

Contents

2021 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON	3
BIOLOGY	3
CHEMISTRY	8
PHYSICS	13
GENERAL KNOWLEDGE SCIENTIFIC FIELD	15
2020 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON....	21
BIOLOGY	21
CHEMISTRY	27
PHYSICS	29
GENERAL KNOWLEDGE.....	32
2019 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON....	39
BIOLOGY	39
CHEMISTRY	43
PHYSICS	45
2018 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON ..	51
BIOLOGY	51
CHEMISTRY	55
PHYSICS	57
GENERAL KNOWLEDGE AND FRENCH	60
2017 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON ..	64
BIOLOGY	64
CHEMISTRY	67
PHYSICS	69
GENERAL KNOWLEDGE AND FRENCH.....	72
2016 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON ..	77
BIOLOGY	77
CHEMISTRY	80
PHYSICS	82
2015 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON	85
BIOLOGY	85
CHEMISTRY	89
PHYSICS	92
GENERAL KNOWLEDGE & LANGUAGE	94
2014 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON....	99



Tel: 652202721

BIOLOGY	99
CHEMISTRY	103
PHYSICS	108
GENERAL KNOWLEDGE	111
2013 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON ...	117
BIOLOGY	117
CHEMISTRY	121
PHYSICS	125
GENERAL KNOWLEDGE & LANGUAGE	128



Tel: 652202721

2021 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON

SECTION I: BIOLOGY

Instruction: For each of the following questions or statements, choose the only one best answer among the given options

1. The normal pH value of body fluid is:
 - A. 7.15 – 7.25
 - B. 7.35 – 7.45
 - C. 7.55 – 7.65
 - D. 7.00 – 7.35
 - E. 6.50 – 7.52
2. The junction between one neuron and the next or between a neuron and an effector is Called?
 - A. A synapse
 - B. A dendrite
 - C. A neurotransmitter
 - D. A ventricle
 - E. A gap junction
3. The retina does the following:
 - A. Enables vision in light and dark using cones and rods
 - B. Gives depth perception using binocular vision
 - C. Contains the ciliary muscles that control the shape of the lens
 - D. Protects and supports the shape of the eye
 - E. Allows vision in light and dark using only cones.
4. Which Blood Component Plays the Biggest Role in Maintaining Pressure Blood Osmotic?
 - A. Albumin
 - B. Carbon dioxide
 - C. White blood cells
 - D. Fibrinogen
 - E. Plasma
5. Blood pressure is the measurement of:
 - A. The pressure exerted by blood on the walls of blood vessels
 - B. The pressure exerted by the blood on the arteries
 - C. The pressure exerted by the blood on the veins
 - D. The pressure exerted by the blood on the aorta
 - E. The pressure exerted by the blood on the capillaries
6. This is the pacemaker of the heart.
 - A. Atrioventricular node
 - B. Purkinje fibers
 - C. Atrioventricular bundle
 - D. Sinus node
 - E. None of the above, a pacemaker is surgically inserted.
7. An antigen is:
 - A. A chemical messenger released by virus-infected cells
 - B. A lymphocyte responsible for cell-mediated immunity
 - C. Something lining the inside of the lungs causing the infections
 - D. An organic or chemical substance which causes the body to form antibodies
 - E. A thick, white-yellow fluid
8. The direct control of water excretion by the kidneys is controlled by:
 - A. Antidiuretic hormone
 - B. The medulla oblongata
 - C. Blood plasma
 - D. The amounts of sodium in the blood
 - E. The amounts of calcium in the blood
9. Carbon monoxide is dangerous because:
 - A. It binds tightly to hemoglobin making it unavailable to oxygen
 - B. It binds strongly to plasma making it unavailable to carbon dioxide



- C. It increases the pH level of the blood causing hyperventilation.
- D. Carbon monoxide is not harmful, we normally have it in our Body
- E. It binds strongly to plasma making good production of red blood cells
10. The liver does which of the following?
- Glycogen storage
 - Synthesis of plasma proteins
 - Bile production
 - Drug Detox
 - All of the above
11. This digestive enzyme is produced in the salivary glands and pancreas:
- Maltase
 - Amylase
 - Nuclease
 - D.Lipase
 - Pepsin
12. The function of the ileum is:
- Absorb nutrients
 - Absorb vitamin B12 and bile salts
 - Introduce bile and pancreatic juices
 - Absorb alcohol and aspirin
 - Absorb lipids
13. Non-essential amino acids
- Are stored in the body
 - Only occasionally needed
 - Can be produced by the body
 - Can be taken as supplements
 - Are not important
14. The reason iodine is in salt is to
- Prevent diabetes
 - Prevent simple goiters
 - Prevent Addison's disease
 - Prevent Cushing's Syndrome
 - Prevent hypertension
15. Sugar in RNA is, sugar in DNA
- Deoxyribose, ribose
 - Ribose, deoxyribose
 - Ribose, phosphate
 - Ribose, uracil
 - None of the above
16. In the mammalian cell cycle DNA synthesis
- occurs during
- S-stage
 - The G1 phase
 - The mitotic phase
 - The G2 stage
 - None of the above
17. The following statements are comparisons of male and female reproduction: Choose, which statement is incorrect:
- The reproductive organs of both sexes are homologous
 - Both sexes have reproductive abilities throughout adulthood
 - Both systems undergo latent development
 - Both systems have gonads that produce gametes and hormones Sexual
 - None of the above
18. What are fingernails made of?
- Elastin
 - Cuticle
 - Keratin
 - D.Plastin
 - None of the above
19. How many lungs does the human body have?
- Has one
 - A pair
 - Two pairs
 - Four
 - None of the above
20. Some amino acids cannot be synthesized by the human body and must Be included in the plan. These are called:
- Basic amino acids
 - Essential Amino Acids
 - Non-essential amino acids
 - Fatty acids
 - None of the above
21. The only cellular organelles visible under the electron microscope are:
- Core



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- B. Ribosomes
C. Golgi bodies
D. The chloroplast
E. None of the above
22. During mitosis, the maximum condensation of chromosomes is:
A. Early in prophase
B. At telophase
C. At metaphase
D. At interphase
E. At phase G2
23. The Biuret test makes it easy to identify:
A. Carbohydrates
B. Amino acids
C. Dipeptides
D. Proteins
E. Starch
24. In humans the enzymes are:
A. Provided by food
B. Synthesized in his body
C. Very active at 0°C
D. Irreversibly destroyed at 100°C
E. The same at any age
25. The Krebs cycle takes place in
A. The intermembrane space of the mitochondria
B. The mitochondrial stroma
C. The cytoplasm
D. The stroma of the chloroplast
E. Core
26. Mutation
A. Can only affect germ cells
B. Alters the sequence of a gene
C. Is always transmitted to offspring
D. Always has a selective advantage
E. None of the above
27. The genome of an individual
A. Matches all cytoplasmic genes
B. Matches all of his DNA
C. Characterizes a genetic abnormality
D. Is fully transmitted to its offspring
E. None of the above
28. Which of the following physiological variations is linked to sex?
A. Albinism
- B. Blood groups
C. Sickle cell disease
D. Hemophiliac condition
E. None of the above
29. Cell-mediated immune response affects
A. B cells
B. Circulating antibodies
C. Macrophages
D. Cytotoxic T lymphocytes (killer cells)
E. None of the above
30. Which of the following structures occupies the neural canal of the spine?
A. The cerebellum
B. The hypothalamus
C. The medulla oblongata
D. The spinal cord
E. None of the above
31. The hormone that accentuates uterine contractions during the menstrual cycle is
A. Progesterone
B. Estrogen
C. Oxytocin
D. Chorionic gonadotropin
E. None of the above
32. The hormone glucagon is
A. Hypoglycemic
B. Hyperglycemic
C. A hormone that promotes lipid synthesis
D. A hormone that promotes glycogenesis
E. Secreted by the β cells of the islets of Langerhans
33. Glycosuria
A. Is excess blood glucose
B. Is a blood glucose deficiency
C. Is the presence of blood in the urine
D. Is the presence of glucose in the urine
E. Is the presence of uric acid in the blood
34. In humans, spermatogenesis
A. Takes place in the interstitial cells
B. Begins at puberty and ends absolutely at age 60
C. Is continuous from puberty
D. Has a duration of 30 days



