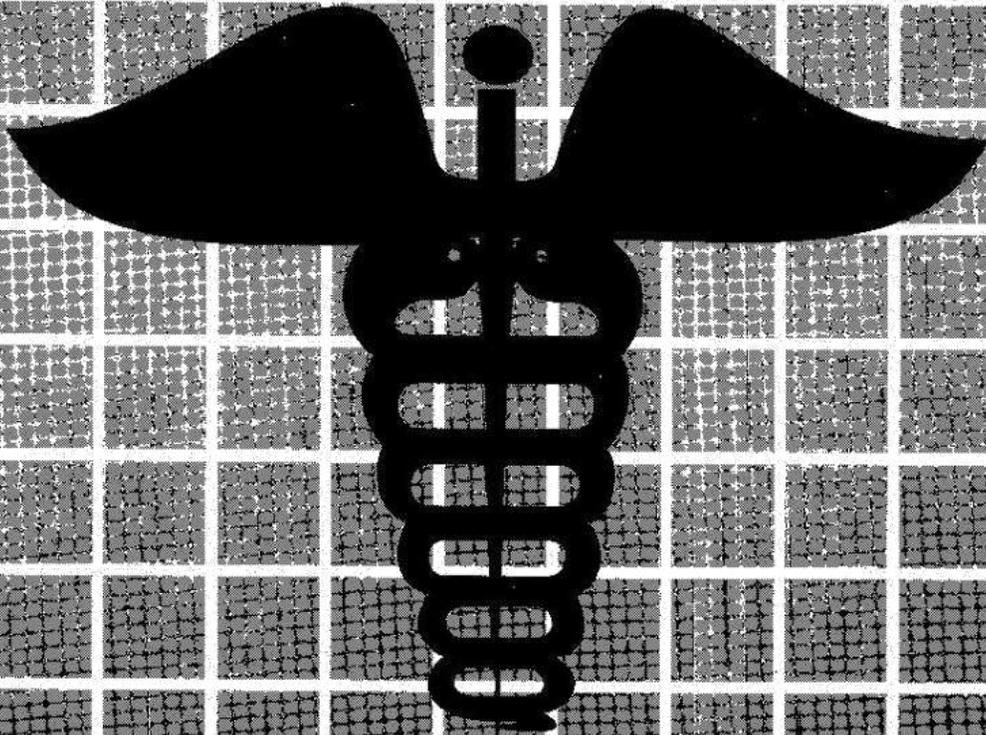


# NMAT

NATIONAL MEDICAL ADMISSION TEST

## PRACTICE SET

PART II



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## GENERAL DIRECTIONS

Part II of the National Medical Admission Test consists of four subtests with multiple-choice items. Each item has a corresponding set of circles on your Answer Sheet. Shade the circle in the column of the letter of your chosen answer. For example, if you choose option B as your answer, shade the circle in column B, as shown in the Sample Answer Sheet below.

| SAMPLE ANSWER SHEET   |                                  |                       |                       |
|-----------------------|----------------------------------|-----------------------|-----------------------|
| A                     | B                                | C                     | D                     |
| <input type="radio"/> | <input checked="" type="radio"/> | <input type="radio"/> | <input type="radio"/> |

If you want to change your answer, erase your first answer completely and shade the circle corresponding to your new answer. When you finish a subtest, proceed to the next until you have completed the entire test.

**Do not write anything on the Test Booklet.**



**TEST A. BIOLOGY**

- Chromosomes become most distinct during cell
  - reproduction
  - respiration
  - metabolism
  - transpiration
- In which pair of organelles are light and chemical energies transformed?
  - Centriole and ribosome
  - Chloroplast and lysosome
  - Chloroplast and mitochondrion
  - Golgi apparatus and microtubule
- Which of the following is the function of the nuclear membrane?
  - It controls the activities of the cell.
  - It encloses the cytoplasm.
  - It surrounds the nucleus.
  - It supplies energy for the cell.
- The chemical responsible for most synaptic transmission in neurons is the
  - adrenaline
  - choline
  - noradrenaline
  - acetylcholine
- Which stages of cellular division have exactly opposite characteristics?
  - Prophase and telophase
  - Prophase and anaphase
  - Metaphase and telophase
  - Metaphase and anaphase
- The continued synthesis of protein requires the continued synthesis of its corresponding
  - tRNA
  - rRNA
  - mRNA
  - nucleic acid
- Which of the following results in the complete oxidation of the substrate to  $\text{ATP} + \text{CO}_2 + \text{H}_2\text{O}$ ?
  - Glycolysis
  - Fermentation
  - Aerobic respiration
  - Anaerobic respiration
- Enzymes are important to the life of cells because they
  - speed up chemical reactions in the cells
  - increase the amount of products of chemical reaction
  - provide the energy necessary for reactions to occur
  - provide the substance for the reactions in the cells
- Plant cells will not break when placed in a container with plenty of water due to the presence of
  - a membrane that regulates the flow of water
  - the cell wall that supports the membrane when turgid
  - the cytoplasm that can absorb much water
  - organelles that expel excess water
- Which of the following is true about catalyzed reactions in cells?
  - The catalyst itself becomes involved in the reaction.
  - The catalytic efficiency of enzymatic reactions is extremely high.
  - The catalytic efficiency of enzymatic reactions is moderately low.
  - Enzymes cause uniform reaction.

11. Which activity does NOT require cellular energy?
- Synthesis of hormones
  - Contraction of muscles
  - Coordination of electrochemical impulses
  - Diffusion of sodium chloride through blood plasma
12. Which feature is present in eukaryotic cells but not in prokaryotic cells?
- Chromosome
  - Cytoplasmic membrane
  - Nuclear membrane
  - Nucleolus
13. Growth of lateral buds apparently involves a balance of which three hormones?
- Auxin, cytokinin, and gibberellin
  - Cytokinin, gibberellin, and ethylene
  - Gibberellin, ethylene, and auxin
  - Auxin, cytokinin, and ethylene
14. Which of the following are present in both prokaryotic and eukaryotic cells?
- Lipid-protein cell walls
  - Cytoplasmic and nuclear regions
  - Distinct nuclear envelopes
  - Circular chromosomes of DNA
15. Which of the following correctly describes the  $\text{Na}^+$  and  $\text{K}^+$  ions across the cell membrane?
- The concentration of  $\text{Na}^+$  ions outside the cell is high and the concentration of  $\text{K}^+$  ions outside the cell is low.
  - The concentration of  $\text{Na}^+$  ions outside the cell is low and the concentration of  $\text{K}^+$  ions inside the cell is low.
  - Inside the cell, the concentrations of  $\text{Na}^+$  and  $\text{K}^+$  ions are both high.
  - Outside the cell, the concentrations of  $\text{Na}^+$  and  $\text{K}^+$  ions are both high.
16. What is the correct sequence of the different stages in blood clotting?
- Fibrinogen  $\xrightarrow{\text{thrombin}}$  fibrin
  - Prothrombin  $\xrightarrow[\text{Ca}^{++}]{\text{thromboplastin}}$  thrombin
  - Fibrin + erythrocytes form a hardened clot
  - Platelets rupture
- I, II, IV, III
  - II, I, IV, III
  - IV, II, I, III
  - IV, I, II, III
17. Which of the following is most likely to occur when a cell is placed in a hypertonic solution?
- Hemolysis
  - Plasmolysis
  - An increase in turgor pressure inside the cell
  - A decrease in solute concentration inside the cell
18. The function of manufacturing is common in which of the following groups of organelles?
- Microtubules, mitochondria, and Golgi apparatus
  - Chloroplasts, lysosomes, and endoplasmic reticula
  - Golgi apparatus, cell membrane, and chloroplasts
  - Ribosomes and chloroplasts
19. Fatty acids are broken down initially by a process known as
- glycolysis
  - transamination
  - beta-oxidation
  - pentose phosphate pathway

