

ENTRANCE TEST
UNIVERSITAS INDONESIA

SIMAK UI

NATURAL SCIENCES TEST

- Maths for Natural Sciences
- Biology
- Physics
- Chemistry
- Integrated Natural Sciences

421



Universitas Indonesia
2012

GENERAL INSTRUCTIONS

1. Before you begin work on the test, check the number of questions and the page numbers in the test booklet.
The booklet consists of 12 pages.
2. Write your student test number on the space provided in the answer sheet.
3. Write the code of the test booklet on the space provided in the answer sheet. The code of this test booklet is: **421**
4. Read carefully each and every instruction on how to answer the questions.
5. Think carefully before answering every question, because incorrect answers will deduct points from your score (scoring system: correct +4, blank 0, incorrect -1).
6. Work on questions you find easy first, then continue with harder questions, so that all questions are answered.
7. Write your answers in the answer sheet provided.
8. For scrap paper, make use of the empty space in your test booklet and **do not use your answer sheet** as your answers will then fail to be processed
9. During the test, you are not allowed to ask or seek explanation about the questions being tested to anyone including the test supervisor.
10. When the test is complete, you are required to stay in your seat until the test supervisor approaches you to collect the answer sheet.
11. Make sure the answer sheet is not dirty, wet, folded, and torn.

SPECIFIC INSTRUCTIONS

INSTRUCTION A:

Choose one answer that it most appropriate

INSTRUCTION B:

The questions consist of 3 parts, i.e. STATEMENT, CAUSE, and REASON that are arranged in sequence. Choose:

- (A) If the statements is correct, the reason is correct, and both show a cause and effect relationship;
- (B) If the statements is correct, the reason is correct, but both do not show a cause and effect relationship
- (C) If the statements is correct and the reason is incorrect
- (D) If the statements is incorrect and the reason is correct
- (E) If the statements and the reason are both incorrect

INSTRUCTION C:

Choose

- (A) If (1), (2), and (3) are correct
- (B) If (1) and (3) are correct
- (C) If (2) and (4) are correct
- (D) If only (4) is correct
- (E) If all of them are correct

SUBJECTS	: Maths for Natural Sciences, Biology, Physics, Chemistry, and Integrated Natural Sciences
EXAM DATE	: 1 JULY 2012
TIME	: 120 MINUTES
NO. OF QUESTIONS	: 60

Remarks	: Questions on MATHS FOR NATURAL SCIENCES number 1 to 12
	Questions on BIOLOGY number 13 to 24
	Questions on PHYSICS number 25 to 36
	Questions on CHEMISTRY number 37 to 48
	Questions on INTEGRATED NATURAL SCIENCES number 49 to 60

MATHS FOR NATURAL SCIENCES

Use **Instruction A** to answer questions number 1 to 9.

1. The following system of equations has more than one solution (x, y)

$$\begin{cases} 2ax + 6y = 5 \\ 4x + 3ay = b \end{cases}$$

The value of $a + b$, where $a, b > 0$ is

- (A) 3 (D) 14
 (B) 5 (E) 24
 (C) 7

2. If $f(x) = (x + 7)q(x) + (x + 2)$. The first multiple of $(x + 7)$ greater than $f(x)$ is

- (A) $f(x) + 1$ (D) $2f(x)$
 (B) $f(x) + 2$ (E) $2f(x) + 1$
 (C) $f(x) + 5$

3. The solution of the inequality

$${}^2\log(1 - 2\sin x) + \frac{1}{2}\log(1 + 2\sin x) \leq 0, \text{ where } 0 \leq x \leq 2\pi \text{ is}$$

- (A) $0 \leq x < \frac{\pi}{6} \cup \frac{5\pi}{6} < x \leq \pi$
 (B) $0 < x < \frac{\pi}{6} \cup \frac{5\pi}{6} < x < \frac{7\pi}{6}$
 (C) $0 < x < \frac{\pi}{6} \cup \frac{5\pi}{6} < x < \frac{7\pi}{6}$
 (D) $0 \leq x \leq \pi$
 (E) $0 < x < \frac{\pi}{6} \cup \frac{5\pi}{6} < x < \pi$

4. Given a geometric sequence $\frac{1}{3}, \frac{1}{9}, \frac{1}{27}, \frac{1}{81}, \dots$. A new infinite geometric sequence is formed using some terms from the given. If the sum of the new sequence is $\frac{1}{26}$, then its ratio is