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- E. Is centrifugal in the seminiferoustubules
35. In a woman, oogenesis
- Begins at puberty and ends at menopause
 - Is discontinuous
 - Takes place in the uterus
 - Is centripetal in the ovary
 - None of the above
36. Which of the following is not a component of a DNA molecule?
- Phosphate

- Glucose
 - Adenine
 - Guanin
 - Cytosine
37. The (The) Specific Is involved in the humoral immune response
- Macrophage
 - Cytotoxic T-lymphocyte (killer cell)
 - T-lymphocyte
 - Plasma cell (plasmacyte)
 - B lymphocyte

Instructions: For questions 38 to 42, answer

- If 1, 2, and 3 are correct
 - If 1 and 3 are correct
 - If 2 and 4 are correct
 - If only 4 is correct
 - If 1, 2, 3, and 4 are correct
38. The following sequence shows the steps in protein synthesis: triplets, Anticodons, amino acids, proteins, chemical reactions of the cell. Which among Are the following statements correct?
- The triplets should come first
 - Amino acids do not participate
 - Enzymes must be present during chemical reactions in the cell
 - All are correct
39. Which of the following functions can be associated with the glycoprotein of the Plasma membrane?
- Blood group determination
 - Binding sites for toxins and bacteria
 - Contribution to the union of sperm and egg
 - Increased absorption efficiency
40. Glucose is to starch what:
- An amino acid is to a protein
 - A steroid is a lipid
 - A nucleotide is to a nucleic acid
 - A polypeptide is one amino acid away
41. Choose the correct statement(s):
- ATP can release energy when transformed into ADP
 - ATP contains energy-rich phosphate bonds
 - ATP contains adenine
 - ATP contains the sugar deoxyribose
42. For osmosis to take place, there must be
- A selectively permeable membrane



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- 2- Equal amounts of solutes on eachside
- 3- A concentration gradient
- 4- Any carrier

Instructions: Questions 43 to 50: Choose the single best correct answer

- 43. Genotype
 - A. Corresponds to all the genes carried by the chromosomes
 - B. Is not the same in identical twins
 - C. Is transmitted with the modifications to daughter cells during mitosis
 - D. Matches the entire DNA molecule
 - E. All of the above
- 44. Metabolism
 - A. Does not represent all enzymatic reactions taking place in the cell
 - B. Is composed of synthesis reactions only
 - C. Uses metabolites and energy
 - D. Corresponds to all cell activities
 - E. All of the above
- 45. Mitosis
 - A. Is a process of sexual reproduction
 - B. Leads to the formation of two identical daughter cells from one mother cell
 - C. Does not exist in prokaryotes
 - D. All of the above
 - E. None of the above
- 46. A Clone
 - A. Consists of all cells with the same functions
 - B. Consists of all organisms or cells derived from the same stock and Having the same genetic information
 - C. Is only obtained from vertebrates
 - D. All of the above
 - E. None of the above
- 47. Immunodeficiency caused by HIV infection
 - A. Allows appearance of opportunistic infections
 - B. Is a consequence of opportunistic infections
 - C. Is due to an increase in T4 cells
 - D. Is due to a decrease in TS cells
 - E. May have different effects on different neurons
- 48. Which is the largest organ in the human body?
 - A. Lungs
 - B. Intestines
 - C. Heart
 - D. Skin
 - E. None of the above
- 49. What is the name of the largest part of the human brain?
 - A. The cerebellum
 - B. Hindbrain

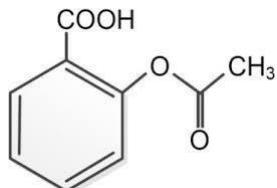


- C. The hypothalamus
 - D. The brain
 - E. None of the above
50. The muscle located at the front of the thigh of the lower limb is called
- A. Quadriceps
 - B. Biceps
 - C. Flexor
 - D. Sterno-cleido-mastoid
 - E. None of the above

CHEMISTRY

Instruction; For each of the following questions or statements, choose the only one Best answer among the given options

51. What is the volume of hydrogen produced when 1.15g of sodium reacts with an excess of ethanol at ambient temperature and pressure ($\text{Na}: 23 \text{ g.mol}^{-1}$; $V_m = 24 \text{ dm}^3$)?
- A. 1,200 dm^3
 - B. 204 dm^3
 - C. 0.12 dm^3
 - D. 1.2 dm^3
 - E. 0.6 dm^3
52. Olein is a triester of glycerol and oleic acid. It is the main constituent of Olive oil. Its general formula is $\text{C}_{17}\text{H}_{13}\text{COO-CH}_2\text{-CH(OOC-C}_{17}\text{H}_{33}\text{)-CH}_2\text{-OOC-C}_{17}\text{-H}_{33}$ with a molecular mass of 884 g.mol $^{-1}$. What mass of soap (oleate of Sodium with a molecular mass of 30 g.mol $^{-1}$) can be obtained during the saponification of 1kg of olein, given that the yield is 90%?
- A. 1031.7g
 - B. 928.5g
 - C. 348.9g
 - D. 309.5g
 - E. 3000 g
53. But-2-ene has two isomers: cis and trans-but-2-ene. These two isomers are the
- A. Enantiomers/Stereoisomers
 - B. Position Isomers
 - C. Chain Isomers
 - D. None of the above
54. Aspirin is a widely used drug in Cameron. Its scientific name is Acetylsalicylic acid. Its molecular mass is 180 g mol. Its structure is:



The aspirin molecule contains the carboxylic acid function and

- A. The amide function
- B. The ester function
- C. The acid anhydride function
- D. The ketone function
- E. The ether function

55. What is the name of the reaction product when one mole of C₂H₂ reacts with two moles Of HBr?

- A. Bromoethene
- B. 1,2-Dibromoethane
- C. 1,1-Dibromoethane
- D. 1,2-Dibromoethene
- E. None of the above

56. The changes of temperature from one state to another under the same conditions for Alcohol are higher than those of alkanes of molecular mass approximately Equal. For example: methanol (M= 32 g. Mol⁻¹) boils at 65°C while ethane (M= 30 g, mol) boils at - 89°C. These temperature differences are due to

- A. The presence of oxygen atoms in the methanol molecule
- B. The fact that methanol is an alcohol while ethane is an alkane
- C. The presence of hydrogen bonds in ethane
- D. The presence of hydrogen bonds in methanol
- E. None of the above

57. Given the following pairs of isomeric compounds Which of them are stereoisomers Have

- I. CH₃ – CH₂ – COH and CH₃ – CO – CH₃
- II. CH₃ – C₆H₄ – NH₂ and C₆H₅ – CH₂ – NH₂
- III. cis butenedioic acid and trans butenedioic acid
- IV. Butenol and butanone

- A. I
- B. II
- C. III
- D. IV
- E. None of the above

58. An organic compound with the formula CsH₁₀O gives a negative test with the reagent of Tollen, can undergo the addition of one mole of hydrogen per mole of compound and does not react Not with metallic sodium. Which of the following formulas below corresponds to This organic compound?

- A. CH₃-CH₂-CO-CH₂-CH₃
- B. CH₃-CH(OH) – CH=CH – CH₃
- C. CH₃ -CH₂-O-CH₂ – CH₂ – CH₃
- D. CH₃-CH₂-O-CH₂-CH=CH₂
- E. CH₃-CH₂-CH₂-CH₂-COH



59. What is the frequency of light that has a wavelength of 432m? Being Given that

$$C=3 \times 10^8 \text{ m.s}^{-1}$$

- A. $1.44 \times 10^{-15} \text{ Hz}$
- B. $1.44 \times 10^3 \text{ Hz}$
- C. $1.30 \times 10^{20} \text{ Hz}$
- D. $8.39 \times 10^{11} \text{ Hz}$
- E. $6.94 \times 10^{14} \text{ Hz}$

60. The ionization energy of an atom is:

- A. The number of electrons on the outermost shell of the atom
- B. The ease with which an atom can lose an electron
- C. The ease with which atoms can combine to form molecules
- D. Load on the Core
- E. None of the above

61. The ionization energy of an element is 1400K.J/mole. What is energy Ionization of an atom?

Given: Avogadro's constant = $6.02 \times 10^{23} \text{ mol}^{-1}$ and $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$.

