ROUND 8

TOSS-UP

Matitude Mar At 12 198 1) PHYSICS Short Answer Neglecting friction, what is the acceleration, in meters per second squared, when a force of 144 Newtons is applied to a 12 kilogram object: Imhiling 新光·接際

(Solution: A = F/M; A = 144/12; $A = 12 \text{ m/sec}^2$)

BONUS

- he recognize could be used to measure current: 1) PHYSICS Multiple Choice When Johann Schweigger invented the first galvanometer, what did
 - W) deflection of a compass needle
 - X) movement of iron particles in a magnetic field
 - Y) movement of electrons through a potential
 - Z) a magneto

Y.

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ANSWER: W) DEFLECTION OF A COMPASS NEEDLE

TOSS-UP

- 2) CHEMISTRY Multiple Choice Which of the following has the highest specific heat value:
 - W) wood
 - X) ice water
 - Y) sand
 - Z) gold

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ANSWER: X) ICE WATER

(Solution: wood = $0.42 \text{ Cal/g}^{\circ}\text{C}$; ice water = 0.5; sand = 0.19; gold = 0.031)

2) CHEMISTRY Short Answer Normal hydrogen at room temperature contains what two forms of hydrogen, as defined by the spins of their electrons and nuclei?

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ANSWER: PARA AND ORTHO Milital Mark of Sept. 18 18. Myith # 14 18 Milite the the 18 18

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- 3) BIOLOGY Multiple Choice When the color of an organism alerts predators to stay away it is technically referred to as:
- W) aposematic coloration
- X) homological coloration
- Z) camouflage coloration

ANSWER: W) APOSEMATIC COLORATION

BONUS

- 3) BIOLOGY *Multiple Choice* Which of the following is NOT a hexose:
 - W) mannose
 - X) glucose
 - Y) fructose

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Z) xylulose (pronounced: zyle-YOU-lows)

ANSWER: Z) XYLULOSE

TOSS-UP

- 4) ASTRONOMY *Multiple Choice* A first quarter Moon will cross the meridian at what time of the day or night:
 - W) midnight
 - X) sunrise
 - Y) sunset
 - Z) noon

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ANSWER: W) MIDNIGHT

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BONUS

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4) ASTRONOMY Short Answer What is the most common astronomical term for the angle analogous to geographical longitude?

ANSWER: RIGHT ASCENSION (ACCEPT: ASCENSION)

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5) MATH Short Answer What is the equation of a line that has a slope of 4 and a y-intercept of 5?

ANSWER: y = 4x + 5

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BONUS

5) MATH *Short Answer* Factor the following expression as completely as possible: x^4

ANSWER: $(x-2)(x+2)(x^2+4)$

- Milital Mar At ' 18 PR 6) EARTH SCIENCE *Multiple Choice* The salts and ions derived from the chemical weathering of rocks are carried by a stream are part of its:
 - W) bed load
- Y) dissolved load
 Z) salt load X) suspended load \(\sqrt{N} \)

ANSWER: Y) DISSOLVED LOAD

6) EARTH SCIENCE Multiple Choice The Sahara desert in Africa is an example of what type of desert:

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- W) subtropical
- X) continental
- Y) rainshadow
- Z) coastal.

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ANSWER: W) SUBTROPICAL

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- 7) GENERAL SCIENCE Multiple Choice Electric appliances and tools are grounded to:
- W) complete the electrical circuit
- X) balance the voltage in both lines
- Y) prevent the overloading of circuits
- Z) prevent surface static charge buildup

ANSWER: Z) PREVENT SURFACE STATIC CHARGE BUILDUP

BONUS

- 7) GENERAL SCIENCE Multiple Choice Which of the following is an example of a multiple fruit:
 - W) apple

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- X) sour cherry
- Y) pineapple
- Z) pear

ANSWER: Y) PINEAPPLE

TOSS-UP

- 8) COMPUTER SCIENCE *Multiple Choice* An email sent over the internet most likely uses what protocol:
 - W) HTTP
 - X) FTP

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- Y) SMTP
- Z) HMTTP

ANSWER: Y) SMTP

BONUS

8) COMPUTER SCIENCE Short Answer What is the name for the high-speed serial bus developed by Apple and Texas Instruments that allows for the connection of multiple devices, supports hot-swapping, and transfers data at rates of up to 400 million bytes per second:

ANSWER: FIREWIRE (ACCEPT: IEEE 1394, I-LINK, AND LYNX) Militate At At & PR

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- 9) PHYSICS Multiple Choice What branch of mechanics customarily deals with force and why objects move as they do:
- W) kinematics
- X) dynamics

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Z) mechanics

ANSWER: X) DYNAMICS

BONUS

- 9) PHYSICS *Multiple Choice* Yellow light has a wavelength of approximately:
 - W) 300-350 nanometers
 - X) 450-500 nanometers
 - Y) 550-600 nanometers
 - Z) 650-700 nanometers

ANSWER: Y) 550-600 NANOMETERS

TOSS-UP

- 10) CHEMISTRY *Multiple Choice* In which of the following pairs are both elements classified as semimetals:
 - W) tellurium and tin
 - X) selenium and bromine
 - Y) scandium and silicon
 - Z) arsenic and germanium

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ANSWER: Z) ARSENIC AND GERMANIUM

BONUS

10) CHEMISTRY Short Answer The f subshell is associated with what L quantum number?