- (A) $\frac{1}{81}$
 (B) $\frac{1}{27}$
 (C) $\frac{1}{26}$
 (D) $\frac{1}{9}$
 (E) $\frac{1}{3}$

5. Given that $|\vec{a}| = 3$, $|\vec{b}| = \sqrt{7}$ and $\vec{a} \times \vec{b} = (1, 2, -3)$, the possible values of $\vec{a} \cdot \vec{b}$ are

- (A) $\{-5, 5\}$
 (B) $\{-7, 7\}$
 (C) $\{-5\sqrt{2}, 5\sqrt{2}\}$
 (D) $\{-5, 7\}$
 (E) $\{-7, 14\}$

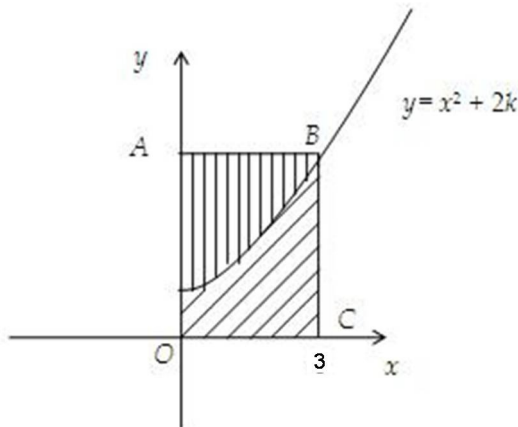
6. Suppose that $\sin x - \sin y = \sqrt{\frac{7}{3}}$ and $\cos x + \cos y = 1$. What is $\cos(x + y)$?

- (A) $\sqrt{\frac{7}{3}} - 1$
 (B) $\frac{1}{3}$
 (C) $\frac{1}{2}$
 (D) $\frac{2}{3}$
 (E) 1

7. If a, b satisfy $\lim_{x \rightarrow 0} \frac{\sqrt{ax+b}-5}{x} = \frac{1}{2}$, then the value of $a + b$ is

- (A) 5
 (B) 25
 (C) 30
 (D) 90
 (E) 125

8.



Given a rectangle $OABC$ such that the areas of the two shaded regions are equal.

The curve $y = x^2 + 2k$ intersects y -axis at

- (A) $(0, 1)$
 (B) $(0, \frac{3}{2})$
 (C) $(0, 2)$
 (D) $(0, \frac{5}{2})$
 (E) $(0, 3)$

9. A cube with side length a is sliced by a plane that passes through two diagonally opposite vertices A and C and the midpoints B and D of two opposite edges not containing A or C . What is the cosines of the angle between quadrilateral $ABCD$ and the base of the cube?

- (A) $\frac{1}{2}\sqrt{3}$
 (B) $\sqrt{3}$
 (C) $\frac{1}{3}\sqrt{6}$
 (D) $\frac{1}{2}\sqrt{6}$
 (E) $\sqrt{6}$

Use **Instruction C** to answer questions number 10 to 12.

10. The equation $2x^2 - 2(2a + 1)x + a(a - 1) = 0$ has two real roots x_1 and x_2 . The value of a such that $x_1 < a < x_2$ is

- (1) $a < -3$
 (2) $a > -3$
 (3) $a > 0$
 (4) $a < 0$

11. The height, x meters, from the ground of a swing at t seconds after the swing is released given by $x(t) = 0.7 \sin 0.5\pi t + 1.3, t \geq 0$

- (1) The swing reaches its original height for the first time 2 seconds after its release
 (2) The height of the swing when $t = 1$ is 1.3 meters
 (3) The height of the swing is greater than 1.65 meters when $\frac{1}{3} < t < \frac{5}{3}$
 (4) The minimum height reached is 0.7 meters

12. Let $f(x) = 2 - \frac{1}{|x+1|}$

- (1) Range of f is $(-\infty, 2)$
 (2) Its x -intercept is $(-0.5, 0)$ and $(-1.5, 0)$
 (3) $\lim_{x \rightarrow \infty} f(x) = 2$
 (4) Its vertical asymptote is $x = -1$