- A. $2.32 \times 10^{-20} \text{ J}$
- B. $8.75 \times 10^{-21} \text{ J}$
- C. $2.32 \times 10^{-18} \text{ J}$
- D. $1.45 \times 10^{-2} \text{ eV}$
- E. $2.32 \times 10^{-1} \text{ eV}$

62. The energy level of the hydrogen atom is given by the relation $E_n = -13.6/n^2 \text{ eV}$. Where E_n is in eV. Given that $h = 6.62 \times 10^{-34} \text{ J.s}$, $C = 3 \times 10^8 \text{ m.s}^{-1}$ and $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$, the Frequency and wavelength emitted during radiation from $n=4$ to $n=1$ of the atom Of hydrogen are respectively:

- A. $1.92 \times 10^{14} \text{ Hz}$ and $1.56 \times 10^{-26} \text{ nm}$
- B. $3.08 \times 10^{15} \text{ Hz}$ and 97.5 m
- C. $1.92 \times 10^{14} \text{ Hz}$ and 97.5 nm
- D. $3.08 \times 10^{15} \text{ Hz}$ and $1.56 \times 10^{-26} \text{ nm}$
- E. $3.08 \times 10^{15} \text{ Hz}$ and 97.5 nm

63. Which of the following statements correctly describes the equilibrium constant of the reaction In the gas phase between H₂ and O₂ to form gaseous H₂O? A. $K_c = [H_2O]^1 [H_2]^1 [O_2]^1$

- B. $K_c = [H_2O]^2 / [H_2]^1 [O_2]^1$
- C. $K_c = [H_2O]^1 / [H_2]^2 [O_2]^1$
- D. $K_c = [H_2]^1 [O_2]^1 / [H_2O]^1$
- E. $K_c = [H_2O]$

64. Consider the reaction $2A + B \rightleftharpoons C + 3D$. If at equilibrium we find that the Molar concentrations of the individual species are A=1, B=4, C=8, D=2. Ouelle Will be the equilibrium constant?

- A. 1/16
- B. 16
- C. 4
- D. 6
- E. 16.4

65. Which of the following pairs of solutions of equal quantity could produce a Buffer ?

- A. NaOH and HCl
- B. HCl and NaCl



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- C. NH₃ and NHACl
 D. NaOH and HF
 E. HCl and NH₃,
66. When a solution of sodium chloride and a solution of ammonium nitrate are Mixed
 A. A precipitate forms
 B. A new salt forms
 C. A gas is released
 D. An acid and a base are formed
 E. No reaction occurs.
67. When solutions of barium chloride and sodium sulfate are mixed, The spectator ions in the resulting reaction are
 A. Ba²⁺ and SO₄²⁻
 B. Ba²⁺ and Cl⁻
 C. Na⁺ and SO₄²⁻
 D. Na⁺ and Ba²⁺
 E. Na⁺ and Cl⁻
68. The table below shows Ka values for some acid-base pairs

No	Acid/base couples	Ka
a)	H ₃ A ¹ /A ¹	1.78*10 ⁻⁵
b)	H ₃ A ² /A ²	5.01*10 ⁻⁸
c)	H ₃ A ³ /A ³	5.01*10 ⁻¹⁰
d)	H ₃ A ⁴ /A ⁴	6.31*10 ⁻⁵

Increasing acidity is in order as follows

- A. a,b,c,d
 B. d, a, b, c
 C. a,d,c,b
 D. a,c,d,b
 E. c,b,a,d
69. The table below shows the pKa values for some acid-base couples

No	Acid/base couples	pKa
a)	CH ₃ COOH/CH ₃ COO ⁻	4.75
b)	HClO/ClO ⁻	7.30
c)	NH ₄ ⁺ / NH ₃	9.30
d)	C ₆ H ₅ COOH / C ₅ H ₅ COO ⁻	4.20

The increasing alkalinity is in order as follows

- A. A, b, c, d
 B. d, a, b, c
 C. a, d,c,b
 D. a,c,d,b
 E. c,b,a,d



70. What is the concentration of sodium ions in a solution obtained by dissolving 3.55g Of NaSO₄(s) in 200 ml of water. Given that: Na(23), S (32) and O (16).

- A. 0.125M
- B. 0.500M
- C. 0.250M
- D. 0.025M
- E. 0.013M

71. Consider the following standard electrode potentials Sn⁴⁺ (aq) /Sn²⁺ (ag) E₀ = + 0.15V Fe³⁺ (aq) / Fe²⁺ (aq) E₀ = +0.77V Given the following reaction: Sn²⁺ (an) + Fe²⁺ (a) = Fe³⁺ (a) + Sn⁴⁺ Which of the following statements is correct?

- A. The cell diagram is given as Pt/Sn²⁺ (aq), Sn⁴⁺/Fe³⁺ (aq) // Fe²⁺ (aq), Pt
- B. The spontaneous reaction will be from right to left
- C. Sn is the species which has been reduced
- D. Fe is the species that has been oxidized
- E. The electromotive force (emf) of the cell is -0.62 volts.

72. 6.4g of sulfur react with 4.1g of aluminum to produce aluminum sulfite (2Al + 3S → Al₂S₃).

Given that S (32 g.mol⁻¹) and Al (27g.mol⁻¹), the mass of sulfite of aluminum obtained is:

- A. 10.50 g
- B. 10.00 g
- C. 11.39g
- D. 8.20g
- E. 19.20 g

73. During a redox or acid/base titration reaction, the chemical species of which The concentration to be determined is

- A. Placed in the conical vial only
- B. Placed in burette only
- C. Placed either in the conical flask or in the burette
- D. All of the above
- E. None of the above

74. During an oxidation-reduction (redox) reaction

- A. The stronger oxidizing agent always reacts with the weaker reducing agent
- B. The weaker oxidizing agent always reacts with the weaker reducing agent
- C. The weakest oxidizing agent always reacts with the strongest oxidizing agent
- D. The strongest oxidizing agent always reacts with the strongest reducing agent
- E. The oxidizing agent can react with any reducing agent

75. The oxidation numbers of nitrogen in the following compounds: N₂O, HNO₃, Na₃N and NH₃ are respectively HAS.

- A. -1, -5, -2 and -3
- B. +2, +1, -2 and -3
- C. +1, +5, -2 and -3
- D. +2, -1, +2 and -3
- E. None of the above



PHYSICS

Instruction; For each of the following questions or statements, choose the only one Best answer among the options offered

76. Two electric charges of -6 pC and $+6 \text{ MC}$ are placed respectively in two points A and B 1m apart. The electric field is zero at the point

- A. Located in the middle of segment AB
- B. Located outside segment AB at 1m of A
- C. Located outside segment AB at 1m of B
- D. Outside the AB line
- E. None of the above

77. The intensity of the current which passes through a circuit for 40 minutes and gives a Efficiency of 24100 C is:

- A. 603 A
- B. 10A
- C. 0.1A
- D. $5.8 \times 10^7 \text{ A}$
- E. None of the above

78. A resistance motor 292 powered by a voltage of 220 V and crossed by a Current of 10A has a mechanical power of:

- A. 20W
- B. 2KW
- C. 20KW
- D. 200W
- E. None of the above

79. The intensity of the electric force exerted by a charge of $-5 \times 10^{-9} \text{ C}$ on another Load of $+10^{-5} \text{ C}$ separated by a distance of 20m is ($K = 9 \times 10^9 \text{ SI Units}$)

- A. 11.25 N
- B. 2.25 N
- C. $1.125 \times 10^{-11} \text{ N}$
- D. 11.25 N
- E. None of the above

80. The value of the electromotive force induced in a coil of negligible resistance Is $4.5 \mu\text{V}$. What is the value of the voltage across this coil?

