**TOSS-UP**

1) BIOLOGY *Short Answer* In which cells of the stomach is intrinsic factor produced?

ANSWER: PARIETAL CELLS

**BONUS**

1) BIOLOGY *Multiple Choice* From what plant is the cancer drug Taxol derived?

W) Belladonna

X) Willow

Y) Pacific Yew

Z) Eucalyptus

ANSWER: Y) PACIFIC YEW

**TOSS-UP**

2) BIOLOGY *Short Answer* List the following steps in order, for the secretion of H+ ions from parietal cells.

1: Cyclic AMP levels increase. 2: H+ is secreted. 3: Protein Kinase A is activated, and phosphorylates proteins involved in the Hydrogen/Potassium ATPase. 4: Adenylate cyclase is activated

ANSWER: 4, 1, 3, 2

**BONUS**

2) BIOLOGY *Short Answer* Which nitrogenous base is the primary target for DNA methyltransferase?

ANSWER: CYTOSINE

**TOSS-UP**

3) BIOLOGY *Short Answer* Denote all of the following statements which are true of the Islets of Langerhans.

1: Alpha Cells produce glucagon. 2: Beta Cells produce insulin. 3: Delta Cells produce epinephrine.

ANSWER: 1 and 2

**BONUS**

3) BIOLOGY *Short Answer* What is the synthetic auxin used commercially as a plant rooting product, used for the vegetative propagation of plants from stem and leaf cuttings?

ANSWER: NAA (ACCEPT: NAPTHALENEACETIC ACID)

**TOSS-UP**

4) BIOLOGY *Short Answer* What is the bacteria, known to produce a potent insecticide, that is used to create insect resistant genetically modified crops?

ANSWER: BACILLUS THURINGIENSIS

**BONUS**

4) BIOLOGY *Short Answer* What is the disorder found primarily in the elderly, in which the central field of vision is degraded, causing many people afflicted to lose the ability to recognize faces?

ANSWER: MACULAR DEGENERATION

**TOSS-UP**

5) BIOLOGY *Short Answer* Name all of the following which are true of the Permian geological period.

1: The origin of reptiles 2: Pangaea was the single land mass 3: Origin of vascular plants 4: Ended with the extinction of many marine and terrestrial creatures.

ANSWER: 1, 2 and 4

**BONUS**

5) BIOLOGY *Short Answer* What protein, found in milk and very similar to lysozyme, is suggested to have been carried as a transposable element, and then mutated after the divergence of the mammalian lineage?

ANSWER: ALPHA LACTALBUMIN

**TOSS-UP**

6) BIOLOGY *Multiple Choice* What dye is retained by gram-negative bacteria during staining?

W) Crystal Violet X) Iodine Y) Safranin Z) Methylene Blue

ANSWER: Y) SAFRANIN

**BONUS**

6) BIOLOGY *Short Answer* What is the name given to bacteria which contain the F Factor in their bacterial chromosome rather than in a plasmid?

ANSWER: HFR CELL (ACCEPT: HIGH FREQUENCY OF RECOMBINATION)

**TOSS-UP**

7) BIOLOGY *Short Answer* What division of proteobacteria is found most commonly in mutualistic associations with plants?

ANSWER: ALPHA PROTEOBACTERIA

**BONUS**

7) BIOLOGY *Multiple Choice* How would you classify a bacteria that derives its energy from inorganic sources such as Hydrogen Sulfide?

W) Chemoheterotroph

X) Chemoautotroph

Y) Photoautotroph  
Z) Photohetereotroph

ANSWER: X) CHEMOAUTOTROPH

**TOSS-UP**

8) BIOLOGY *Short Answer* In bryophytes, what are the structures that conduct water, analogous to the tracheids of vascular plants?

ANSWER: HYDROID

**BONUS**

8) BIOLOGY *Short Answer* What is the toxin secreted by enterohemorrhagic strains of E. coli, which allow them to inhibit protein synthesis?