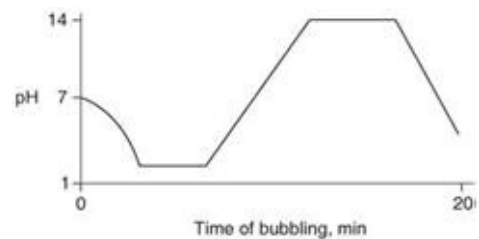
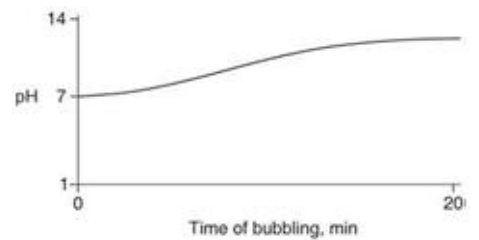
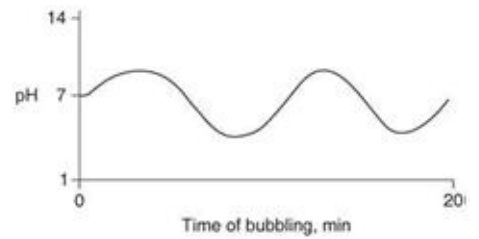
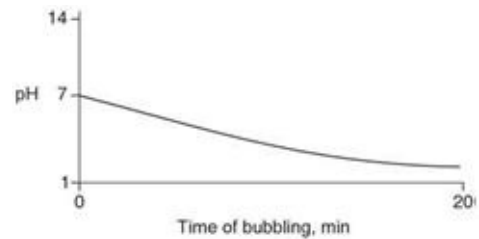
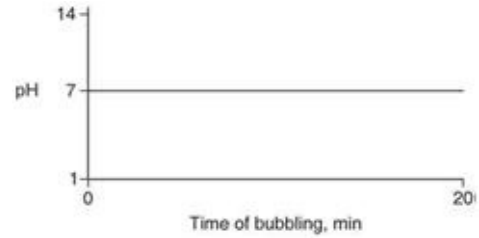
BIOLOGY

Use **Instruction A** to answer questions number 13 to 20.

13. Which of the following are products of the light reactions of photosynthesis that are utilized in the Calvin cycle?

- (A) CO_2 and glucose
- (B) H_2O and O_2
- (C) ADP, P_i , and NADP^+
- (D) ATP and NADPH
- (E) electrons and H^+

14. Carbon dioxide (CO_2) is readily soluble in water, according to the equation $\text{CO}_2 + \text{H}_2\text{O} \rightarrow \text{H}_2\text{CO}_3$. Carbonic acid (H_2CO_3) is a weak acid. If CO_2 is bubbled into a beaker containing pure, freshly-distilled water, which of the following graphs correctly describes the result?



15. If there are 20 chromatids in a cell, how many centromeres are there?
- (A) 10 (D) 40
(B) 20 (E) 80
(C) 30
16. Chromosomes first become visible during which phase of mitosis?
- (A) prometaphase (D) anaphase
(B) prophase (E) telophase
(C) metaphase
17. A sponge's structural materials (spicules, spongin) are manufactured by the
- (A) amoebocytes
(B) epidermal cells
(C) choanocytes
(D) zygotes
(E) pore cells
18. The endoskeletons of most vertebrates are composed of calcified
- (A) cartilage (D) dentin
(B) osteon (E) enamel
(C) chitin
19. Which two genera have members that can evade the human immune system by frequently changing their surface proteins?
1. *Plasmodium*
 2. *Trichomonas*
 3. *Paramecium*
 4. *Trypanosoma*
 5. *Entamoeba*
- (A) 1 and 2 (D) 2 and 4
(B) 1 and 4 (E) 4 and 5
(C) 2 and 3
20. What is the most important role of photosynthetic organisms in an ecosystem?
- (A) converting inorganic compounds into organic compounds
(B) absorbing solar radiation
(C) producing organic detritus for decomposers
(D) dissipating heat
(E) recycling energy from other trophic levels

Use **Instruction B** to answer questions number 21 to 22.

21. Hormones regulate cellular functions, and generally negative feedback regulates hormone levels.

BECAUSE

The circulating level of a hormone is held constant through a series of positive feedback loops.

22. A female pinecone is a short stem with spore-bearing appendages.

BECAUSE

A male pinecone is a short stem with spore-bearing appendages.

Use **Instruction C** to answer questions number 23 to 24.