- A. $3.5 \mu\text{V}$
- B. $6.3 \mu\text{V}$
- C. $5.3 \mu\text{V}$

- D. $4.5 \mu\text{V}$
- E. None of the above

81. 314m of insulated copper wire with a radius of 1mm are rolled up in turns around a Cylindrical core 10cm in diameter. The number of turns of this solenoid is

- A. 5 rounds
- B. 500 rounds
- C. 1000 rounds
- D. 1500 rounds
- E. None of the above

82. When a wire potentiometer is used to compare two electromotive force (emf), good experimental techniques include

- 1- Verification of yarn uniformity
 - 2- The use of a very sensitive currentmeasuring instrument
 - 3- Always checking the constantcurrent through the wire.
- A. 1, 2, 3 are correct
 - B. 1, 2 only
 - C. 2.3 only
 - D. 1 only
 - E. 3 only

83. The corpuscular character of light is demonstrated experimentally by

- A. Scattering
- B. Diffraction
- C. Light interference
- D. Refraction
- E. None of the above

84. If the ^{234}Th atomic novau emits a p particle, the resulting nucleus will contain

- A. Neutrons: 234 and Protons: 91
- B. Neutrons: 234 and Protons: 89
- C. Neutrons: 91 and Protons: 91
- D. Neutrons: 148 and Protons: 82
- E. Neutrons: 143 and Protons: 91

85. Photoelectric emission is



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- A. Independent of light output
 B. Independent of the frequency of the light radiation
 C. Independent of the threshold frequency of the metal
 D. Lighting duration function
 E. None of the above
86. For a given light-emitting cell, which of the following is Correct?
- A. The electrical current output depends on the wavelength of radiation used
 B. The threshold frequency does not depend on the cathode metal but on the anode metal
 C. The threshold frequency depends on the number of photons arriving per second on the cathode
 D. The intensity of the current output is greater when the cell is turned on with Visible light than with ultraviolet light
 E. All of the above
87. When $^{110}_{49}\text{In}$ undergoes a positron emission, the nucleus produces
- A. $^{111}_{49}\text{In}$
 B. $^{110}_{48}\text{In}$
 C. $^{111}_{50}\text{In}$
 D. $^{109}_{50}\text{In}$
 E. $^{109}_{49}\text{In}$
88. A radioactive sample of bismuth 210 has an activity of $9.15 \times 10^{13} \text{ Bq}$. On average, How many disintegrations occur per second in this sample?
- A. 9.15×10^{13}
 B. 4.57×10^{13}
 C. 31.90×10^{13}
 D. 60.17×10^{13}
 E. 91.53×10^{13}
89. The activity of a laboratory sample of iodine is $1.85 \times 10^0 \text{ Bq}$ at the time of transmission. On arrival, the activity value is $1.55 \times 10^0 \text{ Bq}$. Knowing that his Half-life is 8.04 days, what was the time to delivery?
- A. 2.05 days
 B. 0.80 days
 C. 0.02 days
- D. $6.0 \times 10^0 \text{ days}$
 E. 2.15 days
90. The threshold frequency of a photoemissive cell is a function
- A. Intensity of the photoelectric current
 B. Of the wavelength of the light radiation
 C. Target metal
 D. Of the mass of the electron
 E. None of the above
91. The origin of Laplace's force is
- A. Thermodynamics
 B. Atomic
 C. Electromagnetic
 D. Mechanical
 E. Nuclear energy
92. The distance between the earth(t) and the moon() is $384 \times 10^3 \text{ km}$ and the ratio of the masses of the Two planets is $M/M = 81.5$. The point of equigravity on the axis between the two Planets is at
- A. 4654.5 km from the moon
 B. 79345.5 km from the earth.
 C. 38293.8 km from the moon.
 D. 382937.9 km from the earth.
 E. 345706.2 km from the moon
93. The resultant force exerted on a solid of mass 5 tons is $4 \times 10^4 \text{ N}$. The center Of gravity of this solid moves with an acceleration of magnitude:
- A. 8 m/s?
 B. 0.125 m/s?
 C. 25 m/s?
 D. 2.5 m/s?
 E. 0.25m/s?
94. Two steel balls Bi and Ba can fall from the same horizontal plane at a height 25 m to the ground. At the initial moment Bi is released without speed while B_a is Launched with a horizontal speed of 5m/s. At time t= 1.5s:
- A. The height of Bi is greater than that of B_a
 B. The height of B_a is greater than that of Bi
 C. The heights of the two balls are equal
 D. The magnitudes of the velocities of the

- two balls are equal
- E. None of the above Questions 95 to 98:
- A ball is launched from a point 0 on horizontal ground with an inclined speed V_0 At an angle α with respect to the horizontal. By neglecting airresistance and Assuming the ball is a point mass:
95. During the movement of the ball, the acceleration vector
- Stays parallel to the flight path and in the same direction
 - Remains parallel to the flight path but in the opposite direction
 - Stay perpendicular to the flight path
 - Change the direction at the top of the trajectory
 - None of the above
96. At the top of the trajectory the speed is
- Nil
 - Vertical
 - Minimal
 - Maximum
 - None of the above
97. The height of the trajectory at the top is
- Independent of V_0 .
 - Independent of angle α .
 - Proportional to V_0 .
- D. Inversely proportional to V_0 .
- E. Proportional to the square V_0
98. The duration of the movement of the ball is
- Independent of V_0 .
 - Proportional to V_0 .
 - Inversely proportional to V_0 .
 - Proportional to the square of V_0 .
 - None of the above
99. A star with twice the mass of the sun has a gravitational field of $2.65 \times 10^{12} \text{ N.kg}^{-1}$ at its surface. Given: mass of the sun $M = 1.99 \times 10^{30} \text{ kg}$, the Gravitational constant $G = 6.67 \times 10^{-11} \text{ USI}$. The radius of the star is 7 km
- 14 km
 - 10 km
 - 13 km
 - None of the above
100. The magnitude of the gravitational field due to a solid of mass $7.35 \times 10^{22} \text{ kg}$ in one Point located at $3.85 \times 10^6 \text{ m}$ is:
- $1.3 \times 10^4 \text{ N.kg}$
 - $3.3 \times 10^{-5} \text{ N.kg}$
 - $3.3 \times 10^5 \text{ N.kg}^{-1}$
 - $2.6 \times 10^{-3} \text{ N.kg}^{-1}$
 - None of the above

SECTION II

GENERAL KNOWLEDGE SCIENTIFIC FIELD

INSTRUCTIONS: For each of the following questions or statements, choose the single best answer from the options given

1. Civic education is defined as

- The study of the political, economic and social life of the nation
- An individual who deserves the right to settle in a given community
- The reaction between an individual and his community
- The right of individuals to civil rights and fundamental freedoms
- None of the above

2. A function of the APE is to

- Hire teachers to promote pedagogy in schools

- Provide the school with its rules of procedure
- Decide on the location of schools
- Set up a school management committee to carryout the projects

3. Which of the following is not a cause of road accidents in Cameroon?

- Poor road conditions
- Poor condition of vehicles
- Drunkenness, fatigue and dizziness of drivers
- Numerous speed bump



Tel: 652202721

- j. Non-compliance with traffic signs or the Highway Code
- 4. The regular source of income of the municipal commune is:**
- a. Parking fees
 - b. Toll collection
 - c. Customs duties
 - d. Audiovisual license fee
 - e. All of the above
- 5. All the following propositions are negative effects of the rural exodus on the except one; which?**
- a. The development of ghettos in cities
 - b. Unemployment
 - c. Housing and traffic congestion
 - d. The high crime wave
 - e. The spread of sexually transmitted infections
- 6. The smallest administrative unit in Cameroon is:**
- a. Rounding
 - b. Departments
 - c. The region
 - d. District
 - e. Chiefdom
- 7. The largest administrative unit of Cameroon is:**
- a. The department
 - b. Rounding
 - c. The region
 - d. The urban community
 - e. None of the above
- 8. A measure to conserve the natural environment is:**
- a. Proper Waste Disposal
 - b. Collecting and burning dirt
 - c. Dumping of waste into streams and rivers
 - d. Collecting and burying garbage in the ground
 - e. All of the above
- 9. A decision of national importance that allows the electorate to choose among alternative questions or proposals is called:**
- a. The plebiscite
 - b. Democracy
 - c. The referendum
 - d. Armistice
- e. Social democracy
- 10. The constitution which obliges the president of the republic and other high officials to declare their assets was adopted in:**
- A. A.1960
 - B. B.1961
 - C. C.1972
 - D. D.1984
 - E. E.1996
- 11. At one time or another, the conduct of elections in Cameroon has been entrusted to the following bodies except one; which ?**
- a. A.ONEL
 - b. MINAT
 - c. CONAC
 - d. D.ELECAM
 - e. None of the above
- 12. The head office of the BEAC is at:**
- a. Brazzaville
 - A. B.Libreville
 - B. Yaounde
 - C. Bangui
 - D. N'djamena
- 13. A document that sets out the rules governing the relationship between employers and employees is called:**
- a. The labor code
 - b. The penal code
 - c. The Code of Criminal Procedures
 - d. The National Social Security Code
 - e. The Civil Code
- 14. In what year was the Cameroon Human Rights Commission created?**
- A. A.2002
 - B. B.2004
 - C. C.2006
 - D. 2008
 - E. 2010
- 15. Which United Nations body adopted the Universal Declaration of Human Rights in 1948?**
- a. The International Court of Justice
 - b. The Security Council
 - c. The International Labor Organization
 - d. The General Assembly of the United Nations

e. UNICEF

16. To determine the relationship between the frequencies of dominant and recessive alleles in a population, Hardy and Weinberg proposed that these frequencies will remain constant from generation to generation provided that:

- a. Populations are small
- b. Mutations occur
- c. Populations overlap
- d. Mating is random
- e. All of the above

17. A DNA library consists of:

- a. A collection of all the present traits of an organism
- b. A collection of DNA fragments representing the entire genome of an organism
- c. A collection of DNA fragments representing different organisms
- d. A collection of plasmids found in a single bacterial species
- e. None of the above

18. Which of these associations is that of lichens?

- a. Fungi and plants
- b. Mushrooms and man
- c. Fungi and Algae
- d. Fungi and Termites
- e. None of the above

19. Natural selection is also known as:

- a. Adaptive Radiation
- b. Convergent evolution
- c. Speciations
- d. Survival of the Fittest
- e. None of the above

20. Bright colors in certain parts of the plant are made possible by which of the following organelles in the cells of these parts?

