

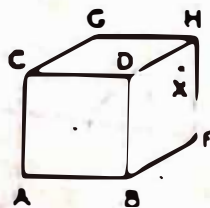
DOCTORAL'S DEGREE
ENTRANCE EXAMINATION
October 1974

Part III

Directions: Choose the correct answer from the lettered choices. Use available space which you have on the page for your scratchwork.

In two hours, the minute hand of a clock rotates through an angle of

- (A) 60°
- (B) 90°
- (C) 180°
- (D) 360°
- (E) 720°



The diagram shows a cube. Each corner has been identified by a letter. Corner E is not shown, but its location is the one corner not shown in the diagram. The cube has a 1" side.

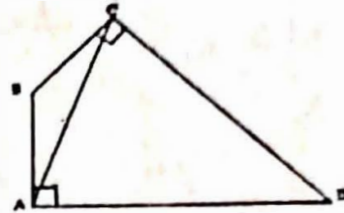
If the cube is successively rotated 180° on axes going through the center of faces ABCD and EFGH, faces AEFG and BFHD, and faces CDGH and ABFE, where will the face containing point X be?

- (A) where face BDHF was at the start of the operation
- (B) Where face AEFG was at the start of the operation
- (C) Where face EFGH was at the start of the operation
- (D) Where face ABFE was at the start of the operation
- (E) Where face ABCD was at the start of the operation.

CMXLIX in Roman numerals is the equivalent of

- (A) 449
- (B) 949
- (C) 969
- (D) 1149
- (E) 1169

4. In the figure, $AB = BC$ and angles BAD and BCD are right angles. Which one of the following conclusions may be drawn?



- (A) angle $BCA = \text{angle } CAD$
- (B) angle B is greater than angle D
- (C) $AC = CD$
- (D) $AD = CD$
- (E) BC is shorter than CD.

5. Suppose in the place of a number system a symbol system were instituted which had digits $\square, \Delta, Z, \text{and } \ominus$ corresponding respectively to the digits 0, 1, 2, 3, 4, 5, 6, 7, 8 and 9. The digit \square is used in the same fashion as the 0 in the decimal system, e.g., $\Delta \square = 10$.

- ✓ A. Which is equal to 10^2 ?

- (A) $\Delta \square \square$
- (B) $\Delta \Delta$
- (C) $\Delta \square \Delta$
- (D) $\square \square$
- (E) $\square \square \Delta$

- ✓ 28. What is the sum of $\Delta + \square + \ominus$?

- (A) Δ
- (B) \square
- (C) \ominus
- (D) $\Delta \square$
- (E) $\Delta \ominus$

6. The least common multiple of 20, 24, 32 is

- (A) 960
- (B) 1920
- (C) 15,360
- (D) 240
- (E) none of these

7. When the fractions $\frac{2}{3}$, $\frac{5}{7}$, $\frac{1}{11}$ and $\frac{3}{13}$ are arranged in ascending order of size, the result is

- (A) $\frac{1}{11}$, $\frac{5}{7}$, $\frac{3}{13}$, $\frac{2}{3}$
- (B) $\frac{5}{7}$, $\frac{1}{11}$, $\frac{3}{13}$, $\frac{2}{3}$
- (C) $\frac{2}{3}$, $\frac{1}{11}$, $\frac{5}{7}$, $\frac{3}{13}$
- (D) $\frac{2}{3}$, $\frac{3}{13}$, $\frac{5}{7}$, $\frac{1}{11}$
- (E) $\frac{1}{11}$, $\frac{2}{3}$, $\frac{1}{11}$, $\frac{5}{7}$

8. Left to right directional movement in reading

- (A) is natural to children
- (B) must be taught
- (C) is common to all cultures
- (D) has no connection with the reading process
- (E) occurs only in the Far East

9. All the following have written plays in verse except

- (A) T. S. Eliot
- (B) Christopher Fry
- (C) John Millington Synge
- (D) William Butler Yeats
- (E) William Shakespeare

