Student Test Number : ..... Student Name : .....

UNIVERSITAS INDONESIA

Veritas, Probitas, Iustitia

NATURAL SCIENCES TEST

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

SIMAK UI

ENTRANCE TEST

UNIVERSITAS INDONESIA

2015

For Validation Purpose, Please Return The Exam Book.

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 a front page, a general instructions page, an answer sheet, and 10 question pages.
2. The answer sheet attached to this booklet can only be used for this test booklet. If you need a new answer sheet, you should use the test booklet which the answer sheet was attached.
3. You have to take the answer sheet from the test booklet. If the top left of the answer sheet is damaged or torn, the answer sheet still can be processed.
4. Write your student test number on the space provided in the answer sheet.
5. Read carefully each and every instruction on how to answer the questions.
6. Think carefully before answering every question, because an incorrect answer will deduct 1 point from your total score (scoring system: correct +4, blank 0, incorrect –1).
7. Work on questions you find easy first, then continue with harder questions.
8. Write your answers on the answer sheet provided.
9. Since scrap paper is not provided, you can make use of the empty space in your test booklet to do calculations. **Do not use the empty space on your answer sheet**.
10. During the test, you are not allowed to ask or seek explanation about the questions being tested to anyone including the test supervisor.
11. When you have finished doing the test, you are required to stay in your seat until the test supervisor approaches you to collect the answer sheet.
12. Make sure the answer sheet is not dirty, wet, folded, and torn.

SPECIFIC INSTRUCTIONS

INSTRUCTION A:
Choose the best answer.

INSTRUCTION B:
Each question consists of 3 parts, i.e. STATEMENT, CAUSE, and REASON that are arranged in sequence. Choose:

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

Tear Here

Answer Sheet
University of Indonesia's Entrance Test (SIMAK UI)

D3 S1

STUDENT NAME

STUDENT TEST NUMBER

DATE OF BIRTH (ddmmyyyy)

Hereby I declare that the data provided in this form are correct. I agree that if I violate the above statement, this answer sheet will not be processed.

Signature

One Two

This answer sheet can only be used with its paired test book. Use 2B pencil to answer the questions and use a pen when you write your signature.

01 A B C D E	21 A B C D E	41 A B C D E	61 A B C D E	81 A B C D E
02	22	42	62	82
03	23	43	63	83
04	24	44	64	84
05	25	45	65	85
06	26	46	66	86
07	27	47	67	87
08	28	48	68	88
09	29	49	69	89
10	30	50	70	90
11	31	51	71	91
12	32	52	72	92
13	33	53	73	93
14	34	54	74	94
15	35	55	75	95
16	36	56	76	96
17	37	57	77	97
18	38	58	78	98
19	39	59	79	99
20 A B C D E	40 A B C D E	60 A B C D E	80 A B C D E	100 A B C D E

SIMAK UI

V(D3) S1R S1P Pro Sp. S2 S3

S2 S3

KKI NS

SUBJECTS	:	Mathematics for Natural Sciences, Biology, Physics, Chemistry, and Integrated Natural Sciences
EXAM DATE	:	7 JUNE 2015
TIME	:	120 MINUTES
NO. OF QUESTIONS	:	60

Notes	:	Questions on MATHEMATICS FOR NATURAL SCIENCES numbers 1 to 12
		Questions on BIOLOGY numbers 13 to 24
		Questions on PHYSICS numbers 25 to 36
		Questions on CHEMISTRY numbers 37 to 48
		Questions on INTEGRATED NATURAL SCIENCES numbers 49 to 60

MATHEMATICS FOR NATURAL SCIENCES

*Use **Instruction A** to answer question(s) number* 1 to 12.

1. The number of komodos in a flock increases so that the difference between the population in year $n+2$ and year n is directly proportional to the population in year $n+1$. If the population in year 2012, 2013 and 2015 were 13, 20 and 41, respectively, then the sum of the population in 2014 and 2015 is ... .