20. What cellular structure is related to protein synthesis?
- (A) Lysosome
  - (B) Nucleolus
  - (C) Mitochondrion
  - (D) Golgi apparatus
21. The carbon dioxide produced by living organisms comes from the
- (A) inhaled oxygen which reacted with carbon in their bodies
  - (B) foodstuffs ingested by the organisms
  - (C) water which reacted with carbon in their bodies
  - (D) glucose in their bodies
22. In pulmonary circulation in mammals, the veins carry
- (A) oxygenated blood away from the heart
  - (B) oxygenated blood toward the heart
  - (C) deoxygenated blood away from the heart
  - (D) deoxygenated blood toward the heart
23. Which portion of the brain establishes regularity of respiration?
- (A) Medulla
  - (B) Cerebrum
  - (C) Inferior pons
  - (D) Superior pons
24. In the initial digestive process in man, all of the following occur in the mouth EXCEPT
- (A) secretion of enzymes
  - (B) primary carbohydrates digestion
  - (C) fats and protein digestion
  - (D) conversion of food into smaller pieces
25. The growth reaction of plants to gravity is called
- (A) thigmotropism
  - (B) thermotropism
  - (C) heliotropism
  - (D) geotropism
26. The function of mucus secreted by the lining of the alimentary canal is to
- (A) help digest fats into fatty acids and glycerol
  - (B) help increase the amount of juices secreted by the digestive glands
  - (C) protect the lining from being acted upon by the digestive juices
  - (D) prevent bacteria from reaching the blood vessels
27. Which of the following is the organism *Archips rosana* most closely related to?
- (A) *Rosana piruta*
  - (B) *Archips fervidiana*
  - (C) *Piruta archips*
  - (D) *Fervidiana rosana*
28. When inhaled, which substance can form a more stable compound with hemoglobin, thereby, causing adverse reactions in an individual?
- (A) Ether
  - (B) Nicotine
  - (C) Carbon dioxide
  - (D) Carbon monoxide

**GO ON TO THE NEXT PAGE ⇨**

In items 29 and 30, refer to the following setups:



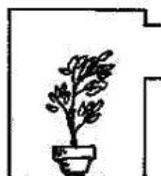
I



III



II



IV

29. Which setup shows phototropism?

- (A) I                      (C) III  
(B) II                      (D) IV

30. To find out if photosynthesis takes place, which setup is appropriate to use?

- (A) I                      (C) III  
(B) II                      (D) IV

31. Which of the following blood vessels carries blood with the highest concentration of oxygen?

- (A) Renal vein  
(B) Pulmonary vein  
(C) Pulmonary artery  
(D) Hepatic portal vein

32. If lanolin paste with IAA is applied to one side of the stem of a coleus plant, which of the following would be observed in the plant?

- (A) It will bend toward the side with the paste.  
(B) It will bend toward the side without the paste.  
(C) It will branch on the side with the paste.  
(D) It will branch on the side without the paste.

33. Transcapillary flow into the tissue spaces occurs when the

- (A) plasma osmotic pressure exceeds the blood pressure  
(B) blood pressure exceeds the plasma osmotic pressure  
(C) osmotic pressure of the tissue fluids exceeds that of the plasma  
(D) hydrostatic pressure of the tissue fluids exceeds that of the plasma

34. Short-day plants, like chrysanthemum and poinsettia, bloom naturally in the seasons when the days are short but can also be made to bloom in summer. Which two conditions make it possible for these plants to bloom in summer?

- I. They are kept in light-controlled greenhouses.  
II. They are allowed to exceed their critical day length.  
III. Their night length is much above the critical value.  
IV. They are exposed to flashes of light at night.

- (A) I and II              (C) I and III  
(B) II and IV            (D) III and IV

35. Which of the following can be observed if there is a lack of parathyroid hormone (PTH)?

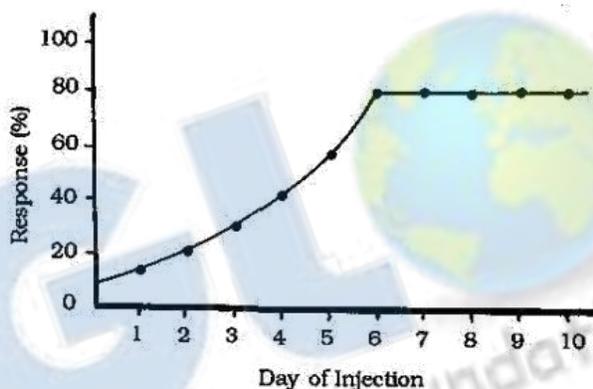
- (A) A decrease in calcium concentration and an increase in phosphate concentration in the blood  
(B) An increase in calcium concentration and a decrease in phosphate concentration in the blood  
(C) An increase in both calcium and phosphate concentrations in the blood  
(D) A decrease in both calcium and phosphate concentrations in the blood

36. All of the following are features of plants adapted to dry, desert conditions EXCEPT

- (A) reduced leaf surface area
- (B) extensive root system
- (C) large number of stomata on the leaf surface
- (D) pores sunken into the leaf surface

37. In which two periods of the human life cycle do the greatest physical changes take place?

- (A) Early childhood and adolescence
- (B) Late childhood and old age
- (C) Before birth and adolescence
- (D) Early childhood and adulthood



38. The curve above represents data obtained from a group of animals receiving a single daily dose of a drug P. A portion of this group was given the dose at day 1 and the response was noted. The same number of animals was given the dose at day 2, and so on, up to day 10. Based on the curve, it can be deduced that the single dose of P used was

- (A) completely eliminated from the body in less than 24 hours
- (B) just enough to elicit the highest possible response
- (C) more than enough to elicit the highest possible response
- (D) less than enough to elicit the highest possible response

39. Our atmosphere is 78% nitrogen. In spite of this abundance, nitrogen is a limiting factor in plant growth. This is primarily due to the fact that

- (A) plants cannot absorb nitrogen directly
- (B) nitrogen is present only in the atmosphere above the soil
- (C) nitrogen does not dissolve in water
- (D) soil organisms compete with plants for nitrogen

40. The various communities existing at different points in time from the pioneer community to the climax community is known as

- (A) succession (C) microsere
- (B) seral stages (D) biomes

41. Which of the following explains why green plants do not grow in oceans at depths greater than 80 meters?

- (A) The ocean is too cold at this depth.
- (B) Insufficient sunlight penetrates beyond this depth.
- (C) The ocean currents are too strong below 80 meters.
- (D) There is insufficient mineral content in waters below this depth.

