THE UNIVERSITY OF BAMENDA (UBa)

Competitive entrance examination into first cycle E.N.S Bambili

Academic year 2014/2015

Series: Biology.

SECTION A: Major Paper: Biology. Duration: 3 hours. Coef: 4

Answer all questions and each question carries equal mark. Write the letter corresponding to the correct Answer in the answer booklet. You must submit your question paper together with the answer booklet. Nothing should be written on the question paper.

1. Removal of the medulla will cause all of the following but for
   a) Depression of the cardiovascular system
   b) Depression of the respiratory system
   c) Difficulties in swallowing d) None of the above
2. Pick out the odd answer
   a) Skull b) Cerebrospinal fluid c) Meninges d) Cerebrum
3. In which of the layers of the meninges do you find the blood vessels supplying the brain a) Dura matter b) Pia matter c) Arachnoids layer d) Dura cavity e) The sub dural space
4. A motorcyclist had a bike accident and received a knock on the head. A brain scan was done and showed a large blood clot compressing the parietal lobe. Which abnormality will be noticed on examining him a) Loss of motor function b) Loss of sensitivity c) Loss of speech d) Loss of vision
5. The auditory center is found in which of the following brain lobes
   a) Parietal b) Temporal c) Occipital d) Frontal
6. A transverse section through the spinal cord reveals all but one of the following a) A lateral horn b) A dorsal horn c) A ventral horn d) H shaped white matter surrounded by gray matter
7. The cell bodies of motor neurons of the autonomic nervous system are found in a) The ventral horn b) The dorsal horn c) The lateral horn d) The spinal ganglion
8. The knee jerk reflex a) Is an inborn reflex b) Is an acquired reflex c) Is under the control of the brain d) All of the above

9. The spinal nerves, pick out the wrong answer a) There are 8 cervical nerves b) There are 12 thoracic nerves c) There are 2 coccygeal nerves d) There are 31 of them
10. Which of the following is not a property of an enzyme? a) It is highly specific for the substrate b) It supplies energy to make the reaction go fast c) It forms an induced fit with its substrate d) It is used over and over again
11. The oxygen consumed during cellular respiration is directly involved in a) Glycolysis b) Accepting electrons at the terminus of the electron transport chain c) The citric acid cycle d) Oxidation of pyruvic acid to AcetylicoA
12. Secretin, gastrin and CCK in humans are all a) Enzymes used to digest foodb) Breakdown products of digestion c) Hormones that control digestive secretions d) Produced in the gut by an acid PH
13. Select the cell organelle that is closely associated with protein synthesis a) Plasma membrane b) Chloroplast c) Ribosomes d) Golgi apparatus
14. The packing of proteins takes place in the following cell organelle a) Endoplasmic reticulum b) Golgi complex c) Mitochondria d) Nucleus
15. Which of the following is characterized by parasitism?
    a) One organism kills and consumes another
    b) Two organisms live together and neither is harmed
    c) Two organisms feed side by side from the same food
    d) One organism lives in or on another and benefits.
16. Nitrogen gas returns to the atmosphere by the action of:
    a) Nitrogen fixing bacteria b) Denitrifying bacteria
    c) Nitrifying bacteria d) Nitrate fertilizer.
17. In a terrestrial ecosystem, the trophic level that would contain the largest biomass would be the a) Producers b) Primary consumers c) Secondary consumers d) Highest order consumers.
18. Which structure in Amoeba plays the same role like the kidney in man?
    (a) Pseudopodium (b) Contractile vacuole
    (c) Nucleus (d) Cell surface membrane.
19. What type of immunity is acquired the body makes its own antibodies I response to exposure to an antigen?

(a)Artificial passive immunity (b)Natural passive immunity
(c) Artificial active immunity (d) Natural active Immunity

20. Which of the following is responsible joining pieces of polynucleotide during DNA replication? (a) DNA polymerase (b) DNA helicase (c) DNA ligase (d) DNA binding protein.
21. Which part of the brain controls and maintains body temperature?
(a) The pon (b) The cerebrum (c) Hypothalamus
(d) Thalamus (e) Cerebellum.
22. The force which tends to keep water continuous up the stem is called?
(a) Root pressure (b) Suction pressure
(c) Cohesive force (d) Transpiration pull
23. Concerning the synapse a) It is chemical only b) It is electrical only c) It could be chemical or electrical d) None of the above
24. Pick out the wrong proposition
a) Acetylcholine is recycled by enzymatic breakdown
b) All neurotransmitters are recycled by diffusion out of the synaptic cleft we produced in small amounts
c) Adrenaline is recycled by recapture into the presynaptic vesicles
d) None of the above
25. The brain is derived from which primary connective tissue
a) Endoderm b) Ectoderm c) Mesoderm d) None of the above

SECTION B: Minor Paper: Chemistry.