   (A) 65
   (B) 67
   (C) 69
   (D) 71
   (E) 73

2. Consider the system
   $x^2 + y^2 = z$
   $2x + 2y + z = k,$
   the value of $xy + zk$ for which the system has a unique solution is ... .

   (A) -3
   (B) -2
   (C) 2
   (D) 3
   (E) 5

3. When $x^3 + mx^2 - 2mx + 1$ is divided by $x-1$ the quotient is $f(x)$ and the remainder is R_1. When $x^3 + mx^2 - 2mx + 1$ is divided by $x+1$ the quotient is $g(x)$ and the remainder is R_2. If $R_1 = R_2$, then m is ... .

   (A) 0
   (B) $\frac{1}{2}$
   (C) $\frac{3}{4}$
   (D) $\frac{3}{2}$
   (E) 4

4. The solution set of the inequality
   $\sqrt{\log_2 x - 1} + \frac{1}{2}\log_{0.5}(x^3 + 2) > 0$ is ... .

   (A) $(2,3]$
   (B) $[2,4)$
   (C) $(0,1]$
   (D) $[-1,1)$
   (E) $[2,3)$

5. The sequence $u_1, u_2, u_3, \ldots$ satisfies $u_1 = 13, u_7 = 33$ and for all $n \geq 3$, u_n is the average of the first $n-1$ terms. The value of u_2 is ... .

   (A) 33
   (B) 46
   (C) 53
   (D) 59
   (E) 66

6. Let $A = \begin{bmatrix} a & b \\ c & d \end{bmatrix}, B = \begin{bmatrix} 5 & 3 \\ 3 & 2 \end{bmatrix}, D = \begin{bmatrix} 1 & 0 \\ 0 & 2 \end{bmatrix}$. If $A = BDB^{-1}$, then $A^3 =$ ... .

   (A) $\begin{bmatrix} -8 & 15 \\ -6 & 11 \end{bmatrix}$
   (B) $\begin{bmatrix} -62 & 105 \\ -42 & 71 \end{bmatrix}$
   (C) $\begin{bmatrix} -5 & 24 \\ 3 & 6 \end{bmatrix}$
   (D) $\begin{bmatrix} 62 & -105 \\ 42 & -71 \end{bmatrix}$
   (E) $\begin{bmatrix} 87 & -135 \\ 54 & -89 \end{bmatrix}$

7. Let θ be an angle such that

$$\tan 4\theta = \frac{\cos\theta - \sin\theta}{\cos\theta + \sin\theta}.$$

Suppose $\theta = x^\circ$ for some positive real number x, the smallest possible value of x is ... .

(A) 5
(B) 9
(C) 12.5
(D) 14
(E) 45

8. If $\sin\theta - \cos\theta = \frac{\sqrt{6}-\sqrt{2}}{2}$, $0 \le \theta \le \frac{\pi}{2}$, then the value of $\sin^3\theta - \cos^3\theta$ = ...

(A) $\frac{1}{2}\sqrt{2}$
(B) $\frac{1}{2}\sqrt{3}$
(C) $\sqrt{2}$
(D) 2
(E) 12

9. A line $x = k$ intersects the graph $y = \log_3 x$ and the graph of $y = \log_3(x+2)$. The distance between the points of intersection is 0.5. Given that $k = a + \sqrt{b}$, where a and b are integers, then $b - a$ = ...

(A) -2
(B) -1
(C) 0
(D) 1
(E) 2

10. The graph $y = a\sqrt{1-bx}$, where a and b are constants, has a tangent with equation $4x+3y = 10$ at $x = -2$, then the value of $a+b$ is ... .

(A) 4
(B) 5
(C) 6
(D) 7
(E) 8

11. A function has slope function $y = 2\sqrt{x} + \frac{a}{\sqrt{x}}$ and passes through the points (0,2) and (1,4), the value of a is ... .