10. Which of the following African nations is *not* correctly matched with its pre-independence name?

- (A) Sudan—Anglo-Egyptian Sudan
- (B) Gabon Republic—Gabon
- (C) Ghana—Ivory Coast
- (D) Central African Republic—Ubangi-Shari
- (E) Republic of Congo—Middle Congo

11. Which of the following can be cited as contributing causes of the French Revolution?

- I. The peasants in France were distinctly worse off than those of other continental countries.
- II. France was the center of the Enlightenment.
- III. The French royal family was incompetent.
- IV. Stringent and effective enforcement of censorship stirred popular discontent.
- V. The French state was becoming bankrupt.

- (A) II, III, V only
- (B) I, II, IV, V only
- (C) II, III, IV, V only
- (D) IV, V only
- (E) I, II, III, IV, V

12. All of the following statements about intelligence tests are true *except*:

- (A) Scores made by individual children may vary to a considerable degree over a period of time.
- (B) There is a high correlation between I.Q. and academic aptitude.
- (C) Current thinking holds that there are various kinds of intelligence in addition to the kind measured by paper and pencil group tests.
- (D) "Culture-fair" I.Q. tests tend to favor the middle and upper socio-economic groups of our population.

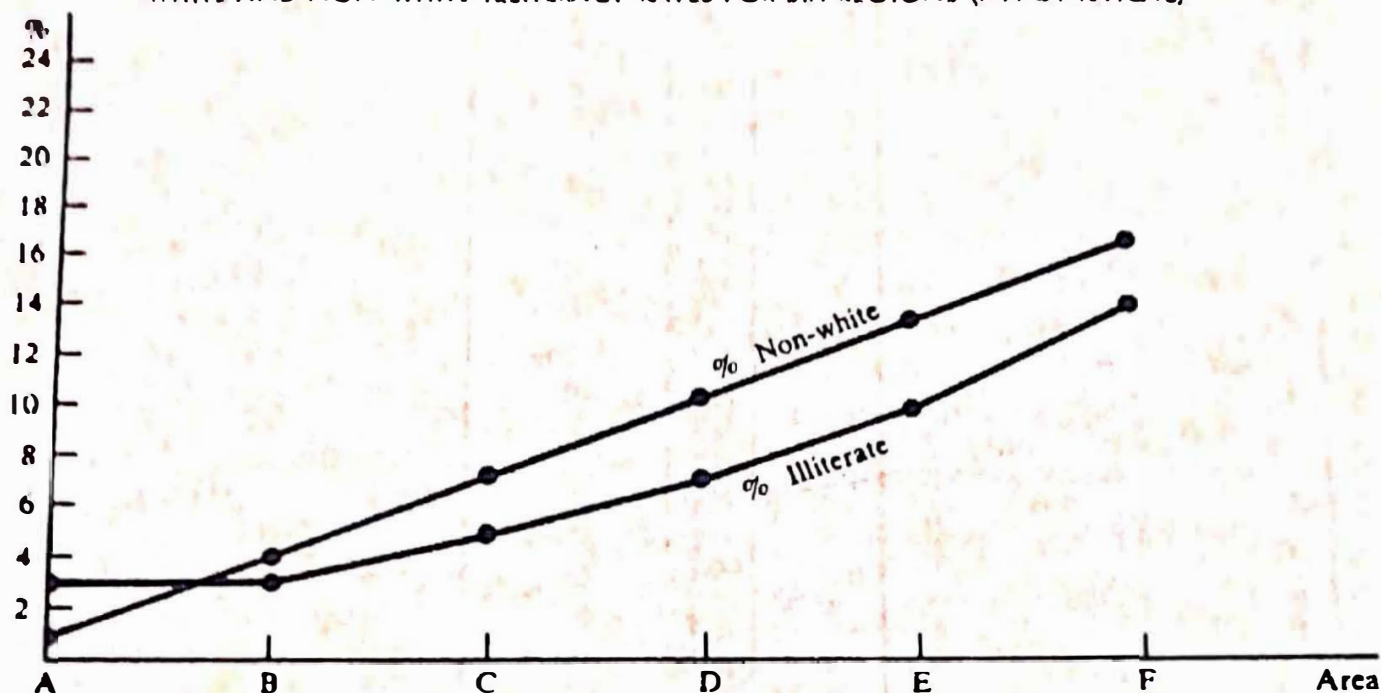
13. Which one of the following statements about free reading is *not* correct?