ANSWER: SHIGA TOXIN

**TOSS-UP**

9) BIOLOGY *Multiple Choice* What synthetic compound is commonly used to diagnose bronchial hyperreactivity, using an aerosolized challenge test?

W) Methacholine X) Acetylcholine Y) Oxybutynin Z) Muscarine

ANSWER: W) METHACHOLINE

**BONUS**

9) BIOLOGY *Short Answer* What noncoding RNA are known to silence retrostransposons and other genetic elements specifically in germ line cells?

ANSWER: PIWI-INTERACTING RNA

**TOSS-UP**

10) BIOLOGY *Short Answer* What are the modified mitochondria Diplomonads possess which work only in anaerobic respiration?

ANSWER: MITOSOMES

**BONUS**

10) BIOLOGY *Short Answer* Name all of the following that are true of resting membrane potential for neurons.

1: It has a value of approximately -70 mV

2: Sodium/Potassium pumps transport 2 potassium ions outside, and one 3 sodium ions inside.

3: Hyperpolarization is often caused by an efflux of K+

ANSWER: 1 and 3

**TOSS-UP**

11) BIOLOGY *Short Answer* What is the primary vector for both African trypanosomiasis and sleeping sickness?

ANSWER: TSETSE FLY

**BONUS**

11) BIOLOGY *Short Answer* What are the algal masses covered in hyphae which are the primary form of asexual reproduction for lichen?

ANSWER: SOREDIA

**TOSS-UP**

12) BIOLOGY *Multiple Choice* What structure characterizes a euglenozoan?

W) Red EyespotX) Kinetoplast Y) Crystallinerod in their flagellaZ)Air sacs under their plasma membrane

ANSWER: Y) CRYSTALLINE ROD IN THEIR FLAGELLA

**BONUS**

12) BIOLOGY *Short Answer* What chemical derived from ergots is a potent psychedelic drug, famous for its key role in 1960’s counterculture movements?

ANSWER: LSD

**TOSS-UP**

13) BIOLOGY *Short Answer* Denote which of the following compounds which can be classified as glycosaminoglycans.

1: Agar

2: Chondroitins

3: Heparin

4: Hyaluronate

ANSWER: 2, 3 and 4

**BONUS**

13) BIOLOGY *Short Answer* From what amino acid is serotonin derived?

ANSWER: TRYPTOPHAN

**TOSS-UP**

14) BIOLOGY *Short Answer* Scurvy is caused by the deficiency of what vitamin?

ANSWER: VITAMIN C

**BONUS**

14) BIOLOGY *Multiple Choice* What is the yellow breakdown product of heme catabolism, responsible for the yellow discoloration in jaundice?

W) Cadaverine X) Bilirubin Y) Piperine Z) Phycobilin

ANSWER: X) BILIRUBIN

**TOSS-UP**

15) BIOLOGY *Short Answer* Denote which of statements are true of histones.

1: There are 4 main types. 2: They are rich in arginine and lysine. 3: Nucleosomes are octamers of histones wound around DNA. 4: Acetylating histones makes transcription less likely.

ANSWER: 2 and 3

**BONUS**

15) BIOLOGY *Short Answer* What is the first class of antibody that a developing B cell makes?

ANSWER: IGM

**TOSS-UP**

16) BIOLOGY *Short Answer* Denote which of the following are classified as RNA Viruses.

1: Poliovirus

2: Rabies Virus

3: Mumps Virus

4: Corona Virus

ANSWER: ALL OF THEM

**BONUS**

16) BIOLOGY *Short Answer* What is the alkaloid responsible for the pungency of black pepper?

ANSWER: PIPERINE

**TOSS-UP**

17) BIOLOGY *Short Answer* What is the waxy substance contained within cork cell walls which protects against water loss?