(A) $\frac{1}{3}$
(B) $\frac{2}{3}$
(C) $\frac{4}{3}$
(D) $\frac{1}{2}$
(E) $\frac{3}{2}$

12. Given a cube *ABCD.EFGH* with edge of length a and a rectangular pyramid *M.IJKL* inside the cube such that its base diagonal coincides with the base of the cube. The length of the edge of pyramid base is half of the length of the edge of cube base. If M is the intersection of diagonal *EG* and *HE*, the distance from the centroid of *JKM* to the plane *BCGF* is ... .

(A) $\frac{1}{12}a$
(B) $\frac{1}{4}a$
(C) $\frac{1}{3}a$
(D) $\frac{1}{2}a$
(E) $\frac{1}{6}a$

BIOLOGY

*Use **Instruction A** to answer question(s) number* 13 to 18.

13. From the following statements, the INCORRECT statement about the characteristics of the arachnids is ... .

    (A) It has antennae and mandibles.
    (B) Its body consists of a cephalothorax and an abdomen.
    (C) It has four pairs of legs.
    (D) The first pair of appendages are chelicerae
    (E) It has jointed appendages.

14. From the following statements, the TRUE statement about the flow of sap through the phloem is ... .

    (A) Sap moves through phloem under pressure
    (B) Sap moves through the phloem in one direction only: from the roots to the leaves.
    (C) Phloem sap moves through the outside of living cells.
    (D) Sugars move into the phloem sap osmotic pressure.
    (E) Sap pushes through the phloem by companion cells.

15. The term for a species evolving into a new species without a physical barrier is ... .

    (A) sympatric speciation
    (B) genetic drift
    (C) reproductive isolation
    (D) hybrids
    (E) allopatric speciation

16. From the following statements, the TRUE statement about the Collenchyma tissue is ... .

    (A) The tissue does not belong to the ground tissue system
    (B) The tissue is composed of living cells that have thin primary cell walls.
    (C) The tissue provides flexible structural support.
    (D) The tissue consisting of cells is often dead at maturity but provides structural support.
    (E) The tissue has both primary cell walls and secondary cell walls.

17. Of the following, a benefit that biodiversity of ecosystems offers which have been shown by scientists is ... .

    (A) increased resistance to invasion by nonnative species
    (B) increased productivity
    (C) increased number of predators
    (D) increased resistance to pollution
    (E) increased resistance to disease

18. DNA fingerprinting can be used ... .

    (A) to specify a certain amino acid
    (B) to separate DNA fragments
    (C) to identify individuals who have committed crimes
    (D) to identify single nucleotide polymorphisms
    (E) to sequence DNA from bacteria only

*Use **Instruction B** to answer question(s) number* 19 to 21.

19. Bottom-dwelling fishes have less gill surface area relative to their body weight than actively swimming fishes.

    BECAUSE

    The fishes need more oxygen and rapid gas exchange when doing fast swimming.

20. The phospholipid molecules in cell membrane are amphipathic.

    BECAUSE

    The hydrophilic heads of the phospholipids are in the interior and their hydrophobic fatty acid chains are at the two surfaces of the bilayer.

21. The process in which the first sperm cell from a flowering plant unites with ovum and the second fuses with stigma is called double fertilization.

    BECAUSE

    After double fertilization, the ovule develops into a seed and the surrounding ovary develops into a fruit.

*Use **Instruction C** to answer question(s) number* 22 to 24.

22. The following(s) which describe(s) the role of an endospore in bacteria is(are) ... .

    (1) a dormant state of bacteria that can survive in unfavorable conditions.
    (2) a bacterial cell that usually produces more than one endospore.
    (3) a protective covering that bacteria secrete to protect them against harsh environments.
    (4) a form of sexual reproduction in bacteria during which genetic information is exchanged.

