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TOSS-UP

Matitude Mar At 12 198 1) PHYSICS Short Answer For two sound sources heard simultaneously, one of which vibrates at 444 hertz and the other vibrates at 456 hertz, what is the beat frequency in beats per second? Matitude Art 13 190

ANSWER: 12 BEATS PER SECOND

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BONUS

- 1) PHYSICS Multiple Choice In the 1950's, the Oak Ridge National Laboratory made a significant impact on medical treatment and diagnosis by providing which of the following to researchers and clinicians:
- W) x-ray machines
- X) power sources for pace makers
- Y) radioisotopes

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Y.

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Y.

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Y.

Y.

Z) large amounts of technetium

ANSWER: Y) RADIOISOTOPES

TOSS-UP

- 2) BIOLOGY Multiple Choice In microbiology, a standard method of obtaining a pure culture is:
- W) centrifugation
- X) streak plate
- Y) stab culture
- Z) liquid fermantation

ANSWER: X) STREAK PLATE

BONUS

- 2) BIOLOGY *Multiple Choice* Which of the following best describes REM sleep: Militate At 18 18
- X) active dreaming with desynchronized EEG
 X) atonia, (read as: A-tone-ee-ah) with deep sleep
 Y) deep sleep with atonia and active 1

 - Z) deep sleep with active dreaming

ANSWER: W) ACTIVE DREAMING WITH DESYNCHRONIZED EEG Militate Market 18

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3) CHEMISTRY Short Answer Using standard chemical nomenclature, what is the chemical formula for perchloric acid?

ANSWER: HClO₄

1

Y.

Y.

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Y.

Y.

1

Y.

Y.

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BONUS

3) CHEMISTRY Short Answer Which element is used in scientific research as a cooling agent for extremely low-temperature studies because at 4.2 K, it has the lowest boiling point of any known substance?

ANSWER: HELIUM (ACCEPT: LIQUID HELIUM OR He)

TOSS-UP

4) ASTRONOMY Short Answer A circle with a dot in the center is most commonly the astronomer's symbol for what?

ANSWER: SUN

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BONUS

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4) ASTRONOMY Short Answer What is the name for the constellation with the brightest star?

ANSWER: CANIS MAJOR (ACCEPT: THE BIG DOG)

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5) MATH *Short Answer* Convert to both radians and degrees the angle that equals one-half of $\frac{3\pi}{4}$ radians:

ANSWER: $\frac{3\pi}{8}$ AND 67.5°

BONUS

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5) MATH Short Answer A merchant wants to mix 2 types of sugar that sell for \$0.40 per gram and \$0.60 per gram, respectively. If he wants a mixture of 5 grams that sells for \$0.58 per gram, how many grams of each should he mix?

ANSWER: 0.5 GRAMS OF \$0.40 PLUS 4.5 GRAMS OF \$0.60

TOSS-UP

- 6) EARTH SCIENCE *Multiple Choice* Approximately what percent of the water in the hydrosphere is groundwater:
 - W) 10
 - X) 5

Y.

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Y.

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Z) less than 1 ANSWER: Z) LESS THAN 1

BONUS

6) EARTH SCIENCE Short Answer What is the term for a tidally generated wave that propagates up a relatively shallow and sloping estuary or river in a solitary wave form, the leading edge of which presents an abrupt rise in level?

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ANSWER: TIDAL BORE (ACCEPT: BORE) Acitate the best of the latest Marithus Market 13 182 Millite the 14 18 18

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- 7) GENERAL SCIENCE *Multiple Choice* The development of this is usually considered by anthropologists and sociologists the main prerequisite for an advanced social, economic and political structure:
- W) art
- X) technology
- Y) monetary system
 - Z) agriculture

ANSWER: Z) AGRICULTURE

BONUS %

7) GENERAL SCIENCE Short Answer What term derived from the Greek word for "shortcoming" generally means an apparent lag in effect behind what is causing it?

ANSWER: HYSTERESIS

TOSS-UP

- 8) COMPUTER SCIENCE Multiple Choice In the Windows environment, which of the following file extensions represents a hidden file to replace pages or segments of data in memory: Milling 新春 · 溪 塚
- W) .dll (read as: dot, D, L, L)
- X) .swp

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- Y) .exe
- Z) .ini

ANSWER: X) .SWP

BONUS

- 8) COMPUTER SCIENCE Multiple Choice Which of the following best represents the data transmission speed of a USB port: Mylithin the the continue of t Mylithite Mark 18 18 Whiting the Fr. 13 185
- W) 128 kilobits per second
- X) 480 megabits per second
 - Y) 650 megabits per second
 - Z) 12 megabits per second

ANSWER: X) 480 MEGABITS PER SECOND

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9) PHYSICS Short Answer As exemplified in beta decay, as an atom's atomic mass increases, more of these particles are needed to maintain nuclear stability:

ANSWER: NEUTRONS

Y.