- (A) It tends to stimulate the development of a desirable outlook on life.
- (B) It should not be allowed on school time.
- (C) It leads to the understanding that reading is necessary and pleasurable.
- (D) It helps to broaden horizons.

14. The study of man's relation to his environment has taken the name _____ from biology.

- (A) etiology
- (B) environmentology
- (C) endology
- (D) ecology
- (E) pathology

WHITE AND NON-WHITE ILLITERACY RATES FOR SIX REGIONS (HYPOTHETICAL)



Here are four assertions:

- I. There are no illiterate whites.
- II. There are no illiterate non-whites.
- III. Whites have a higher illiteracy rate than non-whites.
- IV. Non-whites have a higher illiteracy rate than whites.

On the basis of the graph above *alone*, answer the following questions for the populations of the six areas combined.

- ✗ A. Which of the following *may* be true?
- (A) either I or II (C) I, but not II
 (B) neither I nor II (D) II, but not I
 (E) cannot be determined
- B. Which of the following *may* be true?
- (A) either III or IV
 (B) neither III nor IV
 (C) III, but not IV
 (D) IV, but not III
 (E) cannot be determined
- ✓ C. Which of the following *must* be true?
- (A) only I (C) only IV
 (B) only III (D) I and IV
 (E) none

In which one of the following are the items regarding the United Nations *incorrectly* paired?

- (A) Uniting for Peace Resolution—Right of the General Assembly to act because of a Security Council veto
- (B) UNESCO—Rehabilitation of Korea following the Korean War
- (C) Procedural Matters—Vote of any seven members of the Security Council
- (D) Trusteeship Council—Supervision of designated territories whose peoples have not attained self-government
- (E) International Development Association—Assist backward countries in their economic growth

17. In order to understand the functions of the chromosomes we must know the conditions within the nucleus, for the immediate environment of the chromosomes is the cell nucleus. The cytoplasm of each type of cell is equipped to carry out some specific functions: muscle cell cytoplasm contains the protein myosin, red blood cytoplasm has the hemoglobin, pancreas cytoplasm has the digestive enzyme trypsin, etc. In each type of cell the chromosomes are acting on a differentiated cytoplasm. The parts must be integrated if such a system is to work effectively. There is need for a feedback from the cytoplasm to chromosomes so that the activity is adjusted to the cytoplasm's special requirement.

Protoplasm is the material of which all living substances are formed, usually a jelly-like or fluid substance of grayish translucent appearance.

What are the missing words in the following sentence? "Every cell has a _____ and a _____."

- | | |
|------------------|------------|
| (A) chloroplast, | microsome |
| (B) cytoplasm, | protoplasm |
| (C) nucleus, | protoplasm |
| (D) protoplasm, | cell wall |
| (E) cytoplasm, | nucleus |

18. In the reaction $\text{Ag} + 4\text{HNO}_3 \rightarrow \text{AgNO}_3 + 2\text{H}_2\text{O} + 2\text{NO}$ some of the nitrogen atoms

- (A) gain 2 electrons
- (B) lose 2 electrons
- (C) lose 3 electrons
- (D) gain 3 electrons
- (E) gain 1 electron

19. Gross National Product is defined as

- (A) total goods produced
- (B) total goods and services produced
- (C) total goods and services produced, less taxes
- (D) Net National Product plus dividends
- (E) Net National Product plus investments

20. I. Every dog has fleas.
II. Some dog has fleas.
III. Some dog does not have fleas.
IV. No dog has fleas.
Regarding statements I, II, III, and IV, which of the following claims is correct?