23. Choose the one(s) refering to nondisjunction in meiosis

    (1) abnormalities, such as Down syndrome,
    (2) trisomy, in which an individual possesses an extra chromosome
    (3) Homologous chromosomes fail to move apart properly.
    (4) monosomy, in which one member of a pair of chromosomes is missing

24. Describe the structure and function of the human heart.

    (1) The heart is enclosed by a pericardium.
    (2) The sinoatrial (SA) node initiates each heartbeat.
    (3) Cardiac muscle fibers are joined by intercalated discs.
    (4) The valve between the right atrium and ventricle is tricuspid valve.

PHYSICS

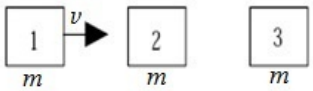
*Use **Instruction A** to answer question(s) number* 25 to 36.

25. A box of food is dropped from a rescue plane flying at a velocity of 252 km/h in the horizontal direction. In a very short time, the box is released and the rescue plane starts to accelerate horizontally at 9720 km/h^2. The box attains the ground at 4.0 s. By neglecting an air resistance, the box will reach the ground ... .

(A) directly on the released place
(B) 6.0 m in front of the released place
(C) 274 m in front of the released place
(D) 280 m in front of the released place
(E) 286 m in front of the released place

26. A stone of mass m is tied to a thread. The thread with a stone is rotated in a vertical circle with the length of the thread L. Assuming negligible air resistance, the thread's tension difference at the bottom of the circle and at the top of the circle is ... .

(A) mg
(B) $2mg$
(C) $4mg$
(D) $6mg$
(E) $8mg$

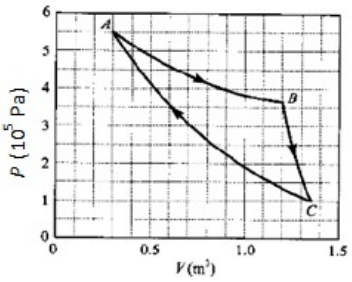
27. 

Three cars with the same mass m are shown in the accompanying figure.
Car 1 moves to the right direction with the speed v and collides with car 2. After the collision, car 1 sticks together with car 2 and both move to the right direction. They collide with car 3 in an elastic collision. The final speed of car 3 is approximately ... .

(A) 0.17 v
(B) 0.50 v
(C) 0.67 v
(D) 0.80 v
(E) v

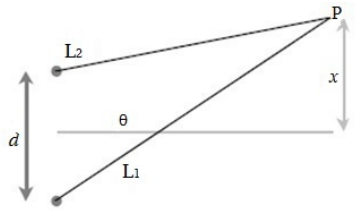
28. A 20 g piece of aluminium (c = 0.21 cal/g °C) at 90 °C is dropped into a cavity in a large block of ice at 0 °C. How much does the ice melt? (latent heat of melting of ice is 80 cal/g)

(A) 4.4 g
(B) 4.7 g
(C) 4.9 g
(D) 5.1 g
(E) 5.3 g

29. 

The network output per cycle for the thermodynamic cycle in the figure is ... .

(A) 5.0 kJ
(B) 10.0 kJ
(C) 25.0 kJ
(D) 50.0 kJ
(E) 110.0 kJ

30. 

Two origins of sounds are separated by a distance d. Both sounds are in phase. Each sound source emits a wave with wavelength λ. The path difference of the two sources is $\Delta L = L_1 - L_2$. If the interference between the two sounds at point P is always destructive, the ΔL is equal to ... .

(A) $d\sin\theta$
(B) $\dfrac{x}{L_1}$
(C) $\dfrac{x}{L_2}d$
(D) $\dfrac{1}{2}\lambda$
(E) 2λ

31. A wave is described by the equation
$y(x,t) = 0.030\sin(5\pi x + 4\pi t)$,
where x and y are in meters and t is in seconds. The $+x$ direction is to the right. The velocity of the wave is ... .