42. If all the green plants on earth suddenly died, which gas would most likely decline in quantity?

- (A) Oxygen (C) Water vapor
- (B) Nitrogen (D) Carbon dioxide

43. Which biome has the highest annual rainfall?

- (A) Tundra (C) Desert
- (B) Taiga (D) Rain forest

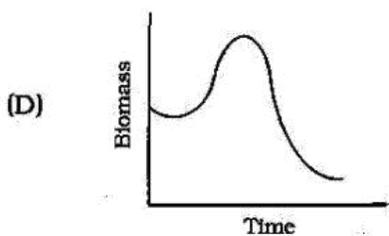
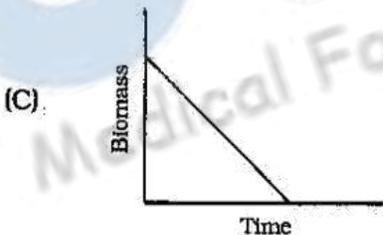
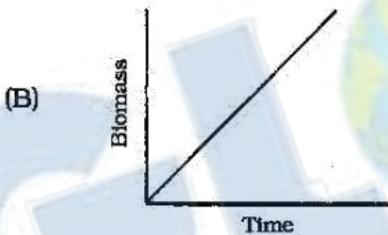
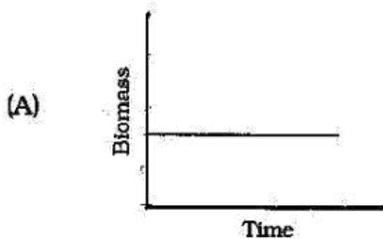
44. Which zone of the ocean is exposed during low tide and covered during high tide?

- (A) Abyssal (C) Neritic
- (B) Littoral (D) Pelagic

45. In any season, competition for light is most intense among the plants of a

- (A) tropical rain forest
- (B) tropical deciduous forest
- (C) coniferous forest
- (D) woodland

46. Which of the following graphs accurately illustrates the change in the biomass of anaerobic organisms in an aquatic system that changes from oligotrophic to eutrophic?



47. The members of a given species are rarely, if ever, uniformly distributed throughout their range. Instead, they are collected into smaller groups called populations. Which of the following best explains this phenomenon?

- (A) Members of a species cannot tolerate overcrowding.
- (B) The physical factors in the environment upon which they depend are themselves not uniformly distributed.
- (C) The environment can support more organisms if they are grouped into populations.
- (D) Organisms interfere with their habitats.

48. Fast rate of population growth and widespread malnutrition are common in India and the Philippines. This proves that

- (A) malnutrition is an effect of fast population growth
- (B) extreme poverty among people results in malnutrition
- (C) malnutrition is a characteristic of developing countries
- (D) when population increases, food supply decreases

49. An organized collection of interacting species is known as

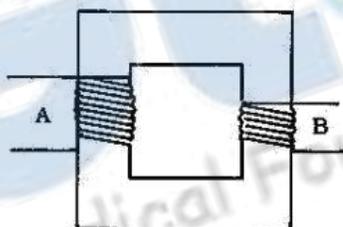
- (A) a community
- (B) an ecology
- (C) a kingdom
- (D) a phylum

50. In an area of 50 hectares, the tamaraw population was 40. Two months later in the same area, the population was halved. Which of the following is LEAST likely to account for the rapid change in population size?

- (A) The tamaraw stopped breeding.
- (B) Predators became more numerous.
- (C) Emigration had occurred.
- (D) A new disease-causing organism was brought into the community.

## TEST B. PHYSICS

1. A man finds that he can walk 1 km in 20 min, 3 km in 1 hr, 6 km in 2 hr, and 9 km in 3 hr. These indicate that the distance he travels is
- (A) inversely proportional to the time  
 (B) inversely proportional to the square of the time  
 (C) directly proportional to the time  
 (D) directly proportional to the square of the time
2. What are the factors that determine the speed of a satellite which moves in a stable orbit around a planet? (G represents the universal gravitational constant.)
- (A) Mass of the planet and G  
 (B) Mass of the satellite and G  
 (C) Mass of the satellite, mass of the planet, and G  
 (D) Orbital radius of the satellite, mass of the planet, and G



3. The device shown above is a
- (A) galvanometer  
 (B) generator  
 (C) transformer  
 (D) rectifier

4. A pingpong ball and a golf ball are dropped in a vacuum chamber from the same height and at the same time. When they have fallen halfway, they have the same

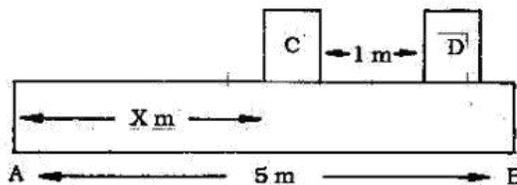
(A) potential energy  
 (B) kinetic energy  
 (C) acceleration  
 (D) velocity

5. A 10-pound object is suspended by a string from an overhead support. A horizontal force of 5.8 pounds is applied on the object. The measure of the angle which the string makes with the horizontal is

(A)  $30^\circ$                       (C)  $60^\circ$   
 (B)  $45^\circ$                       (D)  $90^\circ$

6. A force of 60 newtons is used to raise a 240-newton load using a system of pulleys. The load covered a distance of 1 m for every 5 m of rope pulled through the system. The system has an efficiency of

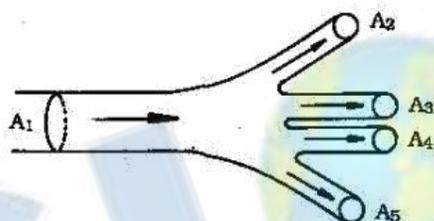
(A) 12%                      (C) 60%  
 (B) 48%                      (D) 80%



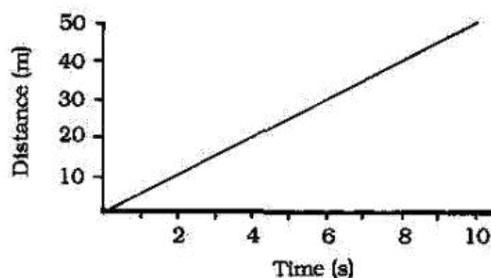
7. Blocks C and D, weighing 4,000 newtons and 2,000 newtons, respectively, rest on a horizontal beam AB, as shown above. If the reaction produced at B is twice as great as the reaction produced at A, how far from A will the weight of Block C act?