Y.

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Y.

Y.

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Y.

Y.

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BONUS

9) PHYSICS Short Answer If C is capacitance, Q is charge, and V is voltage across the capacitor, what mathematical formula is the most direct representation of the capacitance of a parallel plate capacitor:

ANSWER: C = Q/V

10) BIOLOGY Short Answer What specific physical state does Bacillus anthracis form that allows it to survive in an exposed environment for decades?

ANSWER: SPORE (ACCEPT: ENDOSPORE)

BONUS

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Milling 新春·養 豫 10) BIOLOGY Short Answer In apoptosis, what is programmed into the cell:

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ANSWER: DEATH (ACCEPT: CELL DEATH)

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linktitute &	11) CHEMISTRY atom in a molecule			11.4	11.7	bitals around an

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X) sp2

Y) sp3

Z) sp3d

ANSWER: X) SP2

BONUS

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11) CHEMISTRY Short Answer What is the general term for the process in which a crystalline hydrated solid loses water of crystallization to the size of formed:

ANSWER: EFFLORESCENCE

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TOSS-UP

- 12) ASTRONOMY Multiple Choice Which of the following is believed to be the most likely composition of cosmic dust: Myjithite Mit # 18 18
- W) carbonaceous, silicate or iron-bearing materials with some frozen gases
- X) hydrogen, helium and lithium crystals
- Y) thorium, uranium and lead particles from dead stars
- Z) pure ice crystals with small amounts of ionized hydrogen

SOME FROZEN GASES ANSWER: W) CARBONACEOUS, SILICATE OR IRON-BEARING MATERIALS WITH

BONUS

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12) ASTRONOMY Short Answer The precise measurements of Wilson and Penzias of cosmic background radiation was in what region of the electromagnetic spectrum? 即即將

ANSWER: MICROWAVE (ACCEPT: 7.35 CM)

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13) MATH Short Answer The sine of θ (read as: theta) is positive if the angle terminates in what two Quadrants of the Cartesian coordinate system?

ANSWER: I AND II (ACCEPT: 1 AND 2)

BONUS

13) MATH Short Answer What is the slope of a line that passes through the points (5, 3) and (-1, 1)?

ANSWER: 1/3

Y.

Y.

Y.

Y.

1

1

Y.

Y.

TOSS-UP

- 14) EARTH SCIENCE Multiple Choice About how many years ago is it thought that the dominant ice-age cycle changed from 40,000 year periods to 100,000 year intervals with very large fluctuation:
- W) 200,000 400,000
- X) 600,000 800,000
- Y) 2 million 2.5 million
- Z) 4 million 4.5 million

ANSWER: X) 600,000 – 800,000

BONUS

14) EARTH SCIENCE *Multiple Choice* Which of the following is known to have created one of Militalia Mark of 1880 Militime 教育社等序 Mainth Mark 18 18 the largest tsunamis, also known as a mega-tsunami:

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- W) subterranean earthquakes
- X) suboceanic earthquakes
- Y) landslides

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Z) volcanic eruptions

ANSWER: Y) LANDSLIDES

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15) GENERAL SCIENCE Short Answer Which scientist and scholar is well known for such terms as "transcendental function", "archetypes" and "collective unconscious"?

ANSWER: CARL JUNG (ACCEPT: JUNG)

BONUS

- 15) GENERAL SCIENCE Multiple Choice Which famous primatologist, a protégé of Louis Leaky, dedicated her life to research of gorillas and was most likely murdered by poachers in 1985:
- W) Jane Goodall

Y.

Y.

Y.

Y.

Y.

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- X) Shirley Sparling Y) Margaret Mead

 Z) Dian Da

ANSWER: Z) DIAN FOSSEY

TOSS-UP

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- 16) COMPUTER SCIENCE Multiple Choice What kind of viruses modify their appearance and change their program code periodically:
- W) multipartite
- X) non-resident file
- Y) stealth
- Z) polymorphic

ANSWER: Z) POLYMORPHIC

BONUS

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16) COMPUTER SCIENCE Multiple Choice When working optimally, which broadband connection to the internet provides the fastest download speeds:

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- W) cable
- X) DSL

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- Y) wireless satellite
 - Z) MMDS

ANSWER: Z) MMDS Militing 素素 養 一家 Implitute 紫春 林· 溪 序》

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- 17) PHYSICS Multiple Choice Which of the following colors of light has the SMALLEST angle of refraction in normal glass:
- W) violet

Y.

Y.

Y.

Y.

Y.

10

1

Y.

Y.

- X) green
- Z) red Y) orange

ANSWER: Z) RED

BONUS

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17) PHYSICS *Short Answer* At 10 cents per kilowatt hour, how much does it cost to run a 1200 watt heater for 4 hours?