- a. Microbodies
- b. The chloroplast
- c. The sap vacuole
- d. Plasmodesmata
- e. None of the above

21. After a car accident, a man had trouble balancing while walking but he could still hear well. What body structures

might have been damaged

- a. The brain
- b. The cerebellum only
- c. The cochlea
- d. Semicircular canals only
- e. The cerebellum and semicircular canals

22. Which of the following statements is characteristic of carbohydrates?

- a. They are all made of disaccharides
- b. All have α -1,4 glycosidic bonds
- c. All have many hydrogen groups
- d. They have a general formula: CX(H₂O)_Y, where X and Y are variable numbers
- e. None of the above

23. A man with underdeveloped testicles, breast development, subnormal intelligence and an abnormal karyotype is likely to have:

- a. Klinefelter syndrome
- b. Down syndrome
- c. Turner syndrome
- d. Huntington's disease
- e. Wegener's disease

24. Which of these organisms has the most number of cavities in its heart?

- a. The amphibian
- b. Reptile
- c. The bird
- d. The shark
- e. None of the above

25. A transgenic organism is characterized by the presence of:

- a. Plasmid
- b. Recombinant DNA
- c. Recombinant RNA
- d. Restriction endonucleases
- e. None of the above

26. The overall objective of the Calvin cycle is to:

- a. Generate ATP molecules
- b. Generate NADPH
- c. Assist plants in tissue replication
- d. Make Organic Molecules
- e. All of the above

27. Asexual reproductive organisms show little or no genetic variation. Which of the following statements about asexual reproduction is not true?

- a. Asexual reproduction does not involve the formation of gametes
- b. Asexual reproduction involves only one parent
- c. During asexual reproduction many offspring are produced
- d. In asexual reproduction, no fusion of gametes is involved
- e. None of the above

28. The parasitic prototist that causes dysentery is:

- a. Amoeba histolytica
- b. Entamoeba gingivalis
- c. Shigellae dysenteria
- d. Entamoeba histolytica
- e. Taenia saginata

29. DNA replication requires all but one of the following substrates which one?

- a. DNA polymerase
- b. Deoxyribonucleotides
- c. DNA helicase
- d. RNA polymerase
- e. None of the above

30. In flowers when the anthers open with the stigma, we speak of:

- a. Protogyny
- b. Protandry
- c. Ceistogamy
- d. Dichogamy
- e. None of the above

31. The following statements about polyploidy are true except one; which ?

- a. It is when the cells contain multiples of the haploid number of chromosomes
- b. It can be induced by the drug called colchicine
- c. It is as a result of a non-disjunction in the division

Part E : Language

FRENCH (FOR THE CANDIDATES WHO HAVE CHOSEN ENGLISH AS THEIR FIRST LANGUAGE)

Instructions: Les chiffres dans le passage suivant correspondent aux mots qui manquent. Complétez le passage en choisissant les mots justes dans la liste des options pour chaque chiffre.

Le scanner est un appareil récent **36** on doit l'intervention au professeur Hounsfield. Il permet de réaliser un examen **37** le médecin prescrit et **38** on ne doit pas avoir peur car il

- d. It only occurs in plants
- e. None of the above

32. Which scientist discovered penicillin

- a. Jacob Monad
- b. Alexander Flemming
- c. Alma Alta
- d. Mendeleev
- e. James Watson

33. In which year did Watson and Crick propose the double helix structure of DNA

- A. 1953
- B. 1954
- C. 1973
- D. 1974
- E. 1983

34. Which organisms causes syphilis

- a. *Treponemma pallidum*
- b. *Treponemma palidum*
- c. *Trepponema pallidum*
- d. *Trepanoma pallidum*
- e. *Treponema pallidum*

35. Fats soluble vitamins include the following except

- a. A
- b. D
- c. E
- d. K



n'est pas douloureux. C'est un examen **39** utilise les rayons X émis par un arceau rotatif **40** glisse le lit d'examen **41** est allongé le patient. Il donne des images en coupe du corps humain **41** on peut diagnostiquer des pathologies abdominales, neurologiques, thoraciques, orthopédiques.

- 36.** A. Dont
B. Que
C. Qui
D. Où
E. Auquel

- 37.** A. Dont
B. Que
C. Auquel
D. Qui
E. Où

- 38.** A. Auquel
B. A laquelle
C. Que

- D. Dont
E. Que on

39.

- A. Où
B. Que
C. Qui
D. Dont
E. Auquel

40.

- A. Dans lequel
B. Auquel
C. A laquelle
D. Duquel
E. Dont

41.

- A. Que
B. Auquel
C. Qui
D. Sur lequel
E. A laquelle

42.

- A. Grâce auxquelles
B. Grâce auquel
C. Grâce à laquelle
D. Grâce auxquels
E. Grâce à qui



Instructions: Pour chaque phrase ci-dessous, choisissez le mot manquant parmi les options proposées.

- 43. Elle tous les matins avant de sortir.**

- A. Se lave
B. Se laves
C. Se lavent
D. S'est lavé
E. Se laver



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- 44. Les étudiants les samedis matins.**
- A. Vais
 - B. Allons
 - C. Vont
 - D. Aller
 - E. Allez
- 45. Mexique est un beau pays: n'est ce pas ?**
- A. La
 - B. Du
 - C. Au
 - D. Le
 - E. En
- 46. Le surveillant général doit trouver une punition aux élèves.**
- A. Aux
 - B. Au
 - C. Les
 - D. L'
 - E. En
- 47. Maman ne mange pas viande. Elle a un problème de goutte.**
- A. De la
 - B. De
 - C. La
- 48. Les chambres de hôtel sont climatisées.**
- A. Ce
 - B. Ces
 - C. Cette
 - D. Sette
 - E. Cet
- 49. « Avoir le cœur sur la main » veut dire être**
- A. Courageux
 - B. Timide
 - C. Généreux
 - D. Peureux
 - E. Facile
- 50. Quand l'orateur le silence, il commença son discours.**
- A. A obtenu
 - B. Aura obtenu
 - C. Aurait obtenu
 - D. Eut obtenu
 - E. Avait



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**2020 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING
IN CAMEROON**

BIOLOGY

- 1.An animal tissue made up of a single layer of flat cells functioning in the rapid diffusion of substances may be located in ;
A.Alveoli of the lungs
B.Ileum
C.Salivary glands
D.Urinary bladder
E.None of the following above
- 2.The genetic function of restriction endonucleases during a genetic process could be :
A.Adding new nucleotides to a growing DNA strand
B.Joining nucleotides during replication
C.Joining nucleotides at specific sites during the process
D.Cutting nucleic acids at specific sites during the process
E.All responses above
- 3.The bonds that stabilize the secondary structure of protein molecules are
A.Peptide bonds
B.Hydrophobic interactions
C.Ion bonds
D.Hydrogen bonds
E.None of the above
- 4.Which of the following two enzymes is required to produce recombinant DNA ?
A.Endonuclease and transcriptase
B.Endonuclease and Ligase

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- C.Polymerase and Ligase
D.Transcriptase and Ligase
E .Polymerase and transcriptase
5.The base sequence in the codon of the messenger ribonucleic acid(mRNA) transcribed by the triplet CTA on deoxyribonucleic acid(DNA) is :