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ANSWER: 3

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11) BIOLOGY Short Answer What is the predominant immunoglobulin class found in human saliva?

ANSWER: IgA

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BONUS

11) BIOLOGY Short Answer What is the common name for the part of a compound light microscope that functions to converge a light source so that it passes through the specimen:

ANSWER: CONDENSER

TOSS-UP

- 12) ASTRONOMY Multiple Choice Because of precession, the celestial pole traces out a complete Implitute 素素 沒 「寒 circle on the sky about every: Militalia Art of 1980
- W) 26,000 years X) 12,000
 - Y) 6,000 years
 - Z) 600 years

ANSWER: W) 26,000 YEARS

BONUS

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- 12) ASTRONOMY Multiple Choice The ecliptic is:
- W) the line that divides the sky into the northern half and the southern half
- X) the Sun's apparent path across the celestial sphere
- Y) the point directly overhead

Z) the line on the celestial sphere directly above the celestial equator

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ANSWER: X) THE SUN'S APPARENT PATH ACROSS THE CELESTIAL SPHERE Britists & See 18 Millitute 新林· 接際 Deithin the 14 18 180 Myithin the 18 182

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Milling 新菜菜家 13) MATH Short Answer If the universal set is represented by the numbers 1, 2, 3, 4, 5, 6, 7, and set A is represented by the numbers 1, 2, 3; set B by the numbers 3, 4, 5, 6; and set C by the numbers 2, 3, 4, then what set is represented by the union of sets A and B?

ANSWER: 1, 2, 3, 4, 5, 6

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BONUS

13) MATH Short Answer In the US Senate, Senator Bill received four-sixths of the votes, Senator George received two- tenths of the votes, and Senator Mary received the remaining votes. If 48 votes were cast for Senator Mary, how many votes did Senator Bill receive?

ANSWER: 240

TOSS-UP

- 14) EARTH SCIENCE *Multiple Choice* Which of the following make up approximately 80% of all magma erupted by volcanoes on Earth:
 - W) andesitic
 - X) rhyolitic

Z) andesitic and rhyolitic

ANSWER: Y) BASALTIC (Solution: (Solution: andesitic and rhyolitic 10% each)

BONUS

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14) EARTH SCIENCE Short Answer A mixture of molten rock, suspended mineral grains, and dissolved passes that forms in the great or result. dissolved gasses that forms in the crust or mantle when temperatures are sufficiently high, is a definition of what? Mistitute Man At 13 1982 Militale Market 18 18 Molitule At A 18 18 Meithin the the is the

ANSWER: MAGMA

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- 15) GENERAL SCIENCE Multiple Choice Which of the following is an example of a modular organism that grows by producing additional units of body construction that are very similar to the units of which it is already composed:
- W) sea sponge
- X) cockroach
- Y) spider
- Z) turtle

Y.

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ANSWER: W) SEA SPONGE

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15) GENERAL SCIENCE Short Answer A widely used dental amalgam is formed by reacting metallic mercury with an alloy consisting primarily of which 2 metals?

ANSWER: SILVER AND TIN

TOSS-UP

- 16) COMPUTER SCIENCE *Multiple Choice* Which of the following is TRUE about resolution:
- W) printed images resolve with dots per inch and displayed images resolve with pixels
- X) printed images resolve with dots per inch and displayed images resolve with dots per inch
- Y) printed images resolve with pixels and displayed images resolve with dots per inch
- Z) printed images resolve with pixels and displayed images resolve with pixels

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ANSWER: W) PRINTED IMAGES RESOLVE WITH DOTS PER INCH AND DISPLAYED IMAGES RESOLVE WITH PIXELS

BONUS

16) COMPUTER SCIENCE Multiple Choice Fonts that are digital representations of fonts that are not scalable are called: Delitate the the light 面对加州 蒙古 共 "接 序》 Drippy of the state of the stat

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- W) bitmap fonts
- X) outline fonts
- Y) TrueType fonts
- Z) vector fonts

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17) PHYSICS Short Answer What scientist was the first to propose that in the absence of air resistance, all objects fall with the same constant acceleration?