23. Human plasma proteins include which of the following?

- (1) fibrinogen
- (2) hemoglobin
- (3) immunoglobulin
- (4) Lymphocyte

24. Which one of the following, if present in a urine sample, would likely be caused by trauma?

- (1) amino acids
- (2) glucose
- (3) proteins
- (4) erythrocytes

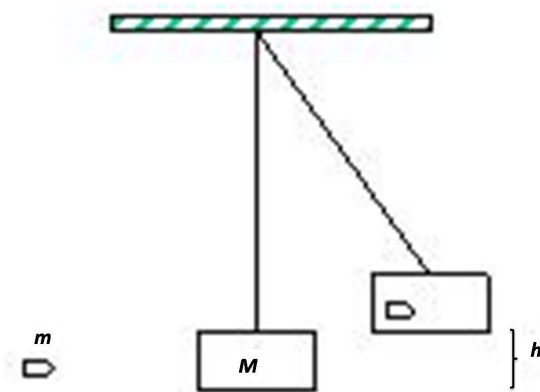
PHYSICS

Use **Instruction A** to answer questions number 25 to 36.

25. A simple pendulum has a period of 2 s and the reading on a barometer is 1 atm on the surface of the mine which has a depth of 1.5 km. At the bottom of the mine, which one of the following statements is CORRECT?

- (A) Reading on barometer greater than 1 atm and period of pendulum greater than 2 s.
 (B) Reading on barometer less than 1 atm and period of pendulum less than 2 s.
 (C) Reading on barometer less than 1 atm and period of pendulum greater than 2 s.
 (D) Reading on barometer greater than 1 atm and period of pendulum less than 2 s.
 (E) Reading on barometer greater than 1 atm and period of pendulum is 2 s.

26.



A bullet of mass $m = 0.01$ kg is fired into a ballistic pendulum of mass $M = 2.0$ kg as shown in above. The bullet remains in the block after the collision and the whole system rises to a maximum height of $h = 8$ cm. The bullet's initial speed is approximately ($g = 10 \text{ ms}^{-2}$)

- (A) 18 ms^{-1}
 (B) 80 ms^{-1}
 (C) 150 ms^{-1}
 (D) 254 ms^{-1}
 (E) 275 ms^{-1}

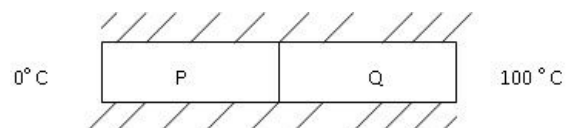
27. A hockey puck on a frozen pond is given an initial speed of 20.0 m/s . If the puck always remains on the ice and slides 115 m before coming to rest, the coefficient of kinetic friction between the puck and ice is ($g = 10 \text{ ms}^{-2}$)

- (A) 0.134
 (B) 0.144
 (C) 0.154
 (D) 0.164
 (E) 0.174

28. A sinusoidal wave travelling in the positive x direction has an amplitude of 15.0 cm , a wavelength of 40.0 cm , and a frequency of 8.00 Hz . The wave number k period of the wave is

- (A) 0.157 rad/m
 (B) 0.125 rad/s
 (C) 0.157 rad/s
 (D) 0.125 rad/m
 (E) 0.100 rad/s

29.



Two rods of equal lengths and cross-sectional areas but different materials are placed in thermal contact as shown in figure above. The thermal conductivity of Q is half that of P . The outer end of P is at 0°C and that of Q is at 100°C . What is the temperature of the interface at steady state?

- (A) 273.00 K
 (B) 296.88 K
 (C) 306.33 K
 (D) 339.66 K
 (E) 353.39 K

30. Double-slit interference is investigated using light of wavelength 600 nm . The fringe spacing is 1.44 mm . If the screen is 1.2 m away from the slits, how far apart are the slits?