- A.GAT
B.GTA
C.GAU
D.AAG
E.None of the above

- 6.Hormones produced by the anterior pituitary gland are called trophic hormones because :
A.They stimulate other glands to produce their hormones
B.They promote the growth of trophic organs
C.They promote the growth of secondary sexual characteristics
D.The hormones they release are produced in the hypothalamus
E.None of the responses above

7.In muscle contraction,the role of tropomyosin is :

- A.To bind calcium ions
B.To activate and deactivate the contractile mechanism
C.To bind troponin to tropomyosin
D.To inhibit any interaction between

- the actin and myosin filaments
- E.None of the above
- 8.What is the main product of cyclic phosphorylation ?
- A.NADP reduced
- B.Oxygen
- C.NADPH2
- D.ADP
- E.ATP
- 9.What causes depolarisation of the post synaptic membrane ?
- A.Fusion of synaptic vesicles with the presynaptic membrane
- B.Fusion of synaptic vesicles with the post synaptic membrane
- C.The transmitter substance diffusing through the synaptic cleft
- D.The precipitation of calcium ions in the synaptic button
- E.None of the above
- 10.Which of the following joints allows a free rotation of the limb ?
- A.Pivot joint(Trochoid joint)
- B.Hinge joints(Trochlea joint)
- C.Sliding joint(Flat joint)
- D.Ball joint(Spheroid joint)
- E.None of the following
- 11.Which of the following processes of meiosis leads to the formation of new genetic combinations in daughter cells ?
- A.The synapse
- B.Crossing over
- C.The formation of bivalents
- D.The formation of chiasms
- E.None of the above
- 12.The size of a cell was observed at 5mm using a microscope with a magnification power of 50,000.What is the actual size of the cell ?
- A.0,0001mm
- B.0,0005mm
- C.10,000mm
- D.250,000mm
- E.None of the above
- 13.Plant hormones differ from animal hormones in :
- A.That they are synthesized in very specific parts of the plant
- B.That they are effective only at high concentrations
- C.That they are transported by the phloem to their target areas
- D.That they act locally
- E.All of the above answers
- 14.The most appropriate definition of animal growth is :
- A.Irreversible increase in cell size
- B.Irreversible increase in the number of cells in an organism
- C.Irreversible increase in dry mass of an organism
- D.Irreversible increase in the complexity of an organism
- E.None of the above answers
- 15.According to the hypothesis of Jacob and Monod,in the regulation of genes ,operon is composed of :
- A.Operator gene and promoter gene

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- B.Operator gene and regulator gene
C.Operator gene and structural gene
D.Operator gene and terminator gene
E.None of the answers above
- 16.The part of the brain containing the cardiovascular and respiratory centres is :
A.The brain
B.The hypothalamus
C.The cerebellum
D.The medulla oblongata
E.None of the answers
- 17.Which of the following statements about the alleles is false ?Alleles determine :
A.The colour of your eyes
B.The colour of your skin
C.The shape of your body
D.Your speech
E.All of the above
- 18.DNA and RNA :
A.Differs only by sugar
B.Differs in sugar and purines
C.Differs in sugar and pyrimidine
D.Differs in sugar and phosphate
E.None of the above
- 19.Modifications of proteins and lipids into glycoproteins and lipoproteins occurs in :
A.Ribosomes
B.Golgi bodies
C.Smooth endoplasmic reticulum
- D.All the answers above
E.None of the answers above
- 20.Competitive inhibitors prevent an enzyme from functioning in
A.Changing the form of the enzyme
B.Merging instead with the substrate
E.Blocking the active site of the enzyme
D.Combining with the product of the reaction
E.None of the above
- 21.The pressure caused by the contraction of the cardiac ventricle is :
A.Venous
B.Atrial
C.Systolic
D.Diastolic
E.None of the above
- 22.Which of the following factors will most likely affect the speed of cell division ?
A.Cell crowding
B.Cell size
C.Atmospheric pressure
D.Temperature
E.None of the above
- 23.Which of the following best describes a bacteriophage ?
A.A bacterium that destroys viruses
B.A virus that destroys bacteria
C.A bacterium that destroys other bacteria
D.A bacterium that destroys fungi

Tel: 652202721

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- E.A bacterium that destroys parasites
- 24.Where are purkinje fibres located in the heart ?
- A.His
 - B.Beam ventricles
 - C.Septum
 - D.Atria
 - E.Pericardium
- 25.Mitochondria is considered a semi-autonomous organelle due to the presence of :
- A.F1 particles
 - B.DNA
 - C.RNA
 - D.Ridges
 - E.None of the above
- 26.Whic of the following is not a function of insulin ?
- A.Increased oxidation of glucose in the cell
 - B.Increased permeability of the cell membrane to glucose
 - C.Initiation of conversion of excess glucose into glycogen
 - D.Initiation of the conversion of excess glycogen into glucose
 - E.None of the above
- 27.At the time of implantation in the uterus,the human embryo is called :
- A.Zygote
 - B.Foetus
 - C.Embryo
 - D.Blastocyte
- E.None of the above
- 28.What characteristic of water makes its temperature change slowly ?
- A.Its high surface tension
 - B.Its high latent heat of vaporization
 - C.Its high density
 - D.Its high specific thermal capacity
 - E.Its low specific thermal capacity
- 29.What happens if the lysosomal membrane breaks down accidentally ?
- A.Hydrolases will be inactivated
 - B.Hydrolases will digest the cellular components
 - C.Hydrolases will increase pH
 - D.Hydrolases will divide the cell
 - E.None of the above
- 30.Which of the following is a chemical emmitter in the synapse of a neuron ?
- A.Copper ions
 - B.Adrenaline
 - C.Acetylcholine
 - D.Cholesterol
 - E.None of the above
- 31.The chemical bond between glycolysis and kreb's cyce is :
- A.Pyruvic acid
 - B.Acetyl Co-A
 - C .Oxaloacetic acid
 - D.Citric acid
 - E.Acetylcholine
- 32.When a cell is completely turgescent,which of the folowing values

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will be zero ?

- A.Turgid pressure
- B.Water potential
- C.Wall pressure
- D.Osmotic pressure
- E.None of the above

33.In which part of the cell does amino acid activation occur during protein synthesis ?

- A.Cytoplasm
- B.The nucleus
- C.On ribosomes
- D.The rough endoplasmic reticulum
- E.None of the above

34.Which of the following statements is true about the egg released during ovulation ?

- A.He has completed the Meiotic division
- B.He is in metaphase II of the meiotic division
- C.He is in prophase I of the meiotic division
- D.He has completed the first meiotic division
- E.None of the above

35.Which of the following cells can undergo meiotic division ?

- A.Sperm and ova
- B.Liver cells and blood cells
- C.Oocytes and spermatogonia
- D.Root cells and short tips(plants)
- E.None of the above

36.Which mammalian gland produces cortisol ?

- A .The parathyroid gland
- B.The adrenal gland
- C.The pituitary gland
- D.The thyroid gland
- E.None of the above

37.What are autosomes ?

- A.Somatic chromosomes
- B.Chromosomes found in mitochondria
- C.Chromosomal abnormalities leading to genetic abnormalities
- D.Chromosomes found in the nucleus
- E.Chromosomes found in the cytoplasm

38.A woman with blood type O can never have a child with :

- A.Blood group A
- B.Blood group B
- C.Blood group O
- D.Blood group AB
- E.None of the above

39.Resting potential is maintained by :

- A.Active transport and osmosis
- B.Active transport and facilitated diffusion
- C.Facilitated diffusion and osmosis
- D.Osmosis only
- E.Active transport and ion channels at controlled voltage

40.In human females,the first polar body :