ANSWER: SUBERIN

**BONUS**

17) BIOLOGY *Short Answer* What is the name of the modified part of the muscle cell plasma membrane at the postsynaptic membrane of the neuromuscular junction?

ANSWER: MOTOR END PLATE

**TOSS-UP**

18) BIOLOGY *Short Answer* What are the membrane proteins which link two neurons by forming pores that connect the cytoplasm of the two cells?

ANSWER: CONNEXONS

**BONUS**

18) BIOLOGY *Multiple Choice* What type of bird feather is specifically used for insulation?

W) Contour X) Down Y) Thermal Z) Natal

ANSWER: X) DOWN

**TOSS-UP**

19) BIOLOGY *Multiple Choice* The FOXP2 gene plays a key role in the activity of what part of the human brain?

W) Calcarine Fissure

X) Suprachiasmatic nucleus

Y) Lingual Gyrus  
Z) Broca’s Area

ANSWER: Z) BROCA’S AREA

**BONUS**

19) BIOLOGY *Short Answer* Put the following plant structures in order, starting at the center of the woody stem.

1: Primary Xylem

2: Pith

3: Secondary Phloem

4: Vascular Cambium

ANSWER: 2, 1, 4, 3

**TOSS-UP**

20) BIOLOGY *Short Answer* Bulbs, rhizomes and tubers are all what type of modified plant structure?

ANSWER: STEM

**BONUS**

20) BIOLOGY *Short Answer* Denote all of the following structures which are produced by the vascular cambium of a woody plant.

1: Secondary Phloem 2: Primary Phloem 3: Secondary Xylem   
4: Primary Xylem

ANSWER: 1 and 3

**TOSS-UP**

21) BIOLOGY *Short Answer* What are the small structures found on either side of the shoot apical meristem tip which develop into leave?

ANSWER: LEAF PRIMORDIA

**BONUS**

21) BIOLOGY *Short Answer* Denote all of the following which are plant macronutrients.

1: Magnesium 2: Sulfur 3: Copper 4: Iron

ANSWER: 1 and 2

**TOSS-UP**

22) BIOLOGY *Multiple Choice* What autosomal recessive blood disease that originated in the Mediterranean results in decreased synthesis of one of the globin chains that make up hemoglobin?

W) Thallasemia

X) Sickle Cell Disease

Y) Hemophilia

Z) Methemoglobinemia

ANSWER: W) THALLASEMIA

**BONUS**

22) BIOLOGY *Short Answer* What is the name of the detached shoot or twig which is grafted on to another plant?

ANSWER: SCION

**TOSS-UP**

23) BIOLOGY *Short Answer* What is the name of the group of transposable elements, found in primates, which are thought to have brought about the evolution of humans?

ANSWER: ALU ELEMENTS

**BONUS**

23) BIOLOGY *Multiple Choice* What occurs if a plant’s soil pH is too low?

W) Iron levels decrease. X) Aluminum ions accumulate. Y) Leaves develop a reddish tinge. Z) Water is lost to the soil.

ANSWER: X) ALUMINIUM IONS ACCUMULATE.

**TOSS-UP**

24) BIOLOGY *Short Answer* What is the general term for an involuntary eye movement characterized by alternating smooth pursuits and saccadic movements?

ANSWER: NYSTAGMUS

**BONUS**

24) BIOLOGY *Short Answer* What is the name given to the process of breaking down glycogen in the liver to form Glucose-6-Phosphate?

ANSWER: GLYCOGENOLYSIS

**TOSS-UP**

25) BIOLOGY *Short Answer* What protein, found in brown fat, allows H+ ions to reenter the mitochondrial matrix without generating ATP, dissipating the energy of oxidation as heat?

ANSWER: THERMOGENIN

**BONUS**

25) BIOLOGY *Multiple Choice* About what percentage of total sleep does REM sleep comprise?

W) 10  
X) 25   
Y) 40   
Z) 50

ANSWER: X) 25