(A) 2 m                      (C) 3.5 m  
 (B) 3 m                      (D) 4.0 m

8. A body thrown vertically up into the air possesses kinetic energy at the beginning of its flight, but as it rises, it loses kinetic energy and acquires potential energy with respect to the level from which it started. Which of the following is NOT likely to happen?
- When it reaches the highest point, the kinetic energy has been wholly changed to potential energy.
  - As it falls, its potential energy is again transformed to kinetic energy.
  - The potential energy is maximum at the highest point of its flight.
  - The kinetic energy is minimum at the lowest point of its flight.



9. Bernoulli's principle states that  $A_1V_1 = A_2V_2$ . Blood flows from Artery  $A_1$ , whose cross-sectional area is  $50 \mu^2$ , at a velocity of  $5 \text{ mm/s}$  to its more peripheral branches,  $A_2$ ,  $A_3$ ,  $A_4$ , and  $A_5$ . If the total cross-sectional area of the branches is  $250 \mu^2$  and each branch has exactly the same diameter as the other, what is the velocity of blood in the branches?
- $0.5 \text{ mm/s}$
  - $1.0 \text{ mm/s}$
  - $10.0 \text{ mm/s}$
  - $25.0 \text{ mm/s}$



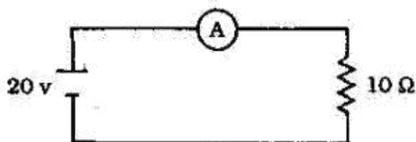
10. Based on the graph above, the acceleration of the moving body is
- $10 \text{ m/s}^2$
  - $5 \text{ m/s}^2$
  - $4 \text{ m/s}^2$
  - $0 \text{ m/s}^2$
11. How much heat is required to warm 10 grams of ice from  $-10^\circ\text{C}$  to  $0^\circ\text{C}$ ? (Specific heat of ice =  $0.5 \text{ cal/g } ^\circ\text{C}$ )
- 75 cal
  - 50 cal
  - 25 cal
  - 10 cal
12. Body X is in contact with Body Y which is hotter than Body X. Which of the following statements are true?
- Body X gains heat and Body Y loses heat.
  - The temperature of Body X decreases and the temperature of Body Y increases.
  - The temperatures of Body X and Body Y will eventually be equal.
- I and II only
  - I and III only
  - II and III only
  - I, II, and III
13. How many calories of heat is given off when 200 grams of water is cooled from  $100^\circ\text{C}$  to  $20^\circ\text{C}$ ?
- 2000 cal
  - 4000 cal
  - 16000 cal
  - 20000 cal

14. A 1200-watt heater is used for raising the temperature of 1 liter of water to boiling point. How long will it take for the water to boil if the initial temperature of water is  $20^{\circ}\text{C}$ ? (1 cal = 4.19 joules)
- (A) 28 s                      (C) 279 s  
(B) 70 s                      (D) 349 s
15. If the absolute temperature of a gas is quadrupled and its pressure is halved, then the volume will
- (A) increase four times  
(B) increase eight times  
(C) decrease four times  
(D) decrease eight times
16. A glass flask which is partly filled with water is heated over a Bunsen flame. As soon as the water begins to boil, the flask is removed from the flame and tightly stoppered immediately. Boiling stops. When cold water is poured on the surface of the flask, which of the following will happen to the water inside the flask?
- (A) It will begin to boil again since the contraction of the flask reduces the pressure inside.  
(B) It will begin to boil again since the condensation of the steam reduces the pressure inside.  
(C) It will not boil since the temperature is less than  $100^{\circ}\text{C}$ .  
(D) It will not boil since the contraction of the flask increases the pressure inside.
17. A Carnot refrigerator takes heat from water at  $0^{\circ}\text{C}$  and rejects heat to a room at  $27^{\circ}\text{C}$ . If 50 kg of water at  $0^{\circ}\text{C}$  is converted to ice at  $0^{\circ}\text{C}$ , how much energy must be supplied to the refrigerator?
- (A)  $4.60 \times 10^{-4}$  kwh  
(B)  $3.90 \times 10^{-4}$  kwh  
(C)  $4.00 \times 10^{-5}$  kwh  
(D)  $2.62 \times 10^{-5}$  kwh
18. The amount of heat required to raise the temperature of 10 grams of water at  $10^{\circ}\text{C}$  to  $50^{\circ}\text{C}$  is
- (A) 100 cal                      (C) 500 cal  
(B) 400 cal                      (D) 600 cal
19. The immediate source of water which forms dew on grass on a summer morning is the
- (A) air  
(B) soil  
(C) grass  
(D) cloud

| Substance | Specific Heat<br>(cal/g $^{\circ}\text{C}$ ) | Thermal<br>Conductivity<br>(cal/cm <sup>2</sup> $^{\circ}\text{C}$ ) |
|-----------|--|--|
| Water     | 1.000  | 0.0015   |
| Aluminum  | 0.217  | 0.4900   |
| Copper    | 0.093  | 0.9200   |
| Iron      | 0.113  | 0.1600   |

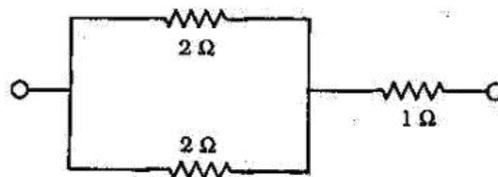
20. The table above gives the specific heat and the thermal conductivity of some substances. Based on the table, which substance requires a greater amount of heat to raise the temperature of its unit mass by one degree?
- (A) Water  
(B) Iron  
(C) Aluminum  
(D) Copper

21. A metal cube is heated in a Bunsen flame and then dropped into an insulated beaker containing water. The masses of the water, the beaker, and the cube, the initial and final temperatures of the water, and the specific heat capacities of the water and the beaker are known. Without further measurements, which of the following can be calculated?
- (A) The density of the cube  
 (B) The specific heat capacity of the cube  
 (C) The thermal conductivity of the cube  
 (D) The specific latent heat of the cube
22. In hydroelectric plants, electric energy is generated by
- (A) making the water evaporate  
 (B) distilling the water  
 (C) changing the water chemically  
 (D) making use of the power of a waterfall
23. A label of an electric stove reads "1200 watts, 110 volts." How much current will the appliance draw when it is used?
- (A)  $(1200)(110)$  amp  
 (B)  $(\sqrt{1200})(110)$  amp  
 (C)  $\frac{1200}{110}$  amp  
 (D)  $\frac{1200}{\sqrt{110}}$  amp



24. The ammeter in the circuit above should read
- (A) 0.5 amp      (C) 10 amp  
 (B) 2.0 amp      (D) 200 amp

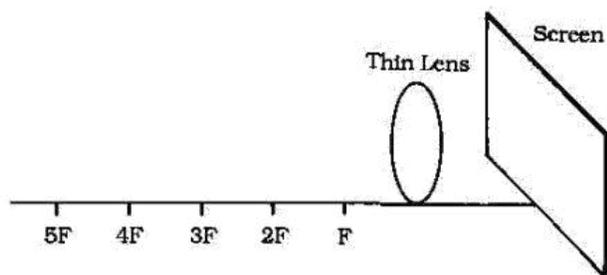
25. A capacitor acquires 0.002 coulomb when 50 volts is applied. Its capacitance is
- (A) 0.4 microfarad  
 (B) 4.0 microfarad  
 (C) 40.0 microfarad  
 (D) 400.0 microfarad
26. The power rating of an electric motor which draws a current of 5 amperes from a 240-volt line is
- (A) 12.0 kw      (C) 48.0 w  
 (B) 1.2 kw      (D) 4.8 w
27. Electroplating results in a better quality product by applying a relatively
- (A) strong current for a shorter time  
 (B) strong current for a longer time  
 (C) moderate current for a shorter time  
 (D) moderate current for a longer time
28. Which of the following is true when the magnetic flux through a coil at 50 turns is reduced from 0.5 weber to 0 weber in 0.2 second?
- (A) The induced emf in the coil is 120 volts.  
 (B) The induced emf in the coil is 125 volts.  
 (C) The emf is 220 volts.  
 (D) The emf is 225 volts.