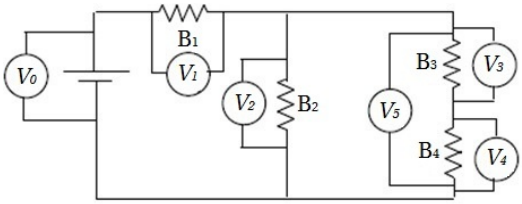
(A) 0.80 m/s to the left
(B) 1.25 m/s to the left
(C) 0.12π m/s to the right
(D) 0.80 m/s to the right
(E) 1.25 m/s to the right

32. You are given two lenses, a converging lens with focal length +10 cm and a diverging lens with focal length −20 cm. Which of the following would produce a virtual image that is larger than the object?

(A) Placing the object 5 cm from the converging lens.
(B) Placing the object 15 cm from the converging lens.
(C) Placing the object 25 cm from the converging lens.
(D) Placing the object 15 cm from the diverging lens.
(E) Placing the object 25 cm from the diverging lens.

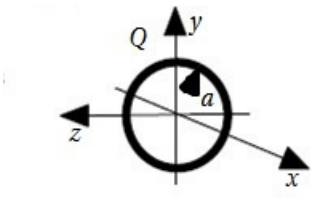
33. One particle has mass m. It travels along a way and makes an upright angle with a magnetic field. Because the particle has a positive charge q, it is influenced by Lorentz force and makes a circle of radius R with frequency f. The magnitude of the magnetic field is ... .

(A) $\frac{mf}{q}$
(B) $\frac{2\pi fm}{q}$
(C) $\frac{m}{2\pi fq}$
(D) $\frac{mf}{qR}$
(E) $\frac{mqf}{2\pi R}$

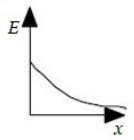
34. 

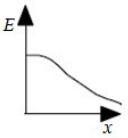
Four identical light bulbs (B_1, B_2, B_3, and B_4) and six voltmeters are connected as shown in the figure. Assuming that V is as its original reading when all bulbs are working and V' is as its reading when B_2 is caught on fire. If B_2 were to be caught on fire, the reading of V_1 is ... .

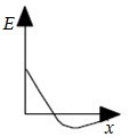
(A) $V' \gg 2V$
(B) $2V > V' > V$
(C) $V' = V$
(D) $V > V' > \frac{1}{2}V$
(E) $\frac{1}{2}V \gg V'$

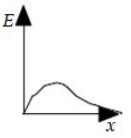
35. 

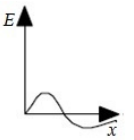
A ring of radius a lies in a $y-z$ plane. The ring contains positive charge Q that is uniformly distributed. The center of the ring is at the origin. The suitable graph that represents relation between electric field E and distance x is ... .
(see the figure)

(A) 

(B) 

(C) 

(D) 

(E) 

36. A beam with a length of L is measured by an observer when the beam moves with a speed of 1.8×10^8 m/s relative to him/her. The true statement is ... .

(A) $L = 0.60$ m
(B) $L = 0.80$ m
(C) $L = 0.90$ m
(D) $L = 1.00$ m
(E) $L \gg 1.00$m

CHEMISTRY

*Use **Instruction A** to answer question(s) number* 37 to 43.

37. Energy is emitted when the following electronic transitions occur in hydrogen, EXCEPT ... .

(A) from n = 3 to n = 1
(B) from n = 5 to n = 4
(C) from orbit which has wavelength 430 nm to one of 280 nm
(D) from an orbit of radius 4.76 Å to one of radius 0.529 Å
(E) an electron adds to the H^+ ion and ends up in the n = 4 shell

38. Consider the data in the following table.

Compound	Molar Mass	Boiling Point (°C)
NH_3	17	–33
PH_3	34	–88
AsH_3	78	–55
SbH_3	125	–17

Despite having lowest molar mass, NH_3 does not have the lowest boiling point among the equivalent compounds of the same class. This is resulted from the fact that ... .