- (A) I is inconsistent with II, III, IV
- (B) II is consistent with III but not with IV and I
- (C) III is consistent with IV but not with I and II
- (D) IV is consistent with II but not with II and III
- (E) none of these

21. First Philosophy, according to Aristotle, is the study of

- (A) Being
- (B) God
- (C) Knowledge
- (D) Ethics
- (E) Mathematics

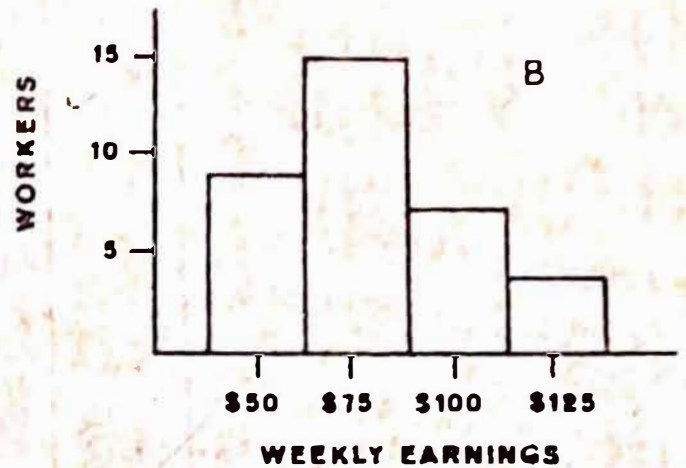
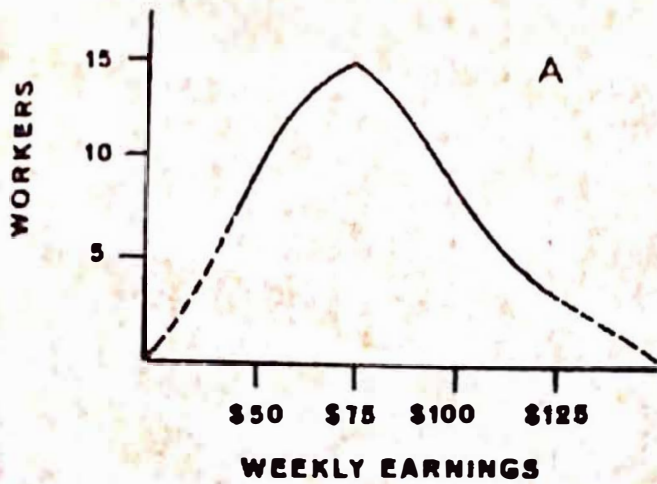
22. Which of the following sets describes a day?

- I. There is one 360° rotation
- II. A period of 23 hours, 56 minutes, 4.09 seconds makes up a mean solar day
- III. A sidereal day contains 24 hours
- IV. The stars are more accurate time references than the sun.

- (A) I only
- (B) I, IV only
- (C) II, IV only
- (D) III, IV only
- (E) I, II, III, IV

✓ 23. In the long run

- (A) fixed costs will be greater than variable costs
- (B) variable costs will be greater than fixed costs
- (C) all costs are variable costs
- (D) all costs are fixed costs
- (E) both A and B are correct



Graph A is a(n)

- (A) histogram
- ☒ (B) frequency polygon
- (C) pictograph
- ☒ (D) normal distribution
- (E) ogive curve

Graph B is a(n)

- ☒ (A) histogram
- (B) frequency polygon
- (C) lorenz curve
- (D) normal distribution
- (E) ogive curve

The mode in graph A is

- (A) \$50
- (B) \$60
- ☒ (C) \$75
- (D) \$100
- (E) \$25