29. The equivalent resistance of the circuit above is
- (A)  $\frac{4}{5} \Omega$       (C) 3  $\Omega$   
 (B) 2  $\Omega$       (D) 5  $\Omega$

30. What happens when a dielectric material is placed in an electric field?

- (A) The material becomes a conductor.
- (B) The material becomes polarized.
- (C) The material undergoes electrolysis.
- (D) The material remains electrically inert.



31. In the diagram above, the focal length of the lens is  $F$ . No image will be projected on the screen if a candle is placed

- (A) at  $2F$
- (B) at  $3F$
- (C) beyond  $4F$
- (D) between  $F$  and the lens

32. A lemon is colored yellow because

- (A) it absorbs only yellow light
- (B) it reflects only yellow light
- (C) only yellow light can pass through a yellow lemon
- (D) only yellow light actually hits the lemon

33. Which of the following explains the appearance of a rainbow in the sky after a rainstorm?

- (A) The white clouds are actually prisms composed of different colors.
- (B) Sunlight reflected by the ground separates into different colors in the sky.
- (C) Raindrops act as prisms that separate sunlight into its components.
- (D) None of these

34. Which of the following factors is responsible for transmitting waves?

- (A) Amplitude
- (B) Wavelength
- (C) Energy
- (D) Mass

35. How many images will be formed if a boy stands in front of two mirrors standing at a  $45^\circ$  angle to each other?

- (A) 2
- (B) 7
- (C) 8
- (D) Infinite

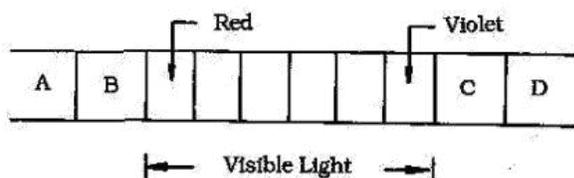
36. Which of the following will result if the number of lines in a diffraction grating of a given width is increased?

- (A) The wavelengths that can be diffracted will be shorter.
- (B) The wavelengths that can be diffracted will be longer.
- (C) The spectrum produced will be narrower.
- (D) The spectrum produced will be broader.

37. A 10-meter object is placed at a distance of 175 meters in front of a lens whose focal length is 50 meters. Which of the following describes the image formed?

- (A) It is 4 meters long and inverted.
- (B) It is 4 meters long and erect.
- (C) It is 25 meters long and inverted.
- (D) It is 25 meters long and erect.

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38. Compared to the wavelengths of visible light, the wavelengths of the radiation in A and B are
- shorter
  - longer
  - just as long
  - not measurable
39. When waves are refracted, which property changes?
- Frequency
  - Period
  - Speed
  - Amplitude
40. A certain solar cooker is made of a big concave mirror. To get the greatest amount of reflected sunlight, where should the food be placed?
- At the focus of the mirror
  - At the center of curvature of the mirror
  - Between the focus and the center of curvature of the mirror
  - Above the center of curvature of the mirror
41. An alpha particle is the same as
- |                      |                       |
|----------------------|-----------------------|
| (A) ${}^2_1\text{H}$ | (C) ${}^3_2\text{He}$ |
| (B) ${}^3_1\text{H}$ | (D) ${}^4_2\text{He}$ |
42. When a large atom such as  $\text{U}^{235}$  splits into two smaller atoms, then the combined mass of the products resulting from the splitting will be
- one-half of the original mass
  - the same as the original mass
  - one-half more than the original mass
  - two times more than the original mass
43. The atomic reaction where  ${}^{13}_6\text{B}$  becomes  ${}^{13}_7\text{C}$  results in the release of
- a neutron
  - an alpha particle
  - a beta particle
  - a gamma particle
44. An electron is travelling at 1% the speed of light. What is its kinetic energy in joules? (Speed of light =  $3 \times 10^8$  m/s)
- $4.000 \times 10^{-18}$  J
  - $4.098 \times 10^{-18}$  J
  - $4.098 \times 10^{10}$  J
  - $4.000 \times 10^{18}$  J
45. Which of the following is an implication of the formula  $E = mc^2$ ?
- Energy can be created from nothing.
  - Matter can be created from nothing.
  - Relatively large amounts of matter can be changed into relatively small amounts of energy.
  - Relatively large amounts of energy can be obtained from relatively small amounts of matter.

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**TEST C. SOCIAL SCIENCE**

1. Which of the following defines sociology?
  - (A) A study that is concerned with discovering and organizing facts, principles, and methods
  - (B) A study of human groups, their customs and institutions, and their development at all times and places
  - (C) A study that deals with the production, distribution, and consumption of wealth by human groups
  - (D) A study of human behavior, mental processes, and personality
  
2. People can best show enculturation when they learn to
  - (A) be refined
  - (B) act as people
  - (C) love one another
  - (D) talk, act, and think in acceptable ways
  
3. Proverbs often provide useful insights into a people's
  - (A) value system
  - (B) political processes
  - (C) legal processes
  - (D) value origins
  
4. Which of the following situations indicate an open-class society?
  - I. A member of the minority group becomes the president of a big business enterprise.
  - II. An outcast was put to death for trying to approach a member of the ruling class.
  - III. A son inherits the lowly job of his father in spite of his superior talent and interest in another occupational field.
  - IV. A boy from the elite group marries the girl he loves from the working class.
  - (A) I and III only
  - (B) I and IV only
  - (C) I, II, and III only
  - (D) II, III, and IV only
  
5. Which of the following examples of social norms are folkways?
  - I. Going to the cemetery to visit the dead on All Saints' Day
  - II. Performing one's duties as head of the family
  - III. Showing compassion for unfortunates in society
  - IV. Santacruzán in May
  - (A) I and IV only
  - (B) I, II, and III only
  - (C) II, III, and IV only
  - (D) I, II, III, and IV
  
6. Which of the following refer to patterns of beliefs that serve to guide, control, and regulate conduct?
  - (A) Values
  - (B) Norms
  - (C) Mores
  - (D) Folkways