(A) the molecules are small
(B) there are hydrogen bonds
(C) there are London forces
(D) the molecules are polar
(E) the molecules are non-polar

39. Given the following standard reduction potentials for the redox-pairs of chemical species:

Chemical species	Standard Reduction Potential: E°(V)
Pb^{2+}/Pb	–0.13
Cu^{2+}/Cu	+0.34
Zn^{2+}/Zn	–0.76
Ag^{+}/Ag	+0.80

It is possible to state that, in normal electrochemical conditions, by arranging these species in pairs in an electrochemical cell, ...

(A) lead is reduced when faced to all other elements
(B) lead is an oxidant agent when faced to silver and copper and a reducing agent versus zinc
(C) lead oxidizes when faced to silver and copper and is reduced versus zinc
(D) lead oxidizes only when faced to zinc
(E) lead is neither oxidizes nor reduced when faced to all other elements

40. The following compound which forms a cis-trans isomer is ... .

(A) $(C_5H_6)_2C{=}CH_2$
(B) $CH_3\text{-}CH{=}CH_2$
(C) $C_2H_5\text{-}CH{=}CH\text{-}CH_3$
(D) $CH_3\text{-}CH{=}C(CH_3)_2$
(E) $CH_2{=}CH_2$

41. Consider the following thermochemical compounds:
$MnO_2 + CO \rightarrow MnO + CO_2$ $\Delta H = -151$ kJ
$Mn_3O_4 + CO \rightarrow 3MnO + CO_2$ $\Delta H = -54$ kJ
$3Mn_2O_3 + CO \rightarrow 2Mn_3O_4 + CO_2$ $\Delta H = -141$ kJ
ΔH for:
$2MnO_2 + CO \rightarrow Mn_2O_3 + CO_2$
is ... .

(A) −313 kJ
(B) −291 kJ
(C) +291 kJ
(D) +313 kJ
(E) −219 kJ

42. A possible molecular formula for a gas with density 1.43 g/L at STP is ... .

(A) N_2
(B) O_2
(C) F_2
(D) Cl_2
(E) CO

43. Examine the data below for the reaction:
$2A + 2B \rightarrow C + 2D$

Trials	Initial [A]	initial [B]	rate
1.	2×10^{-3}M	0.050 M	4.0×10^{-4}M.s^{-1}
2.	4×10^{-3}M	0.100 M	3.2×10^{-3}M.s^{-1}
3.	2×10^{-3}M	0.150 M	1.2×10^{-3}M.s^{-1}

The following equation which is the correct rate equation for the reaction is ... .

(A) rate = $k[A]^2[B]^2$
(B) rate = $k[A]^2[B]$
(C) rate = $k[A][B]^2$
(D) rate = $k[A][B]$
(E) rate = $k[A]^2[B]^3$

*Use **Instruction B** to answer question(s) number* 44 to 46.

44. According to the Bronsted-Lowry theory, molecule HCO is the conjugate acid of molecule CO.

    BECAUSE

    According to Bronsted-Lowry theory, acid-base conjugate pairs consist of two molecules (species) which differ only in one hydrogen atom.

45. A mixture of 400 mL $Cd(NO_3)_2$ solution 2.0×10^{-4} M and 600 mL KIO_3 solution 1.5×10^{-3} M forms cadmium iodate. Ksp $Cd(IO_3)_2 = 2.3 \times 10^{-8}$.

    BECAUSE

    The quotient reaction of Cd^{2+} and IO_3^- is greater than is the value of Ksp.

46. The first ionization energy for a nitrogen atom is higher than is that of an oxygen atom.

    BECAUSE

    In the periodic table, the greater the nuclear charge of an atom is (getting to the right), the lower the ionization energy is.

*Use **Instruction C** to answer question(s) number* 47 to 48.