- (A) 2.500 mm
 (B) 0.500 mm
 (C) 0.250 mm
 (D) 0.050 mm
 (E) 0.005 mm

31. A point source of light is placed at the bottom of a tank of water 1.00 m deep such that it emits light rays upward in all directions. A circle of light is formed by the rays that are refracted into the air and the rays outside of this circle are reflected back into the water. Given that the index of refraction of water is 1.33, the radius r of the circle at the surface of the water is approximately

- (A) 1.33 m (D) 0.75 m
 (B) 1.00 m (E) 0.50 m
 (C) 1.14 m

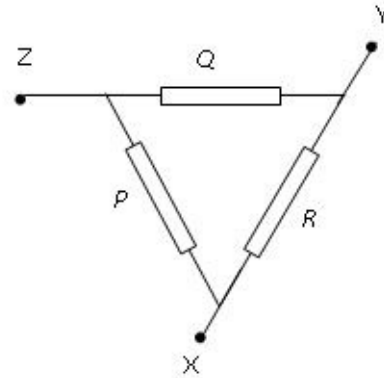
32. A 40 g ice cube at 0°C is added to 200 g of water at 20°C . The specific heat of ice is $2310\text{ J kg}^{-1}\text{C}^{-1}$, and that of water is $4200\text{ J kg}^{-1}\text{C}^{-1}$ and the specific latent heat of melting of ice is $3.36 \times 10^5\text{ J kg}^{-1}$. Calculate the final equilibrium temperature, assuming no other agents for heat exchange are present.

- (A) 275.1 K (D) 280.0 K
 (B) 276.6 K (E) 298.0 K
 (C) 277.6 K

33. A long solenoid with closely spaced turns carries a direct electric current. Each turn of wire exerts

- (A) an attractive force on the next adjacent turn.
 (B) a repulsive force on the next adjacent turn.
 (C) zero force on the next adjacent turn.
 (D) either an attractive or a repulsive force on the next adjacent turn, depending on the direction of current in the solenoid.
 (E) either an attractive or a repulsive force on the next adjacent turn, but is not depending on the direction of current in the solenoid.

34.



The diagram shows a circuit consisting of three identical resistors, P , Q and R , each of resistance $4.0\ \Omega$ and connected as shown. If 3.0 A of current flows into point X in the circuit and 3.0 A flows out at point Y , then the power generated by resistor R is approximately

- (A) 36 W (D) 4 W
 (B) 16 W (E) 2 W
 (C) 9 W

35. A small-amplitude progressive wave in a stretched string has a velocity of 10 ms^{-1} and a frequency of 100 Hz . What is the phase difference, in radians, between two points 2.5 cm apart in the string?

- (A) $\frac{\pi}{8}$
 (B) $\frac{\pi}{4}$
 (C) $\frac{3\pi}{8}$
 (D) $\frac{\pi}{2}$
 (E) $\frac{3\pi}{2}$

36. Half lives of two uranium isotopes U^{238} and U^{235} are known to be $4.5 \times 10^9\text{ yr}$ and $7.1 \times 10^8\text{ yr}$, respectively. If the earth was formed with equal amounts of the two isotopes, estimation the current age of the earth given that uranium ores are 99.29% of U^{238} and 0.71% of U^{235} is

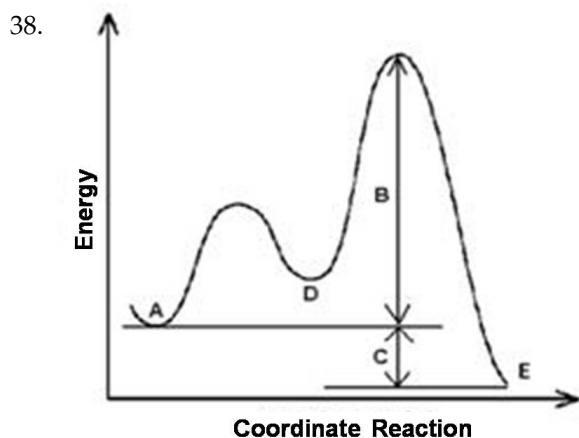
- (A) $2 \times 10^9\text{ yr}$
 (B) $4 \times 10^9\text{ yr}$
 (C) $6 \times 10^9\text{ yr}$
 (D) $8 \times 10^9\text{ yr}$
 (E) $9 \times 10^9\text{ yr}$

CHEMISTRY

Use **Instruction A** to answer questions number 37 to 45.

37. In the glycolysis process, one glucose molecule $C_6H_{12}O_6$ (s) is converted to form two molecules of lactic acid. If the enthalpy value of the glucose metabolism and lactic acid is -2808 kJ/mol and -1344 kJ/mol respectively, then the enthalpy standard of the process of glycolysis is

- (A) -120 kJ/mol
 (B) 120 kJ/mol
 (C) 0
 (D) 1464 kJ/mol
 (E) -1464 kJ/mol



From the diagram that describes mechanism reaction of A to E, which one of the following statements is INCORRECT?