7. Any human action which is considered sufficiently out of the ordinary so as to be regarded as unique or unprecedented is
- a deviant act
  - a diffusion
  - an innovation
  - an invention
8. The authority fostering belief in the competence of the individuals discharging statutory obligation is
- charismatic authority
  - traditional authority
  - legal authority
  - functional authority
9. Changes in culture are said to be endogenous when they
- come from within the culture
  - come from outside of one's culture
  - do not affect the culture
  - drastically destabilize culture
10. Which of the following is considered the most valid criticism of Marxist's model of society?
- Polarization of society into two conflicting groups
  - Emphasis on class dictatorship
  - Overemphasis on the importance of economic class to explain historical trends
  - The forces that reduce the polarization of classes
11. All of the following are examples of a sanction EXCEPT
- slapping the palms of a bad boy
  - sentencing a murderer to death
  - confessing a crime to authorities
  - getting a failing mark for cheating in exams
12. Which instance supports the notion that culture is learned?
- A vegetarian had to eat pork because there was nothing else to eat.
  - A Visayan girl became fluent in Tagalog after a few years stay in Manila.
  - A modern Chinese woman no longer followed the practice of binding her feet because of its impracticality.
  - A child whose parents were very strict grew up to be shy and withdrawn.
13. Which of the following can be said of both comic books and da Vinci's art?
- They both illustrate some facets of man's culture.
  - They show the contrast "cultured vs. uncultured."
  - They emphasize the absence of culture.
  - They are concerned with each one's quality.
14. When faced with a tragic situation, women are allowed to express their grief freely while men are expected to be quiet and stoic. This illustrates a
- norm
  - value
  - more
  - folkway
15. Ethnic minorities, adolescent gangs, religious groups, and exclusive clubs for the elite are examples of groups usually present in complex societies. They exhibit their own peculiar or unique behavior which is tolerated by the greater society as long as they do not endanger societal values. These groups fall under a category called
- institution
  - kinship
  - subculture
  - community

16. According to Pepinsky, which of the following is the most effective form of social control among Chinese communists?
- (A) Group manipulation of guilt and shame
  - (B) Surveillance system
  - (C) Party directives
  - (D) Written laws
17. Which of the following is NOT a characteristic of bureaucracy?
- (A) Specialization
  - (B) Chain of command
  - (C) Informality and autonomy
  - (D) Merit appointment and job tenure
18. The primary function of religion in human societies is to
- (A) establish an orderly relationship between man and his surroundings
  - (B) help people understand the existence of both good and evil
  - (C) allay man's fears and anxieties over unexplainable phenomena
  - (D) provide a way for man to be able to communicate with God
19. Which of the following is NOT true of the relationship among members of large secondary groups?
- (A) Primary relations tend to persist in the form of intimate cliques.
  - (B) There is emphasis on the efficiency by which people accomplish their jobs.
  - (C) It is unlikely that every member is aware of every other member.
  - (D) The goal is to provide for the personal needs of the members.
20. Which of the following conditions is true under the fascist system?
- (A) Labor unions are independent and are not under state influence.
  - (B) Private ownership of business by individuals is permitted.
  - (C) Business is owned by the government but leased to private individuals.
  - (D) The government owns and runs all businesses.
21. Since the process of social interaction conditions an individual to accept his social class, then its effect on social classes is
- (A) modifying
  - (B) preserving
  - (C) replacing
  - (D) reordering
22. The caste system generally differs from the class system because the former is
- (A) more complex
  - (B) less rigid
  - (C) more rigid
  - (D) less ranked
23. Archaeologists have found evidence to show the widespread use of local pottery wares throughout the Philippines during the later part of the New Stone Age. This would imply that prehistoric Filipinos must have
- (A) already discarded their use of stone tools
  - (B) developed new ways of preparing food
  - (C) discovered clay deposits throughout the country
  - (D) had enough food and water receptacles for their needs

24. Which of the following is true of stereotypes?
- (A) They usually give an accurate account of the personal behavior of members of a group.
  - (B) Knowledge of stereotypes leads to more effective responses.
  - (C) They are always based on empirical research.
  - (D) Many people interact initially with the stereotype rather than with the true person.
25. Which of the following descriptions refer(s) to discovery?
- (A) Combining known elements to produce something new
  - (B) Spread of cultural elements from one individual or group to another
  - (C) Initial awareness of existing but unobserved elements of nature
  - (D) All of these



26. Which of the following is the best statement that can be derived from the illustration above?
- (A) The language we use for things can also influence the way we think about it.
  - (B) Signs are used to represent a situation and to influence action.
  - (C) It is important to study the meaning of language.
  - (D) It is necessary to identify the problem in order to arrive at a solution.

27. If one could influence the bending of a metal rod by merely thinking about it, this would be an example of
- (A) clairvoyance
  - (B) psychokinesis
  - (C) precognition
  - (D) telepathy
28. When a person under stress slips back to an earlier psychosexual level, the mechanism involved is
- (A) fixation
  - (B) identification
  - (C) repression
  - (D) regression
29. A child was presented a very detailed picture for a short time. When the picture was removed, the child was able to describe the picture to the least detail. This illustrates the phenomenon called
- (A) illusion
  - (B) hallucination
  - (C) auditory imagery
  - (D) eidetic imagery
30. Mark is a young man who tends to withdraw from others. He has flight of ideas and often shows inappropriate affect. He claims to hear voices calling him "Jesus - The Savior." Most probably, Mark is exhibiting symptoms of
- (A) affective disorder
  - (B) generalized anxiety
  - (C) panic reaction
  - (D) schizophrenia
31. What is the synaptic transmitter responsible for inhibiting the sensation of pain?
- (A) Dopamine
  - (B) Epinephrine
  - (C) Enkephalin
  - (D) Thorazine

32. The minimum intensity that a stimulus must achieve before it can be perceived is known as
- minima
  - subliminal
  - percept
  - threshold
33. According to Piaget's stages of cognitive growth, an adult who makes decisions based on what fortune tellers tell him is functioning at the
- operational level
  - sensorimotor level
  - preoperational level
  - formal operational level
34. Under relaxed circumstances, most people remember uncompleted tasks better than they do completed tasks. This is known as the
- von Restorff effect
  - Zeigarnik effect
  - Greenspoon effect
  - Muller-Lyer illusion
35. Which of the following is NOT a Gestalt principle of perceptual organization?
- Proximity
  - Continuation
  - Differentiation
  - Closure
36. Which parent is most likely to produce a competent and self-reliant child?
- A loving, permissive parent who makes no demands on the child
  - A loving parent who is firm and consistent
  - A parent who provides a lot of educational toys but does not mind if the house is disorganized
  - A parent who lays down the house rules and trusts that the child will follow them
37. In which areas do man's impulses most frequently conflict with the moral standards of society?
- Sex
  - Aggression
  - Independence
  - Self-assertion
- I and II only
  - III and IV only
  - I and III only
  - II and IV only
38. After a musical concert, a man complained that he heard little of the music due to the frequent shuffling and throat-clearing in the audience. His companion, however, expressed his satisfaction over the concert. This difference in experience is related to
- subliminal threshold
  - sensory adaptation
  - selective attention
  - just-noticeable difference
39. According to Roger's Self Theory, all individuals have an innate tendency to
- repress sexual urges
  - be aggressive and punish people
  - move in the direction of positive change
  - examine others' mental experiences and activities
40. A child is conditioned to fear a furry black cat. Soon, she becomes fearful of any black object. This response is an example of
- negative transfer
  - spontaneous recovery
  - operant conditioning
  - stimulus generalization
41. According to the behaviorists, phobias are learned through
- desensitization
  - modeling
  - classical conditioning
  - operant conditioning