47. A sample of PF_5 is placed in a 1.00 L container at 1227°C. At such temperature, $K_c = 1.4 \times 10^{-5}$ and the equilibrium reaction is:

    $$PF_5(g) \rightleftharpoons PF_3(g) + F_2(g)$$

    (1) At this temperature, $K_p = 1.72 \times 10^{-3}$
    (2) $K_p = \dfrac{K_c}{(RT)}$
    (3) K_c depends in temperature
    (4) If the volume of the container is minimized to 0.5 L, the reaction will shift to the right

48. A solution is made of 25 g benzene dan 2.5 g X compound. Freezing point of benzene is 5.3°C, while the freezing point constant for benzene is 5.4°C/m. The CORRECT statement(s) is(are) ... .

    (1) The molecular mass of X compund is 225 g/mol
    (2) The number of molecules of X compund is 3.34×10^{21}
    (3) Freezing point depression occurs as the intermolecular force of benzenes is greater than is that of benzene X
    (4) The molality of solution is 0.222 m

INTEGRATED NATURAL SCIENCES

Potential of Marine and Fisheries in East Nusa Tenggara

The fisheries development in East Nusa Tenggara is supported by the potential ± 5,700 km length of coastline and vast ocean that reaches 15,141,773.10 ha. The potential supporting fisheries sector is the Mangrove Forest of ± 51,854.83 ha (11 species), coral reefs as much as ± 160 species from 17 families, 42,685 fisherman families, 808 coastal villages, 1,105.438 inhabitants, and 194,684 fishermen (± 9.9 % of the total population of the coastal villages) (BPS, 2012).

The potency of fisheries in the form of sustainable potency of (MSY) fish resources of East Nusa Tenggara water has reached 388.7 thousand tons/ year, with allowable amount to catch (JTB) of 292,200 tons/year. The fisheries production data of 2012 indicate the utilization rate of only about 34.97% of JTB.

Furthermore, the potential area for seaweed cultivation is 51,870 hectares, or 5% of the coastline, with the potential production of dry seaweed up to 250.00 tons/ year. From this high potency, only 5,205.70 ha areas were used in 2010 with a production of 1.7 million tons of wet seaweed. The potential area for brackish water aquaculture was 35,455 ha, and only around 1,039.80 ha were being exploited in 2012. Last, the freshwater aquaculture includes freshwater ponds of 8,375 ha with utilization level up to 1,521.00 ha. Efforts to increase the cultivated seaweed production area have been made intensively by involving community and private sectors.

*Use **Instruction A** to answer question(s) number* 49 to 51.

49. Let the productivity of fisheries in East Nusa Tenggara, the percentage of utilization, continued to increase, from year to year since the beginning of 2013 (per month) to date, in accordance to arithmetic sequence of 0.03%; 0.06%; 0.10%; 0.15%; 0.21%, respectively from the previous month, then the production of fishery obtained in January 2015 was ... .

    (A) 105,590 ton
    (B) 105,776 ton
    (C) 106,332 ton
    (D) 141,279 ton
    (E) 146,620 ton

50. Solar radiation on the surface of the sea is estimated 1.5×10^3 Watt/m^2. Energy potential of solar radiation that can be absorbed by the surface of the sea every second in East Nusa Tenggara can be estimated as ... .

    (A) 0.25×10^{14} joule
    (B) 1.25×10^{14} joule
    (C) 2.25×10^{14} joule
    (D) 3.25×10^{14} joule
    (E) 4.25×10^{14} joule

51. If one liter of brackish water contains 15 g of NaCl, then the boiling point and the freezing point of brackish water is ... .
    (T_d water = 100 °C, T_b water = 0 °C, K_f = 1.86 °C/molal, K = 0.52 °C/molal, ρ_{water} = 1 g/mL)

    (A) 100.48 °C and −0.13 °C
    (B) 100.95 °C and −0.26 °C
    (C) 100.13 °C and −0.48 °C
    (D) 100.26 °C and −0.95 °C
    (E) 100.48 °C and −0.26 °C

*Use **Instruction B** to answer question(s) number* 52 to 53.