ANSWER: 48 CENTS

(Solution: 1200 watts = 1.2 Kw...1.2 Kw x 4 hrs x 10 cents = 48 cents)

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TOSS-UP

- 18) BIOLOGY Multiple Choice Which of the following classes of antibodies will predominate Imstitute of the state of the s upon a second exposure to an antigen:
- W) IgG
- X) IgE
- Y) IgA
- Z) IgN

ANSWER: W) IgG

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BONUS

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18) BIOLOGY Short Answer What two monosaccharides make up the disaccharide sucrose? 面的抽物。

ANSWER: FRUCTOSE AND GLUCOSE (accept in any order)

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19) CHEMISTRY Short Answer Which of the gas laws specifically states that the volume of a fixed amount of gas at a constant pressure varies directly with its absolute temperature?

ANSWER: CHARLES' LAW

BONUS 13

19) CHEMISTRY Short Answer What common product is made by taking water that is filtered through hardwood ashes, evaporating it in iron pots, mixing what remains with tallow, and allowing it to cure for a few weeks:

ANSWER: SOAP

Y.

Y.

Y.

Y.

Y.

Y.

1

Y.

Y.

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TOSS-UP

- 20) ASTRONOMY *Multiple Choice* The angular distance of a star east of the Prime Meridian is most commonly referred to as the star's:
- W) deviation
- X) gnomon angle
- Y) zenith point
- Z) right ascension

ANSWER: Z) RIGHT ASCENSION

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20) ASTRONOMY Short Answer The nominal galactic center lies on the galactic plane in the A St the autitude direction of what constellation?

ANSWER: SAGITTARIUS (ACCEPT: THE ARCHER)

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- 21) EARTH SCIENCE Multiple Choice Neglecting any amplification effects that might be produced by shoreline irregularities, what is the tallest wave-height that can reasonably be created by an earthquake-generated tsunami:
- W) 3 meters
- X) 15 meters
- Y) 75 meters
 - Z) 150 meters

Y.

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ANSWER: X) 15 METERS

BONUS 1/4

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Maritude # # 13 PR

Mylinte start 21) EARTH SCIENCE Short Answer Launched by NASA in December of 1999 as part of the EOS Terra payload, what is the name of the instrument which provides high radiometric sensitivity that can study atmospheric, land, and ocean imaging in a single instrument that can also be custom tailored to the individual needs of the user: Musitata Art 18

ANSWER: MODIS (ACCEPT: MODERATE-RESOLUTION IMAGING SPECTRORADIOMETER)

TOSS-UP

- 22) GENERAL SCIENCE Multiple Choice Which of the following best describes how well a balance can repeatedly indicate the same mass over a series of identical weighings under similar environmental conditions:
- W) precision
- X) accuracy
- Y) linearity
- Z) readability

ANSWER: W) PRECISION

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22) GENERAL SCIENCE Short Answer Which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of bacteria has been found to be the most successful at restoring the intestinal Grant Answer which genus of the intestinal Grant Answer which genus of the intestinal Grant Answer which is the contest of the intestinal Grant Answer which genus of the intestinal Grant Answer which is the contest of the intestinal Grant Answer which genus of the intestinal Grant Answer which is the contest of the intestinal Grant Answer which genus of the intestinal Grant Answer which are the contest of the contest of the intestinal Grant Answer which are the contest of the contest successful at restoring the intestinal flora and relieving the symptoms of irritable bowel syndrome?

ANSWER: LACTOBACILLUS Implitute 紫春 林· 溪 序》 Milling 新菜 · 養 序 Drithte Make 18 182

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23) PHYSICS Short Answer What was the name eventually given to the particles that make up cathode rays?

ANSWER: ELECTRONS

Y.

Y.

Y.

Y.

1

Ph.

Y.

BONUS

23) PHYSICS Short Answer Neglecting friction, what is the net force required, in Newtons, to accelerate a 500 Kg object at 3 m/sec² in a horizontal direction:

ANSWER: 1500 NEWTONS

(Solution: A x M = F = $3 \times 500 = 1,500 \text{ newtons}$)

TOSS-UP

in the peripheral circulation. Where are most of the rest stored? 24) BIOLOGY Short Answer Seventy percent of the platelets released from the bone marrow are

ANSWER: SPLEEN

BONUS

24) BIOLOGY Multiple Choice Which of the following is a naturally occurring amino acid that is NOT found in proteins?

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- W) asparagine
- X) phenylalanine
- Y) citrulline
- Z) threonine

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ANSWER: Y) CITRULLINE

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- Matinta Mar No. 18 PR. 25) CHEMISTRY Multiple Choice When bonded together, which of the following pairs has the highest average bond dissociation energy:
 - W) H and Br
 - X) H and F

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Z) N and Cl ANSWER: X) HANDF

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(Solution: H-F = 570; H-Br = 366; C-Br = 270; N-Cl = 200)

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25) CHEMISTRY Short Answer Using standard chemical nomenclature, what is the chemical formula for phosphine?

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