42. Which factor may prevent diffusion of responsibility from occurring?
- (A) An ambiguous situation  
 (B) The presence of many people  
 (C) The presence of someone who initiates helping  
 (D) The occurrence of an emergency in a public place
43. Which of the following are problems in experimental research in psychology?
- I. Demand characteristics  
 II. The Hawthorne effect  
 III. The halo effect  
 IV. Random assignment
- (A) I and IV only  
 (B) II and III only  
 (C) I, II, and III only  
 (D) I, II, III, and IV
44. Which of the following best illustrates heuristic availability?
- (A) To determine whether someone is an accountant, I compare his traits to the average accountant.  
 (B) To determine whether someone is trustworthy, I try to recall instances of such behavior.  
 (C) To determine my impression of someone, I combine the available bits of information to find an average.  
 (D) To determine whether someone is trustworthy, I engage in decoding.
45. The view that psychopathology is the result of inadequate resolution of certain developmental stages rather than learned ways of behaving separates
- (A) Gestalt therapy from reality therapy  
 (B) psychoanalysis from behavior therapy  
 (C) client-centered therapy from psychoanalysis  
 (D) rational-emotive therapy from behavior therapy

| Group | Phase  |        |                 |
|-------|--------|--------|-----------------|
|       | I      | II     | III             |
| A     | Task 1 | Task 2 | Test for Task 1 |
| B     | Task 1 | Task 2 | Test for Task 2 |
| C     | Task 1 | -      | Test for Task 1 |
| D     | -      | Task 2 | Test for Task 2 |

46. In an experiment, subjects were randomly assigned to four groups and were asked to memorize a set or two sets of unrelated verbal materials. Then each group was tested for retention of the task(s). The table above shows the participation of each group. Which of the following will most probably be observed?
- (A) Retention of Task 1 will be higher for Group A than for Group C.  
 (B) Retention of Task 2 will be higher for Group B than for Group D.  
 (C) Retention of Task 1 will be lower for Group A than for Group C.  
 (D) Retention of Task 2 will be equal for both groups B and D.
47. All of the following will increase the ability of a stimulus to capture attention EXCEPT
- (A) contrast  
 (B) habituation  
 (C) intensity  
 (D) repetition

48. Learning may be more difficult for deaf children because
- (A) the hearing area in the brain is connected to the comprehension area
  - (B) they cannot imitate information immediately
  - (C) they learn a private language which affects real language
  - (D) they have to learn with a reduced level of feedback
49. In which of the following instances is projection displayed?
- (A) Letty channels her angry feelings into her bowling.
  - (B) Norie is extra sweet to her sister even though deep inside, she resents the latter's popularity.
  - (C) Romy justifies his cheating on exams by claiming that everyone else does it.
  - (D) Greg convinces himself that the girl who jilted him is not really so desirable.
50. When Rita fights with her older brother, she starts off rationally but ends up in tears, stamping her foot, or throwing objects in all directions. The defense mechanism displayed in this situation is
- (A) suppression
  - (B) repression
  - (C) regression
  - (D) projection

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## TEST D. CHEMISTRY

1. A substance that increases the rate of a chemical reaction *without being used up* in the process is called
- (A) electrolyte (C) oxidant  
(B) catalyst (D) indicator
2. If X is an element belonging to group IIIA of the Periodic Table, the formula of its oxide would be
- (A)  $X_2O$  (C)  $X_2O_3$   
(B)  $X_2O_4$  (D)  $XO_2$
3. Which of the following elements is the most electronegative?
- (A) N (C) F  
(B) C (D) O
4. Which of the following is NOT true of Group II elements, Be, Mg, Ca, Sr, Ba, and Ra?
- (A) Be is the most active metal among them.  
(B) Ra has the lowest ionization potential.  
(C) Ca is bigger than Mg.  
(D) They have relatively low electronegativities.
5. The solubility of  $KClO_3$  at  $60^\circ C$  is 25 g per 100 g of water. If at  $60^\circ C$ , 15 g of the salt is dissolved in 50 g of water, then the solution must be
- (A) unsaturated  
(B) saturated  
(C) supersaturated  
(D) diluted and unsaturated
6. A volume of 1.1 liters of  $O_2$  was collected inside a balloon at 295 K and 13.6 psi. The next day, the surrounding conditions were observed to be  $32^\circ C$  and 0.98 atm. What is the volume of the gas inside the balloon? (1 atm = 14.7 psi)
- (A) 0.107 liter (C) 10.7 liters  
(B) 1.070 liters (D) 107.0 liters
7. Which of the following solutions has a molarity different from the rest?
- (A) 6 N  $H_3PO_4$   
(B) 4 N  $Ca(OH)_2$   
(C) 8 N  $H_2C_2O_4$   
(D) 2 N  $NH_4OH$

| Element | Electronegativity |
|---------|-------------------|
| K       | 0.8               |
| Cl      | 3.0               |
| H       | 2.1               |
| O       | 3.5               |
| C       | 2.5               |
| N       | 3.0               |

8. Based on the table above, in which of the following compounds is the bonding ionic?
- (A) KCl (C)  $CH_4$   
(B)  $NH_3$  (D)  $H_2O$
9. Which of the following act as sources of energy in times of prolonged hunger and insulate the body against loss of heat?
- (A) Carbohydrates  
(B) Minerals  
(C) Proteins  
(D) Fats

10. A 100-mL solution contains 4 grams of NaOH. If 50 mL of water is added to this solution, which of the following will remain unchanged?

(A) Molarity of the solution  
 (B) Number of moles of NaOH  
 (C) Percent by weight of NaOH  
 (D) Normality of the solution

11. In NaCl, the bond between Na and Cl is

(A) hydrogen (C) covalent  
 (B) metallic (D) ionic

12. What is the normality of an acid solution if 50 mL of the solution requires 48.61 mL of 0.1879 N alkali for neutralization?

(A) 0.4000 N (C) 0.1827 N  
 (B) 0.2678 N (D) 0.1274 N

| Substance | Mass (g) | Volume (mL) |
|-----------|----------|-------------|
| K         | 10       | 20          |
| L         | 20       | 10          |
| M         | 5        | 1           |
| N         | 20       | 5           |

13. Based on the table above, which substance will float in water?

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

14. An element has three naturally occurring isotopes of masses 23.9924, 24.9938, and 25.9898. These have abundances of 78.6%, 10.1%, and 11.3%, respectively. What is the average atomic mass of this element?