- (A) Reaction is done through mechanism 2 stages
 (B) Reaction is done exothermically
 (C) D is intermediate product
 (D) ΔH reaction is as big as C
 (E) B is reaction activation energy

39. For the following zinc-lead cell:
 $Pb^{2+} (aq) + Zn (s) \rightarrow Pb (s) + Zn^{2+} (aq)$
 $E^\circ = 0.637V$

Which one of the following statements is INCORRECT related to the above cell?

- (A) In a standard condition, reaction to the right is done spontaneously.
 (B) Notation of cell is $Zn / Zn^{2+} // Pb^{2+} / Pb$.
 (C) Zinc electrode is cathode.
 (D) Lead-electrode is positive electrode.
 (E) In the equilibrium position, value of potential cell is nil.

40. Reaction $CO (g) + H_2O (g) \rightleftharpoons CO_2 (g) + H_2 (g)$ has equilibrium constant value of $K_c = 25$ at 550 K. If 0.20 mol CO and water vapor are mixed in a 5 L tank at 550 K temperature and let it reacted, how much is the CO_2 concentration gas in the equilibrium?

- (A) $1/6$ M
 (B) $1/5$ M
 (C) $1/30$ M
 (D) $1/3$ M
 (E) $2/5$ M

41. Besides ammonia, nitrogen forms three others hydride: hydrazine (N_2H_4), diazene (N_2H_2) and tetrazene (N_4H_4). The sequence of the right long bond of N-N of the compounds is

- (A) $N_2 > N_2H_2 > N_2H_4$
 (B) $N_2H_4 > N_2H_2 > N_2$
 (C) $N_2 > N_2H_4 > N_2H_2$
 (D) $N_2H_4 > N_2 > N_2H_2$
 (E) $N_2H_2 > N_2H_4 > N_2$

42. Process that is involved in the occurrence of corrosion is

- (A) oxidation
 (B) reduction
 (C) oxidation and reduction
 (D) electrolysis
 (E) galvanization

43. Which pair of the sequence of relative boiling points of the following compounds is INCORRECT?

- (A) $O_2 > NO$
 (B) $C_2H_5OH > CH_3OCH_3$
 (C) $CH_3COOH > C_4H_{10}$
 (D) $ICl > Br_2$
 (E) $CCl_4 > CH_4$

44. The right set of quantum number (n, l, m_l, m_s) for the last electron at ion As^{3-} is
 (atom number As = 33)

- (A)

3	2	0	-1/2
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 (B)

4	0	0	-1/2
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 (C)

4	1	-1	+1/2
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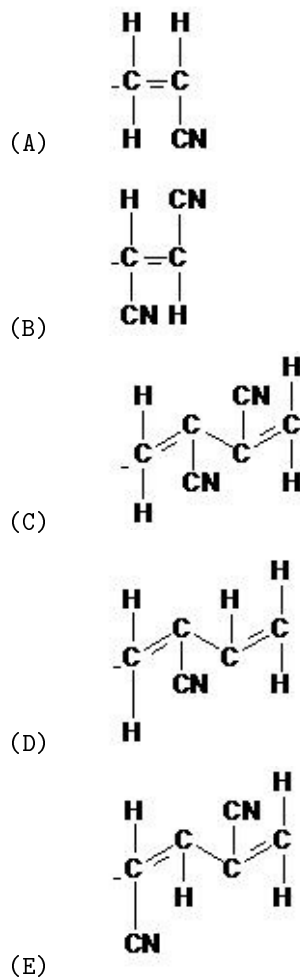
 (D)

3	1	-1	+1/2
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 (E)

4	2	-1	-1/2
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45. Acrylic fiber compound is addition polymer, some of this polymer chains are shown below. Find the monomer that forms the above polymer compound.



Use **Instruction C** to answer questions number 46 to 48.

