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Biology Science Bowl Questions

1. Short Answer: Which of the following is/ are water soluble?

1) Insulin 2) Epinephrine 3) Thyroxine 4)Cortisol

Answer: 1 and 2

BONUS Short Answer: What is the name of the cluster of endocrine cells that produces alpha and beta cells, which in turn produce glucagon and insulin?

Answer: Islets of Langerhans

2. Multiple Choice: Which plant cells are relatively thin and flexible, mostly lacking secondary walls?

W) Parenchyma

X) Collenchyma

Y) Sclerenchyma

Z) Companion

ANSWER: W

BONUS Multiple Choice: Acetyl COA adds its two-carbon acetyl group to oxaloacetate, producing what product in the Krebs cycle?

W)Alpha-Ketoglutarate

X) Succinyl CoA

Y) Fumarate

Z) Citrate

ANSWER: Z

3. Multiple Choice: Before which phase of meiosis does crossing over occur?

W) Prophase I

X) Anaphase I

Y)Metaphase II

Z) Telophase II

ANSWER: W

BONUS Multiple Choice: Which of the following is false?

W) On a gene, a map unit is 1% recombination frequency.

X) The law of segregation says two alleles for each gene separate when gametes form.

Y) Distance does not affect the chances of crossing over.

Z) Polyploidy means having more than two complete chromosome sets.

ANSWER: X

4. Short Answer: Which protein synthesises an RNA primer at the 5’ end of the DNA leading strand?

ANSWER: Primase

BONUS Short Answer: Which amino acid’s codon sequence is also the initiation codon?

ANSWER: Methionine or Met

5. Multiple Choice: Which amino acid is polar?

W) Methionine

X) Serine

Y)Lysine

Z) Isoleucine

ANSWER: X

BONUS Multiple Choice: Which of the following does not lead to a nonfunctioning or incorrectly coded protein?

W) Base-pair substitution

X) Nonsense Mutation

Y) Frameshift Mutation

Z) Insertion of 1 Amino Acid in the middle of the sequence

ANSWER: W

6. Multiple Choice Mammals use which of the following in their respiratory system?

W) Positive Pressure Breathing

X) Cutaneous System

Y) Negative pressure breathing

Z) Erythropoietin System

ANSWER: Y

BONUS Multiple Choice What is the approximate atrial systole and ventricular diastole time period in an adult at rest with a heart rate of about 72 beats per minute? The complete cardiac cycle takes 0.8 seconds.

W) 0.1 second

X) 0.2 second

Y) 0.3 second

Z) 0.4 second

ANSWER: W

7. Short Answer What is one of the factors that determine cardiac output?

ANSWER: Heart rate or stroke volume

BONUS Short Answer: Which insect order does the Japanese beetle belong to?

W) Blattodea

X) Coleoptera

Y) Dermaptera

Z) Diptera

ANSWER: X

8. Short Answer: What organelle found in fat-storing tissues of plant seeds have enzymes that convert fatty acids to sugar, providing the seedling with energy and carbon until it makes its own sugar by photosynthesis?

ANSWER: Glyoxisome

BONUS Short Answer: What protein is the constituent of microtubules?

ANSWER: Tubulin

9. Multiple Choice: In a HYPERTONIC solution a plant cell is

W) Lysed

X) Turgid

Y) Flaccid

Z) Plasmolyzed

ANSWER: Z

BONUS Multiple Choice: To catalyze reactions, enzyme do all of the following EXCEPT

W) Lower activation energy

X) Stabilize the transition state

Y) Shift the equilibrium

Z) Acting as a template for substrate orientation

ANSWER: Y

10. Short Answer: What mechanism, used by hemoglobin, amplifies the response of enzymes to substrates when one substrate molecule primes an enzyme to accept additional substrate molecules more readily?

ANSWER: cooperativity

BONUS Short Answer: In glycolysis, enolase removes water from 2-Phosphoglycerate to produce what in product of the second-to-last step?

ANSWER: Phosphoenolpyruvate

11. Short Answer: For photosynthesis, Chlorophyll a molecules absorb and no not emit which colors the best?

1) Green

2) Violet- blue

3) yellow

4) red

ANSWER: 2 and 4

BONUS Multiple Choice: What is the name of the cyclin dependent kinase and cyclin complex that promotes mitosis by phosphorylating various proteins?

W) IGF

X) PDGF

Y) FSH

Z) MPF

ANSWER: Z

12. Short Answer: Which enzyme catalyzes the first step of the calvin cycle, carbon fixation?

ANSWER: Rubisco or RuBP carboxylase

BONUS Short Answer: What is the name of the inactive X in each cell of a female?