Tel: 652202721

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- A.Not produced before fertilization
B.Divides to give the second polar body
C.Forms at ovulation
D.Forms only if fertilization occurs
E.None of the above
- 41.Where is cornified epithelium in a mammal ?
A.The oral cavity
B.The surface of the skin
C.The vaginal mucosa
D.The esophagus
E.The rectum
- 42.The protein part of a functional enzyme is called :
A.The holoenzyme
B.The apoenzyme
C.The allosteric enzyme
D.The coenzyme
E.None of the answers
- 43.The enzyme and vitamin needed for blood clotting are :
A.Thrombokinase and Vitamin K
B.Fibrinogen and vitamin A
C.Prothrombin and vitamin B1
D.Albumin and Vitamin C
E.Cholinesterase and vitamin K
- 44.The function of the liver that causes the production bile pigments is :
A.The deamination of proteins
B.The detoxification of cellular metabolic toxins
- C.The degradation of hormones
D.The degradation of fats
E.The degradation of hemoglobin
- 45.The absence of this vitamin in the diet leads to the deficiency disease called scurvy.Which one ?
A.Vitamin A
B.Vitamin B
C.Vitamin D
D.Vitamin E
E.Vitamin C
- 46.The optimal Ph for the functioning of the pepsin enzyme is
A.7.0
B.2.0
C.5.0
D.8.0
E.6.0
- 47.The phase at which gastrin is stimulated to release HCl in the stomach is :
A.The gastric phase
B.The intestinal phase
C.The cephalic phase
D.The conditioned phase
E.None of the above
- 48.The transport of soluble final products of carbohydrate and protein digestion through the intestinal mucosa into the blood capillaries of the villi is done by :
A.Diffusion and Osmosis
B.Diffusion and active transport

Tel: 652202721

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- C.Endocytosis and Exocytosis
D.Endocytosis and pinocytosis
E.Endocytosis only
- 49.In humans,iodized salts in children's food prevent against
- A.Gigantism
B.Acromegaly
C.Constipation
D.Rickets
E.Cretinism
- 50.Hemophilia is inherited as a sex-related recessive trait.What is the probability that a woman with a normal father who marries a normal man has children with this trait ?
- A.100%
B.25%
C.50%
D.60%
E.75%

CHEMISTRY

51. The molarity of a solution is ;
- The number of moles per volume in dm³
 - The number of moles per volume in cm³
 - The mass of solute in a given volume
 - One mole of solute in a volume of 1dm³*
 - None of the above
52. Isotopes always have
- The same mass number
 - The same atomic number*
 - The same number of neutrons
 - The same sub-atomic structures
 - All of the above
53. The process which causes an increase in atomic number by 1 unit is
- Electron capture
 - β emission
 - α emission
 - γ emission
 - None of the above
54. Which of the following molecules does not possess a permanent dipole?
- CH₂Cl
 - C₂Cl₆
 - CH₃OCH₃
 - NCl₃
 - None of the above
55. Which name is given to the energy change represented by the equation; Na(s) → Na(g)?
- Atomisation
 - Vaporisation
 - Formation of gaseous sodium atoms
 - Evaporation
 - None of the above
56. The standard enthalpy of formation of an element in its standard state at 298K is;
- Always positive
 - Always negative
 - Zero
 - Positive and negative depending on their states
 - None of the above
57. The vapour pressure of an ideal solution of 2 liquids A and B, containing equal number of moles of A and B at 25°C, is 1atm. Given that the vapour pressure of pure liquid A at the same temperature is 0.158atm, the vapour pressure of pure liquid B will be:
- 0.79atm
 - 0.92atm
 - 1.84atm
 - 0.842atm

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- e. 0.084 atm
58. Which of the following systems is not in a state of dynamic equilibrium at room temperature?
- Iodine in a closed vessel
 - NO_2 gas in a closed vessel
 - A copper band in aqueous copper sulphate
 - A cell through which a constant is being passes*
 - None of the above
59. The reaction $\text{NaH(s)} + \text{NH}_3\text{(aq)} \rightarrow \text{H}_2\text{+NaNH}_2\text{(s)}$ can be classified as
- An addition reaction
 - A redox reaction
 - A substitution reaction
 - A neutralisation reaction*
 - None of the above
60. Define a strong acid
- One which dissolves completely in water
 - One which ionises completely in water
 - One which dissociates partially in water
 - One which decomposes completely in water*
 - One which doesn't dissolve in water
61. The redox reaction $\text{Pb(s)} + 2\text{Ag}^+\text{(aq)} \leftrightarrow \text{Pb}^{2+}\text{(aq)} + 2\text{Ag(s)}$ indicates that:
- Pb is below Ag in the electronic series
 - Ag atoms are oxidized as they each gain an electron
 - There is a transfer of 2 electrons from each lead ion to 2 silver ions*
 - Pb is a stronger oxidising agent than Ag
 - None of the above
62. Of the methods proposed below, which two are the most appropriate to determine the speed of the reaction?
- Gas volume and colorimetry
 - Pressure of gas emitted and dilatometry
 - Titrimetry and colorimetry
 - Titrimetry and volume of emitted gas*
 - none of the above
63. 2 factors that can affect the speed of this reaction are:
- Concentration and catalyst
 - Surface area of Mg and catalyst
 - Concentration and surface area of Mg*
 - Temperature and pressure of HCl
 - None of the above
64. An atom or group of atoms which are rich or deficient in electrons are called;
- Anions
 - Cations
 - Protons
 - Ions*
 - None of the above
65. Which of the following statements are true for the modern periodic table?
- The periodic table is based on the atomic masses of elements
 - The horizontal rows of the periodic table are called groups
 - The periodic table is based on the electronic structure of elements*
 - In the periodic table, rows are called groups and columns are called periods
 - None of the above
66. Which of the following compounds supposedly has a higher degree of ionic character?
- Caesium sulfide
 - Francium sulfide*
 - Rubidium sulphide
 - Rubidium selenide

Questions 62 & 63:

Magnesium reacts with dilute hydrochloric acid following the equation
 $\text{Mg(s)} + 2\text{HCl(aq)} \rightarrow \text{H}_2\text{(g)} + \text{MgCl}_2\text{(aq)}$

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- e. None of the above
67. Which of the chlorides below decomposes most easily upon heating?
- SnCl_2
 - SnCl_4
 - PbCl_2
 - PbCl_4
 - None of the above
68. CO_2 and SiO_2 are both
- Gaseous at room temperature
 - Soluble in dilute hydrochloric acid
 - Soluble in concentrated aqueous sodium hydroxide*
 - Amphoteric oxides
 - All of the above
69. As the atomic number of group IV elements increases, their dioxides become
- More covalent
 - More acidic
 - More stable to heat*
 - Stronger oxidising agents
 - All of the above
70. Which of the following properties of halogens decreases with increase in RAM?
- Absorption of visible light
 - First ionisation energy*
 - Metallic character
 - Melting point
 - None of the above
71. Alkanes
- Are all straight chained hydrocarbons
- b. Have a general formula of C_nH_{n+1}
- c. *Undergo substitution reactions*
- d. Are unsaturated hydrocarbons
- e. All of the above
72. 2-hydroxypropanoic acid
 $[\text{CH}_3\text{CH}(\text{OH})\text{COOH}]$ is a molecule which exhibits
- A geometric isomerism*
 - Optical isomerism
 - Tautomerism
 - Metamerism
 - None of the above
73. Which of the following is not a nucleophile
- OH
 - CN
 - NH_3
 - BF_3
 - None of the above
74. Isomers have
- The same structural formula
 - The same functional group
 - The same crystalline structure
 - The same percentage by mass
 - None of the above
75. Phenol was added to a reagent X and an uncoloured homogenous solution was formed. Which of the following substances could be X?
- Br(aq)
 - NaCl(aq)
 - HCl(aq)
 - NaOH(aq)
 - None of the above

PHYSICS

76. The S.I unit of work done on an object is?
- $\text{Kg m}^2 \text{s}^{-2}$
 - $\text{Kg m}^2 \text{s}^{-1}$
 - Kg m s^{-2}
 - $\text{Kg m}^3 \text{s}^{-2}$
 - $\text{Kg m}^2 \text{s}^2$
77. Which of the following physical quantities are all scalar?
- Each time the speed of a body changes,