46. From the following compounds which one can be used as elements to make 2-butanol through one stage reaction?

- (1) $H_3CCH=CHCH_2$
 (2) $H_3CCH_2CH=CH_2$
 (3) $H_3CCH_2CH(Br)CH_3$
 (4) $H_3CCH_2CH_2CH_2Br$

47. Aluminum is an element that belongs to group IIIA (13) in period 3. The following statement(s) is/are CORRECT about aluminum

- (1) easier to corrode compared to iron
- (2) easier to be oxidized to form Al^{3+} compared to iron
- (3) will not react with oxygen in the air; therefore, it can stand against corrosion
- (4) produced through electrolysis process

48. In saturated solution with temperature of $25\text{ }^{\circ}\text{C}$ and pressure of 1 bar, which one of the following conditions will increase the solution?

Dissolved Substance Process/Condition

- (1) $\text{CO}_2(\text{g})$ increase in volume
- (2) $\text{NaCl}(\text{s})$ increase in pressure
- (3) $\text{N}_2(\text{g})$ decrease in pressure
- (4) $\text{O}_2(\text{g})$ decrease in temperature

INTEGRATED NATURAL SCIENCES

Alfalfa

Alfalfa (*Medicago sativa*) is widely grown throughout the world as food for cattle because of its high protein content and highly digestible fiber. Historically, alfalfa was cultivated by the Arabic Spain and had a reputation as the fodder for their horses. Alfalfa was brought to the USA by Spanish colonizers. Since then a rapid and extensive introduction of the crop over the Western US has begun.

Like other legumes, its root nodules contain bacteria, *Sinorhizobium meliloti*, with the ability to fix nitrogen, producing a high-protein feed regardless of available nitrogen in the soil. In biological nitrogen fixation, nitrogen is converted into ammonia by the aid of an enzyme called nitrogenase in an acidic condition. One mole of hydrogen is released for every mole of nitrogen converted. Its nitrogen-fixing abilities (which increases soil nitrogen) and its use as an animal feed greatly improve agricultural efficiency.

Alfalfa can be sown in spring or fall, and does best on well-drained soils with a neutral pH of 6.8–7.5. Alfalfa requires sustained levels of potassium and phosphorus to grow well. It is moderately sensitive to salt levels in both the soil and in irrigation water, although it continues to be grown in the arid Southwestern United States, where salinity is an emerging issue.

Greenhouse experiments were carried out to evaluate the effect of different soil-based countermeasures on radiocaesium transfer to alfalfa grown on artificially contaminated loamy-clayey soil. Various rates of potassium and ammonium supplements were applied, and the uptake of radiocaesium by control and treated alfalfa plants was monitored during four growth periods. Transfer factors ranging between 0.06 and 0.02 were determined for control plants. Application of potassium at rates higher than 0.1 meq per 100 g soil was found to suppress radiocaesium uptake, the effect being more pronounced at increasing fertilization rates. On the contrary, soil treatment with ammonium enhanced the bio-accumulation of radiocaesium, indicating that Cs⁺ ions, previously unavailable to plant roots, were released from soil particles.

Use **Instruction A** to answer questions number 49 to 52.

49. The number of electrons involved in the biological fixation of nitrogen is

- (A) 2 (D) 8
(B) 4 (E) 5
(C) 6

50. According to the text, alfalfa can be cultivated in the soil which has the hydrogen concentration of

- (A) 1×10^{-4} M
(B) 1×10^{-5} M
(C) 1×10^{-6} M
(D) 1×10^{-7} M
(E) 1×10^{-8} M

51. The number of words that can possibly be made from all of the letters in the word 'alfalfa' is

- (A) 35 (D) 210
(B) 105 (E) 245
(C) 140

52. The physics characteristic of caesium-137 have

- (A) 82 neutrons and 55 protons
(B) 82 protons and 55 electrons
(C) 82 electrons and 55 protons
(D) 82 electrons and 55 neutrons
(E) 82 protons and 55 neutrons

Use **Instruction B** to answer questions number 53 .

53. For their growth, alfalfa requires potassium and phosphorus enriched soil.

BECAUSE

Both minerals are essential for the plant growth and can be categorized as macro nutrient.

Ocean Carbon Sink

Oceans are at present CO₂ sinks, and represent the largest active carbon sink on Earth, absorbing more than a quarter of the carbon dioxide that humans put into the air. On longer timescales they may be both sources and sinks. During ice ages CO₂ levels decrease to 180 ppmv (part per million by volume), and much of this is believed to be stored in the oceans. As ice ages end, CO₂ is released from the oceans and CO₂ levels during previous interglacials have been around 280 ppmv. This role as a sink for CO₂ is driven by two processes, the solubility pump and the biological pump.