ANSWER: Barr body

13. Short Answer: What is the name of the X-shaped region that results from crossing over, which leaves two homologs connected by at least one X-shaped region?

ANSWER: Chiasmata (Chiasma)

BONUS Short Answer: What is the inducer of the lac operon?

ANSWER: Allolactose

14. Multiple Choice: What refers to an extra X chromosome in a male?

W) Nothing because male is normal

X) Klinefelter syndrome

Y) Turner syndrome

Z) Duchenne dystrophy

ANSWER: X

BONUS Multiple Choice: Which of the following is true?

W) Acetylation aids translation.

X) Methylation aids translation.

Y) Epigenetic inheritance is changes in the nucleotide sequence that are passed on.

Z) Control elements prohibit proteins from binding, meaning less translation.

ANSWER:W

15. Short Answer: Because they control the orientation of the egg and thus the fly, maternal effect genes are also known as what?

ANSWER: Egg polarity genes

BONUS Short Answer: Which of the following viruses has an icosahedral capsid?

1) Tobacco mosaic virus

2) adenovirus

3) influenza

4) T4

ANSWER: 2 and 4

16. Multiple Choice: HIV belongs to which class of animal virus?

W) Proxyvirus

X) Flaviviurs

Y) Coronovirus

Z) Retrovirus

ANSWER: Z

BONUS Multiple Choice: Which test determines the presence of fat?

W) Benedicts

X) Sudan

Y) Iodine

Z) Biuret

ANSWER: x

17. Short Answer: What word describes a cell, esp. that of a plant, in which mature cells can dedifferentiate and then give rise to all the specialized cell types?

ANSWER: totipotent

BONUS Short Answer:

ANSWER:

18. Multiple Choice: Which violates a condition of Hardy-Weinberg?

W) There is a large population of deer.

X) The survival of a dominant white or a recessive black mouse doesn’t matter on color.

Y) The wind carries pollen from a flower faraway to a new species.

Z) Birds of a population mate randomly.

ANSWER: y

BONUS Short Answer: The frequency of dominant red allele is 0.8. The frequency of the white recessive allele is 0.2. Assume complete dominance. What is the expected frequency of a heterozygote in this population?

ANSWER: 0.32 or 32%

19. Short Answer: Which traits are shared between charophytes and green land plants?

1) phragmoplast

2) peroxisome enzymes

3) multicellular gametangia

4) apical meristem

ANSWER: 1 and 2

BONUS Multiple Choice:In which geologic time period did mammals originate?

W) Triassic

X) Carboniferous

Y) Neogene

Z) Ordovician

ANSWER: W

20. Short Answer: What is the name of the process in which phages carry bacterial genes from one host cell to another, and is part of horizontal gene transfer?

ANSWER: Transduction

BONUS Short Answer: Which of the following give traits common to bacteria and archaea but not eukarya?

1) no nuclear envelope

2) peptidoglycan in cell wall

3) branched hydrocarbons in membrane

4) no histones in DNA

ANSWER: 1

21. Multiple Choice: Which phyla has the most number of extant species?

W) Anthophyta

X) Lycophyta

Y) Bryophyta

Z) Hepatophyta

ANSWER: w

BONUS Multiple Choice: What is the name of of long, tubular single cells that anchor bryophyte gametophytes?

W) Gametophore

X) protonema

Y) rhizoid

Z) xyloidal root

ANSWER: y

22. Multiple Choice:

W)

X)

Y)

Z)

ANSWER:

BONUS Multiple Choice: where does the pupil dilator atropine come from?

W) Belladonna plant

X) Foxglove

Y) Periwinkle

Z) Opium poppy

ANSWER: w

23. Multiple Choice: What enzyme of the small intestine breaks down polypeptides?

W) Trypsin

X) Carboxypeptidase

Y) Aminopeptidase

Z) Dipeptidase

ANSWER: z

BONUS Multiple Choice: which signal triggers hunger?

W) leptin

X) pyy

Y) ghrelin

Z) pyy

ANSWER: y

24. Short Answer: The SA node sends electric signals to what, delaying the signal for about 0.1 second before it spreads to the walls of the ventricle?

ANSWER: AV node or atrioventricular node

BONUS Short Answer: Mast cells release what molecule in a local inflammatory response?

ANSWER: Histamine

25. Multiple Choice: In the human excretory system, what empties processed filtrate into the collecting duct?

W) loops of henle

X) proximal tube

Y) cortical nephron

Z) distal tubule

ANSWER: z

BONUS Multiple Choice: In humans, when blood pressure drops, the juxtaglomerular apparatus or JGA releases renin. Renin in turn cleaves what plasma protein?

W) Angiotensin

X) aldosterone

Y) ADH

Z) natriuretic peptide

ANSWER: w