1. One mole of nitrogen molecule N_2 contains
   a) 1molecule b) 2 atoms c) $6.02x10^{23}$ atoms d) $6.02x10^{23}$ atoms
2. Four main operations of the mass spectrometer include ionization (P), acceleration (Q), vaporization(R) and deflection(S). They take place in the order (a) PQRS (b) QRSP (c) RQPS (d) RPQS
3. The spectral lines represents
   (a) Shells and sub shells
   (b) Electrons moving from the ground state to the exited state
   (c) Electrons moving from the exited state to the ground state
   (d) Emitted energy as electrons more from exited state to the ground state.
4. The spectrum is made up of discrete lines because:
   (a) Electrons more in lines round the nucleus.
   (b) The energy of electrons is quantized
   (c)Electronic transition takes place in straight lines
   (d) Electrons in an atom have a particular nature.
5. The atomic emission spectrum provides evidence for
   (a) Existence of nucleus and electrons in atoms.
   (b) The existence of electron energy levels
   (c) The movement of electrons in orbits
   (d) The loss of energy by electrons as they move away from the nucleus.
6. Which of the molecules given below could you expect to be polar $S0_2$, $POcl_3$ CO, BCl_3 CCl_4?
   (a) SO, CCl_4, $POCL_3$only (b) CCl_4, BCl_3, $POCl_3$ only
   (c) BCl_3, SO_2, CO only (d) $POCl_3$, CO, SO_2 only
7. Which of the following chlorides will not hydrolyze in water
   a) $SiCl_4$ (b) $PbCl_4$ (c) $PbCl_2$ (d) $GeCl_2$
8. What will be the change in pH when 1drop($0.2cm^3$) of 1.0MHCl (eq) is added to $25cm^3$ of pure water (a) 7.0 (b) 2.1 (c) 4.9 (d) 1.2
9. Calculate the pH for $1.00x10^2$M of sodium acetate (CH_3OOH| CH_3COO pka =4.70) (a) 7.40 (b) 3.20 (c) 2.30 (d) 8.35
10. Calculate the pH for $1.00x10^2$M of HSNa (pk_1 = 7.10 pk_2 = 13.00 $_{fa}$ H_2S)
    (a)7.10 (b) 3.45 (c) 34.5 (d) 10.05

11. 100cm^3 of a gaseous oxide of nitrogen was completely decomposed into nitrogen and oxygen. 2NxOy (g) → xN_2 (g) + yO_2 (g) to give 150cm^3 of gaseous product. After passing the decomposition products over heated copper, the volume decreased to 100cm^3. All volumes were measured at room temperature and pressure. What is the formula of the original gas?
    (a) NO_2 (b) NO (c) N_2O (d) N_2O_2
12. Flask A contains 1dm^3 of nitrogen at 1atm and flask B contains 2dm^3 of oxygen at 3atm. If the flasks are connected, at constant temperature, what is the final pressure in atmosphere? (a) 2 (b) $2\,{}^{1}/_{3}$ (c) $2\,{}^{1}/_{2}$ (d) 4
13. What volume of gas is occupied by 1.15mol of an ideal gas at 1.01x105NM^{-2} and 20°C (a) $\frac{1.15x\ R\ x\ 20}{1.01\ x10^5}$ (b) $\frac{1.15x\ R\ x\ 193}{1.01\ x10^5}$ (c) $\frac{1.15x\ R\ x\ 20}{1.01\ x10^{-5}}$ (d) $\frac{1.15x\ R\ x\ 293}{1.01\ x10^{-5}}$
14. Cyanogen is a compound of carbon and nitrogen. On combustion in excess oxygen, 250cm^3 of cyanogen forms 500cm^3 of carbon dioxide and 250cm^3 of nitrogen (measured at the same temperature and pressure). What is the empirical formula of cyanogen? (a) CN (b) C_2N (c) CN_2 (d) C_2N_2
15. How does the pressure of a given mass of gas in a fixed volume change as the temperature rises? (a) Increases linearly (b) Increases exponentially (c) Decreases exponentially (d) Does not change
16. The PH at equivalent point for a titration of a strong base with a strong acid is (a) acidic (b) 7 (c) basic (d) not determinable
17. Which of the following is the weakest acid
    (a) HCN(ka =4.9x10^{-10}) b) HClO (ka =3x10^{-8}) (c) HNO_2 (ka =4.5x10^{-4}) (d)HF (ka =6.8x10^{-4}) (E) HClO (ka = larger than 6.8x10^{-4})
18. Which of the following statements regarding a catalyst is not correct?
    (a) An enzyme is a catalyst that only binds certain substrate
    (b) An enzyme is a protein that is a highly efficient for one or more chemical reaction, in a living system
    (c) Catalyst increase the rate of a reaction by altering the mechanism there by increasing the activation energy
    (d) Catalyst do not alter the equilibrium constant.
19. How does the volume of 1mol of as ideal gas change if the temperature and the pressure are both decreased by a factor of four?

(a) Decreases by four times (b) Increases by sixteen times"

(c) Increases by four times (d) Decreases by sixteen times

20. Calculate the ionic strength of a solution of $Fe_2(CO_3)s$ of concentration 0.020M (a)0.25 (b) 0.30 (c)-0.10 (d) 0.00

Question 16 and 17: $S0_2$ $(_g)$ dissolves in water to from H_2SO_3. Calculate

21. The volume of $so_{2\,(g)}$, at rtp needed to farm 1l of 0.3MH_2SO_3 solution a) 7.2L (b) 2.7L (c) 6.2L (d) 2.6L

22. The mass of $SO_{2(g)}$ needed to form 3L of 0.02MH_250_3

a) 3.89g (b) 4.38g (c) 3.48g (d) 8.0g

23. A mole of a substance can be defined as:

A. That amount of the substance equivalent in amount to 12g of the carbon -12 isotope. B. The number of atoms in 12g of the carbon -12 isotope. C. That amount of substance with the same number of atoms as in 12g of the carbon -12 isotope. D. That amount of substance which is as heavy as 1/12 the mass of the carbon -12 isotope.

24. A lead-acid car battery requires $2dm^3$ of 4.0M sulphuric acid. The mass of pure sulphuric acid needed for this is:

A. 2.4x98g B. 2x4x98g C. 4/2x98g D. 2/1000x4x98g

25. How many potassium ions are present in $20cm^3$ of 0.001M solution of potassium phosphate? A. 3 B. $2x10^{-3}$ C $6x10^{-4}$ D. $3.6x10^{-20}$.