52. Seaweed is the cultivation of brackish waters.

    BECAUSE

    Some types of seaweed that is consumed by humans adapt well with brackish water environment.

53. As many as 160 species of coral reefs from 17 families that exist in East Nusa Tenggara waters are found in the polyp phase.

    BECAUSE

    Coral reefs have no medusa phase in their life.

*Use **Instruction C** to answer question(s) number* 54 .

54. If the productivity of fisheries in East Nusa Tenggara, the percentage of usage, has continued to increase from year to year, since the beginning of 2013 (per month) to date in the future following the arithmetic sequence of 0.03%; 0.06%; 0.10%; 0.15%; 0.21%; respectively calculated from the previous month, then fisheries production that has exceeded the amount of allowable catch will occur in ... .

    (1) March 2016
    (2) May 2016
    (3) April 2016
    (4) June 2016

Mediterranean Diet

The terminology of Mediterranean diet is taken from the eating habits of people from the Mediterranean countries. Their eating habits have been studied by scientists, and have regarded as the most healthy way of life around the world. The Mediterranean diet could be a simple dish, but still tasty and healthy, which includes vegetables, fruits, grains, whole grains, nuts, olives, and olive oil combined with cheese, yoghurt, fish, poultry, eggs, and wine. This food is a fundamental ingredient to provide thousands micronutrients, antioxidants, vitamins, minerals, and fiber that can protect body from the risk of chronic diseases. Many foods in the diet plan are presented as fresh foods. Some foods are also presented as groceries. Preparation method of food presentation is simple, avoiding frying with much oil, and less intake of saturated fat, salt, sweeteners, and red meat. An analysis of 50 studies has linked the Mediterranean diet to reduce risk of heart disease, stroke, and diabetes. Some studies show Mediterranean diet benefits directly to the risk of cardiovascular disorder with the parameters including total cholesterol, LDL (low density lipoprotein), HDL (high-density lipoprotein), triglycerides, blood pressure, and blood sugar levels. Other studies suggest that one of the strategies to decrease the risk of diabetes is by having the Mediterranean diet and maintaining a healthy weight.

*Use **Instruction A** to answer question(s) number* 55 to 56.

55. The difference between the hydrostatic pressure in brain tissue and feet of a basketball player with height of 1.83 m when he jumps for 80 cm is ... .
(density of blood 1.06×10^3 km/m^3 and $g = 10$ m/s^2)

    (A) 197 mmHg
    (B) 80.6 mmHg
    (C) 136.8 mmHg
    (D) 152 mmHg
    (E) 158 mmHg

56. The main cause of cardiovascular disorders is ... .

    (A) Hypertension
    (B) Diabetes
    (C) Aterosklerosis
    (D) Hormonal disorder
    (E) Aneurysm

*Use **Instruction B** to answer question(s) number* 57 to 58.

57. Boiling oil in frying process is one example of conduction events.

    BECAUSE

    The conduction is a heat transfer and accompanied by its conductor particle displacement.

58. The Mediterranean diet is beneficial to cardiovascular disorders directly with the parameters: total cholesterol, LDL, HDL, triglycerides, blood pressure, and blood sugar levels.

    BECAUSE

    Mediterranean diet could be a simple dish but still tasty and healthy including vegetables, fruits, and grains.

*Use **Instruction C** to answer question(s) number* 59 to 60.

59. If x is a success rate of the Mediterranean diet, y describes the level of risk, z states the attainment of ideal weight and r denotes the level of cardiovascular disorder risk, the equation that states the relationship between those variables is ... .

    (1) $y = \dfrac{1}{xz}$
    (2) $y = x + z$
    (3) $r = \dfrac{1}{x}$
    (4) $r = \dfrac{y}{x}$

60. The grocery(ies) which is(are) often incorporated into antioxidants is(are) ... .

    (1) vitamin E
    (2) cheese
    (3) olive oil
    (4) egg