 is empty.
(C) Shiro sits in a seat numbered 3.
(D) Tony sits in a seat numbered 1.
(E) Umeko sits in a seat numbered 3.

14. Which one of the following statements could be true?

(A) Robert sits in row H.
(B) Shiro sits in row H.
(C) Quentin sits in the same row as, and in a seat adjacent to, Shiro.
(D) Robert sits in the same row as, and in a seat adjacent to, Tony.
(E) Robert sits in the same row as, and in a seat adjacent to, Umeko.

15. If Tony sits in a seat numbered 2, then which one of the following statements could be false?

(A) Quentin sits in a seat numbered 3.
(B) Umeko sits in a seat numbered 1.
(C) Quentin sits in the same row as, and in a seat adjacent to, Robert.
(D) Robert sits in the same row as, and in a seat adjacent to, Shiro.
(E) Tony sits in the same row as, and in a seat adjacent to, Umeko.

16. Considering only the six seats in which members of the Kim family could sit, which one of the following is a complete and accurate list of those seats any one of which could be empty?

(A) G1, G3
(B) G3, H1
(C) H1, H3
(D) G1, G3, H1
(E) G1, G3, H1, H3

17. Which one of the following is a complete and accurate list of those members of the Kim family any one of whom could sit in seat H2?

(A) Quentin
(B) Shiro, Umeko
(C) Robert, Shiro, Umeko
(D) Tony, Shiro, Umeko
(E) Quentin, Shiro, Tony, Umeko

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Questions 18–23

Exactly seven professors—Madison, Nilsson, Orozco, Paton, Robinson, Sarkis, and Togo—were hired in the years 1989 through 1995. Each professor has one or more specialities, and any two professors hired in the same year or in consecutive years do not have a specialty in common. The professors were hired according to the following conditions:

Madison was hired in 1993, Robinson in 1991.
There is at least one specialty that Madison, Orozco, and Togo have in common.
Nilsson shares a specialty with Robinson.
Paton and Sarkis were each hired at least one year before Madison and at least one year after Nilsson.
Orozco, who shares a specialty with Sarkis, was hired in 1990.

18. Which one of the following is a complete and accurate list of the professors who could have been hired in the years 1989 through 1991?

(A) Nilsson, Orozco, Robinson
(B) Orozco, Robinson, Sarkis
(C) Nilsson, Orozco, Paton, Robinson
(D) Nilsson, Orozco, Paton, Sarkis
(E) Orozco, Paton, Robinson, Sarkis

19. If exactly one professor was hired in 1991, then which one of the following could be true?

(A) Madison and Paton share a specialty.
(B) Robinson and Sarkis share a specialty.
(C) Paton was hired exactly one year after Orozco.
(D) Exactly one professor was hired in 1994.
(E) Exactly two professors were hired in 1993.

20. Which one of the following must be false?

(A) Nilsson was hired in 1989.
(B) Paton was hired in 1990.
(C) Paton was hired in 1991.
(D) Sarkis was hired in 1992.
(E) Togo was hired in 1994.

21. Which one of the following must be true?

(A) Orozco was hired before Paton.
(B) Paton was hired before Sarkis.
(C) Sarkis was hired before Robinson.
(D) Robinson was hired before Sarkis.
(E) Madison was hired before Sarkis.

22. If exactly two professors were hired in 1992, then which one of the following could be true?

(A) Orozco, Paton, and Togo share a specialty.
(B) Madison, Paton, and Togo share a specialty.
(C) Exactly two professors were hired in 1991.
(D) Exactly two professors were hired in 1993.
(E) Paton was hired in 1991.

23. If Paton and Madison have a specialty in common, then which one of the following must be true?

(A) Nilsson does not share a specialty with Paton.
(B) Exactly one professor was hired in 1990.
(C) Exactly one professor was hired in 1991.
(D) Exactly two professors were hired in each of two years.
(E) Paton was hired at least one year before Sarkis.

S T O P

IF YOU FINISH BEFORE TIME IS CALLED, YOU MAY CHECK YOUR WORK ON THIS SECTION ONLY.
DO NOT WORK ON ANY OTHER SECTION IN THE TEST.