(A) 28.6 (C) 24.3  
 (B) 25.2 (D) 22.4

15. Oxides of nonmetals with water form acids while oxides of metals with water form bases. Which of the following will be acidic in water?

(A) Carbon dioxide  
 (B) Calcium oxide  
 (C) Barium oxide  
 (D) Magnesium oxide

| Sample | Weight of A (g) | Weight of B (g) |
|--------|-----------------|-----------------|
| T      | 7               | 12.5            |
| V      | 28              | 25.0            |
| W      | 25              | 14.0            |
| R      | 14              | 37.5            |
| S      | 14              | 25.0            |

16. Five samples containing elements A and B are analyzed. Four of the samples are pure compounds, the other is a mixture. Results of the analysis are given in the table above. Which two samples are of the same compound?

(A) T and V (C) W and R  
 (B) T and W (D) T and S

17. Fifty-four grams of a certain metal at  $98^{\circ}\text{C}$  was placed into 80 mL of water at 297 K. Assuming no heat is lost to the surrounding, what is the temperature of the water and the metal? (Specific heat of the metal =  $0.085 \text{ cal/g}^{\circ}\text{C}$ )

(A)  $280^{\circ}\text{C}$  (C)  $28^{\circ}\text{C}$   
 (B)  $35^{\circ}\text{C}$  (D)  $25^{\circ}\text{C}$

18. What is the molecular weight of an unknown gas if 200 mL of this gas diffuses through an apparatus in 180 seconds while 250 mL of  $\text{NO}_2$  under the same conditions diffuses through the same apparatus in 170 seconds?

(A) 8.97 g/mole  
 (B) 60.88 g/mole  
 (C) 80.52 g/mole  
 (D) 805.20 g/mole

28. If 40 mL of 0.100 M  $\text{KMnO}_4$  (acidified) is diluted with 160 mL of water, then the normality of the resulting solution will be

- (A) 0.0200 N      (C) 0.1000 N  
(B) 0.0250 N      (D) 0.1250 N

29. A certain endothermic reaction occurs with a decrease in entropy. Therefore, the reaction is

- (A) spontaneous at high temperatures only  
(B) spontaneous at low temperatures only  
(C) spontaneous at all temperatures  
(D) nonspontaneous at all temperatures

30. Under which condition will the change in internal energy of a system be equal to the change in enthalpy of the system?

- (A) The system evolves heat at constant pressure.  
(B) The system absorbs heat while expanding to a vacuum.  
(C) The system absorbs heat at constant temperature and pressure.  
(D) The system evolves heat while its volume decreases against an opposing pressure of 1 atm.

31. A carcinogenic air pollutant from automotive sources and cigarette smoke is

- (A) aflatoxin      (C) urethane  
(B) ammonia      (D) benzopyrene

32. How many grams of NaOH is dissolved in 200 mL of a 1 M solution? (Atomic weights: Na = 23, O = 16, H = 1)

- (A) 1 g      (C) 40 g  
(B) 8 g      (D) 200 g

| Substance | Soluble in |         | Combustible | Melting Point |
|-----------|------------|---------|-------------|---------------|
|           | Water      | Ethanol |             |               |
| K         | No         | Yes     | Yes         | 10°C          |
| L         | Yes        | No      | No          | 300°C         |
| M         | No         | Yes     | No          | 50°C          |
| N         | No         | No      | Yes         | 300°C         |

33. Based on the data above, which substance is most likely an organic compound?

- (A) K      (C) M  
(B) L      (D) N

34. An analysis of a compound shows that it contained 78.2% B and 21.8% H and had a molecular weight of 27.6. What is the molecular formula of the compound? (Atomic weights: H = 1, B = 10.8)

- (A)  $\text{BH}_3$       (C)  $\text{B}_3\text{H}_9$   
(B)  $\text{B}_2\text{H}_6$       (D)  $\text{B}_2\text{H}_5$



35. In the reaction above, 3 moles of  $\text{C}_2\text{H}_2$  is reacted with 8 moles of  $\text{O}_2$ . Which of the following is the limiting reagent in the reaction?

- (A)  $\text{C}_2\text{H}_2$       (C)  $\text{O}_2$   
(B)  $\text{CO}_2$       (D)  $\text{H}_2\text{O}$

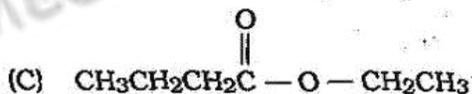
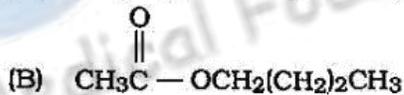
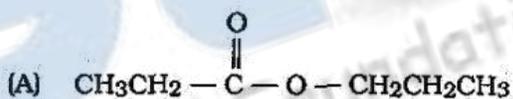
36. A component of curing salts which is used to preserve meat, acts as a color fixative, and has mutagenic effect is

- (A) NaCl      (C) KCl  
(B)  $\text{NaCO}_3$       (D)  $\text{NaNO}_2$

43. Which of the following technical grade laboratory solvents are most likely to contain an appreciable amount of water due to hydrogen bonding?

I. Diethyl ether  
 II. Hexane  
 III. Acetone  
 IV. Methanol

- (A) II and III only  
 (B) I, II, and IV only  
 (C) I, III, and IV only  
 (D) I, II, III, and IV
44. Which of the following descriptions is true about the structure of a compound with a molecular formula  $C_6H_{10}$ ?
- (A) It has a ring and a double bond.  
 (B) It has two rings and a double bond.  
 (C) It has a double bond and a triple bond.  
 (D) It has a ring and a triple bond.
45. A liquid,  $C_6H_{12}O_2$ , was hydrolyzed with water and acid to give an acid A and an alcohol B. Oxidation of B with chromic acid produced A. The formula of the original compound is



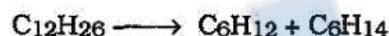
46. Which of the following is an acid?
- (A)  $C_2H_5OH$       (C)  $CH_3CH_2COOH$   
 (B)  $CH_3OCH_3$     (D)  $CH_3COCH_3$

47. An example of a carbohydrate is

(A)  $CHOOH$       (C)  $C_5H_5OH$   
 (B)  $(C_6H_{10}O_5)_x$     (D)  $CH_4$

48. Which of the following compounds has a bond formed by overlap of  $sp-sp^3$  hybrid orbitals?

(A)  $CH_3 - C \equiv C - H$   
 (B)  $H - C \equiv C \equiv H$   
 (C)  $CH_3CH_2CH_2CH_3$   
 (D)  $CH_2 = CH = CH = CH_2$



49. Which of the following processes is represented by the reaction above?

(A) Substitution  
 (B) Synthesis  
 (C) Cracking  
 (D) Polymerization

50. Which of the following compounds has the largest dipole moment?

(A)  $CCl_4$   
 (B)  $O = C = O$   
 (C) *trans*  $ClCH = CHCl$   
 (D) *cis*  $ClCH = CHCl$

**STOP!**  
**CLOSE YOUR BOOKLET.**  
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**INSTRUCTIONS.**

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