The former is primarily a function of differential CO₂ solubility in seawater and the thermohaline circulation. Dissolved carbon dioxide in the ocean occurs mainly in three inorganic forms: free aqueous carbon dioxide (CO₂(aq)), bicarbonate (HCO₃⁻), and carbonate ion (CO₃²⁻). A minor form is true carbonic acid (H₂CO₃) whose concentration is less than 0.3% of free aqueous carbon dioxide concentration.

The latter is the sum of a series of biological processes that transport carbon (in organic and inorganic forms) from the surface euphotic zone to the ocean's interior. A small fraction of the organic carbon transported by the biological pump to the seafloor is buried in anoxic conditions under sediments and ultimately forms fossil fuels such as oil and natural gas.

Use **Instruction A** to answer questions number 54 .

54. In the ocean, carbonate ion can be precipitated to its calcium salt liberating carbon dioxide according to the reaction $\text{Ca}^{2+} + 2\text{HCO}_3^- \rightarrow \text{CaCO}_3 + \text{CO}_2 + \text{H}_2\text{O}$. The solubility product constant value (K_{sp}) for this salt is 4.9×10^{-9} at 25 °C. What is the solubility (mol/L) of calcium carbonate in the seawater omitting the common ion effect

- (A) $\sqrt{7} \times 10^{-5}$
- (B) 7×10^{-5}
- (C) $\sqrt{7} \times 10^{-4.5}$
- (D) $(1.23)^{1/3} \times 10^{-3}$
- (E) $(4.9)^{1/3} \times 10^{-3}$

Use **Instruction B** to answer questions number 55 .

55. Diatome is an organism that takes the most advantage of dissolved CO₂ in the ocean.

BECAUSE

Diatome is an organism that has chlorophyll and can be classified as chlorophyta.

Use **Instruction C** to answer questions number 56 to 57.

56. Which one of the followings will take the advantage of dissolved CO₂ in the ocean?

- (1) phytoplankton for photosynthesis
- (2) porifera to make spicula
- (3) mollusca to make shell
- (4) anthozoa for reef building

57. Thermohaline is attributed to

- (1) temperature
- (2) salt contents
- (3) density of sea water
- (4) salinity

On The Alert of Dengue Fever

Dengue fever is mostly spread in tropical and sub-tropical areas. Asia ranks first in the number of people who suffer from dengue fever every year. World Health Organization (WHO) recorded that from 1968 to 2009 Indonesia had the highest case of dengue fever in South East Asia. Approximately 95% of the people who suffered from dengue fever were children under 15 years old (source: *Magister epidemiologi UNHAS*).

In South Sulawesi, according to a report from *Subdin P2PL* year 2003, there were 2,636 people who suffered from dengue fever in 26 regencies/cities and 39 died with the case fatality rate (CFR) is 1.48%. In addition there were 82 extraordinary circumstances with 495 people suffered from the disease with 19 people died (CFR = 3.84%). If compared to dengue fever extraordinary circumstances in 2002, the number of cases increased 1.60 times and the number of people who suffered from the disease increased 4.21 times whereas the number of people who died increased by 1.97%. In the meantime for 2004, it was reported there were 2,598 people suffered from dengue fever (including data from West Sulawesi) and 19 people died (CFR = 0.7%). Combating dengue fever was done by fogging, exterminating of mosquito breeding ground including exterminating of mosquito larvae by using abate. Dengue fever usually occurs between the months of January and April, June, October and December (entering rainy season).

Use **Instruction A** to answer questions number 58 to 59.

58. The total number of extraordinary cases due to dengue fever in South Sulawesi in 2002 was
- (A) 131 cases (D) 48 cases
(B) 118 cases (E) 42 cases
(C) 51 cases
59. The number of people suffered and died due to dengue fever in South Sulawesi Province in 2002 was
- (A) 131 people and 37 people
(B) 118 people and 10 people
(C) 101 people and 42 people
(D) 51 people and 39 people
(E) 42 people and 21 people

Use **Instruction C** to answer questions number 60 .

60. The unit of a physical quantity that can explain why mosquitoes stay atop of liquid and do not immerse in liquid is
- (1) Newton per meter
(2) Erg per cm
(3) Dyne per cm
(4) Joule per m