ANSWER: GALILEO

Y.

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Y.

Y.

BONUS

17) PHYSICS Short Answer If a piano string is 1.6 meters long and has a fundamental frequency of 320 Hertz, what is the wavelength, in meters, of the fundamental?

ANSWER: 3.2

(Solution: wavelength = 2L; = (2)(1.6) = 3.2 meters)

TOSS-UP

- 18) CHEMISTRY *Multiple Choice* Which of the following is considered a nonpolar molecule:
- W) H₂S
- X) NH₃
- Y) NO₂
- Z) BeH₂

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ANSWER: Z) BeH₂

BONUS

18) CHEMISTRY Short Answer What general term describes a substance whose electrons are all Militally Mark of 1880 spin-paired and that are weakly repelled by magnetic fields?

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ANSWER: DIAMAGNETIC

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19) BIOLOGY *Short Answer* What is the name for the group of muscles that stabilize the shoulder joint by holding the head of the humerus in its socket?

ANSWER: ROTATOR CUFF

Y.

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BONUS

19) BIOLOGY *Short Answer* The "one gene one enzyme" rule proposed by Beadle and Tatum was mostly based upon their work with what genus of organisms?

ANSWER: NEUROSPORA

TOSS-UP

20) MATH *Short Answer* An arc of length 2π is cut off by a central angle of $\frac{\pi}{4}$ radians. What is the radius of the circle?

ANSWER: 8

(Solution: $r = S/\alpha$; = $2\pi / (\pi/4)$; = 8)

BONUS

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20) MATH *Short Answer* Simplify the following equation: $\sqrt{9x+9} - \sqrt{4x+4}$

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ANSWER: $\sqrt{x+1}$ (ACCEPT: $\sqrt{1+x}$)

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- 21) EARTH SCIENCE Multiple Choice Which of the following types of plutons is a cylindrical conduit of igneous rock below a volcanic vent:
- W) laccolith
- X) dike
- Y) volcanic stock
- Z) volcanic pipe

ANSWER: Z) VOLCANIC PIPE

BONUS

- 21) EARTH SCIENCE *Multiple Choice* Trellis drainage patterns are most likely to form on:
 - W) coastal plains
 - X) folded terrains
 - Y) glacial outwash
 - Z) permafrost

Y.

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ANSWER: X) FOLDED TERRAINS

TOSS-UP

22) GENERAL SCIENCE Short Answer What contemporary of Autolycus wrote a set of thirteen books titled "Elements", which remains among the most studied works in human thought and was a culmination of classical geometry?

ANSWER: EUCLID

BONUS

- 22) GENERAL SCIENCE Multiple Choice In the tempering of steel, the slower the hot steel cools in the quenching process:
 - W) the softer its core and the less the outer hardness penetrates
 - X) the softer its core and the more the outer hardness penetrates
 - Y) the harder its core and the less the outer hardness penetrates
 - Z) the harder its core and the more the outer hardness penetrates

ANSWER: W) THE SOFTER ITS CORE AND THE LESS THE OUTER HARDNESS Maritally 教育 养 · 婆 序》 stitute 素 并接序 PENETRATES Willia Mark 13 William Mark 13 slithte 教育 技术 '遂

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- 23) PHYSICS Multiple Choice Which of the following explains why a sailboat can sail into the wind:
- W) Archimedes' Principle
- X) Bernoulli's Law
- Z) Reynolds' Numbers

ANSWER: X) BERNOULLI'S LAW

BONUS

- 23) PHYSICS *Multiple Choice* If the resolution of the human eye is about 0.1 millimeter and the resolution of a light microscope is about 2.000 anostroms, what is the same magnification of a human eye combined with a light microscope:
 - W) 250 times

Y.

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- Y) 1,000 times Z) 2 000 2

ANSWER: X) 500 TIMES

- 24) CHEMISTRY Multiple Choice Liver enzymes oxidize ethanol to:
- W) methanol
- X) formaldehyde
- Y) oxalic acid

Z) acetaldehyde

ANSWER: Z) ACETALDEHYDE

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24) CHEMISTRY Short Answer Which of the gas laws describes how the volume of a gas is affected by changes in pressure temperature. affected by changes in pressure, temperature, and amount?

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Matinta Mar At 13 1980 25) BIOLOGY Short Answer In bacterial transference of genes, what is the term for when naked DNA enters the cell from the surroundings:

ANSWER: TRANSDUCTION

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- Mylithe ## # 13 PR 25) BIOLOGY Multiple Choice Which of the following is the type of plant leaf that lacks a palisade and spongy mesophyll:
 - W) common crabgrass

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- Y) apple tree
 Z) lotus

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ANSWER: W) COMMON CRABGRASS

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