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- its velocity also changes
- B) If the body has a constant speed, it is possible for it to have an acceleration
- C) If it was brought to rest, it is not possible for it to start moving if the resultant force acting on it is null
- D) Even without acceleration, it is possible for a body to change its speed
- E) All of the above
79. A block X of mass 3 Kg is accelerated from rest by a force of 5 N during 2 seconds. An identical block accelerated by a force of 5 N of during 4 seconds. The ratio of the kinetic energy of X to the kinetic energy of Y after acceleration is
- A) 2:1
B) 2:4
C) 1:4
D) 5:3
E) 2:3
80. Since an electron carries a charge of magnitude $1.6 \times 10^{-19} C$ how many electrons per second cross a conductor when it carries a current of 1.00 mA
- A) 6.25×10^{19}
B) 6.25×10^{15}
C) 1.0×10^{15}
D) 6.25×10^{-19}
E) 1.0×10^{-15}
81. The length per unit resistance of a copper wire has a value of 7.63 mm per ohm, with a diameter of 1.450 mm. This corresponds to a resistivity of
- A) $2.16 \times 10^{-4} \Omega m$
B) $1.72 \times 10^4 \Omega m$
C) $5.04 \times 10^4 \Omega m$
D) $7.63 \times 10^{-3} \Omega m$
E) None of the above
82. An ideal gas dilates in an isothermal manner and absorbs a quantity of thermal energy equal to 500 J, the amount of work done during the expansion is
- A) 1000 J
B) 1500 J
C) 0 J
D) -500 J
E) 750 J
83. A sample of gas of volume $1.5 \times 10 m^3$ at a pressure of $3 \times 10^5 Pa$. What is the new volume when pressure is reduced by half at constant temperature?
- A) $0.75 \times 10^5 m^3$
B) $4.5 \times 10^5 m^3$
C) $3.0 \times 10^5 m^3$
D) $1.5 \times 10^5 m^3$
E) $2.0 \times 10^5 m^3$
84. Which of the following affirmations on potential energy and the force between 02 molecules is not true?
- A) The potential energy and the force turn to zero at infinity
B) The potential energy is lowest at equilibrium position
C) The potential energy and the force are equal at equilibrium separation
D) At equilibrium separation, the force between two molecules is null
E) None of the above
85. The height at which a liquid rise in a capillary tube with an open extremity due to surface tension depends on:
- A) Radius of the tube
B) Difference in pressure
C) Difference in temperature
D) Volume of water
E) All of the above
86. What is the electric force at mid distance between two particles carrying each a charge of 2
- A) $7.2 \times 10^{18} V m^4$
B) $7.2 \times 10^{-18} V m^{-1}$
C) $7.2 \times 10^{-19} V m^{-1}$
D) $1.44 \times 10^{-18} V m^{-2}$
87. The nucleus of a transformer is laminated to:

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- A) Reduce the loss due to coiling
 B) Reduce hysteresis losses
 C) Reduce the loss of eddy currents
 D) Prevent the loss by eddy currents
 E) None of the above
88. The resultant capacitance of a combination in series of capacitors of capacitances: $8.00 \mu F$, $16\mu F$, and $32 \mu F$ is:
 A) $4.57 \mu F$
 B) $7.32 \mu F$
 C) $56.0 \mu F$
 D) $32.0 \mu F$
 E) $8.57 \mu F$
89. The energy stored in a capacitor of capacitance $10 \mu F$ carrying a charge of $100 \mu C$ is of
 A) $4 \times 10^{-3} J$
 B) $5 \times 10^{-3} J$
 C) $5 \times 10^{-4} J$
 D) $4 \times 10^{-2} J$
 E) None of the above
90. Which of the following declarations is a property of a uniform electric field?
 A) The field produces a force on a moving particle which is always perpendicular to the direction of displacement of the particle
 B) The field produces no force on a charged particle at rest
 C) The electric potential has the same value at all points in the field
 D) The electric field strength is the same in all points
 E) None of the above
91. If the number of turns of a solenoid are doubled without changing its length, the self-inductance of the solenoid will be
 A) Quadrupled
 B) Doubled
 C) Halved
 D) Squared
 E) None
92. When the voltage of an alternating current is applied to a capacitor, no power is used up because the current and the voltage are out of phase by 180°
 A) And the voltage are in phase
 C) Is lagging the voltage by 90°
 D) Is leading the voltage by 90°
 E) None of the above
93. The energy stored in an inductor of inductance 5 mH when the current of 6 A is crossing it is
 A) $1.8 \times 10^{-2} J$
 B) $9.0 \times 10^{-3} J$
 C) $1.4 \times 10^{-2} J$
 D) $9.0 \times 10^{-2} J$
 E) $1.6 \times 10^{-2} J$
94. At which frequency an inductor of 10 H will have a reactance of 2000Ω
 A) $\pi/200 \text{ Hz}$
 B) $\pi/100 \text{ Hz}$
 C) 100 Hz
 D) $100\pi \text{ Hz}$
 E) None of the above
95. An isolated sphere has a positive charge on its surface. Which of the following assertions describe best the electric field lines out of the sphere?
 A) The electric field is null out of the sphere, hence there are no electric field lines
 B) There are a series of concentric circles with the sphere pointing anticlockwise
 C) There are a series of concentric circles with the sphere pointing clockwise
 D) They are directed radially towards the exterior
 E) None of the above
96. Which of the following affirmations concern a particle of constant mass undergoing a uniform circular motion is not true?
 A) The particle has a constant speed
 B) The particle has a speed in constant evolution
 C) The particle is submitted to a constant

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- force
- D) The particle has a kinetic energy in constant evolution
- E) None of the above
97. The period of a simple pendulum is doubled when its length is increased by 0.60 m, the original length of the pendulum is
- A) 0.60 m
B) 0.20 m
C) 0.06 m
D) 0.02 m
E) 0.04 m
98. Which of the following affirmations is true?
- A) A thermometer is a device that permits to measure the quantity of heat loss by an object
- B) Heat is the form of energy which is transferred solely due to a difference in temperature
- C) A change in temperature is always produced when heat is exchanged between a body and the surrounding
- D) Two bodies of the same temperature exchange no heat
- E) All of the above
99. Conduction, convection, and radiation are methods of heat transfer. Which of the following affirmations is true concerning the methods of heat transfer?
- A) The transfer of energy by these processes require no material medium
- B) Energy moves up the temperature gradient in all the processes
- C) Energy moves down the temperature gradient in all the processes
- D) These processes require a material medium
- E) None of the above
100. An ammeter of resistance 5Ω has a full-scale deflection when a current of 50 mA crosses it, the value of the resistance necessary to adapt it to measure a current of 5 A is A) 19.80Ω
B) 5.00Ω
C) 0.05Ω
D) 0.25Ω
E) 2.50Ω

GENERAL KNOWLEDGE

CIVICS EDUCATION

1-Citizenship can be defined as

- a)The study of the political, economic and social life of a nation
- b)An individual who merits the rights to live in a given community
- c)The relation between an individual and his community
- d)The relation between an individual's civil right and fundamental liberties
- e)None of the above

2-Social ills current in educational milieu are all of the following except;

- a)Fraud and cheating during exams

b)vandalism

c)writing on walls and benches

d)prostitution

3-The following proposals are road safety measures in Cameroon except?

- a)signalisation panels
b)traffic lights
c)availability of check points
d)payment of charges by overloaded vehicles
e)none of the above

4-The head of the urban council in Cameroon is?

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- a)mayor
- b)municipal councillor
- c)president of council
- d)government delegate
- e)the secretary general

5- All the following are effects of rural exodus except?

- a)unemployment
- b)loss of population in villages
- c)progress loss of villages
- d)progressive loss of central cultural values
- e)a decrease in crop production in villages

6-A city that serves as regional capital and not divisional capital in Cameroon is ?

- a)buea
- b)douala
- c)yaounde
- d)ngaoundere
- e)bamenda

7-The minister in charge of administrative units in Cameroon is?

- a)minister of justice
- b)minister of communication
- c)minister of territorial administration
- d)minister of decentralisation
- e)minister of economy and planning

8-The most important source of emission of greenhouse gas is?

- a)industry

- b)residential zone
- c)farm soils
- d)natural forest
- e)lakes and rivers

9-an administrative system that promotes the rule of the majority while guaranteeing protection of the minorities is?

- a)socialism
- b)democracy
- c) communism
- d) dictatorship
- e)none of the above

10-the constitution that provides for reunification of English and French Cameroon?

- a)constitution of 1960
- b)constitution of 1961
- c)constitution of 1972
- d)constitution of 1996
- e)none of the above

11-choose the letter that relates the correct number of the members of the national assembly and senate respectively

- a)180 and 120
- b)120 and 100
- c)180 and 150
- d)180 and 100
- e)160 and 80

12-the organ in Cameroon responsible for voting the national budget is

- a)the presidency of the republic

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b) judiciary power

c) ministry of finance

d) the parliament

e) national assembly

13-the franc CFA serves as an exchange means in all the following countries except?

a)tchad

b)central African republic

c)gabon

d)DRC

e)Cameroon

14-the following countries are in CEMAC except?

a)gabon

b)equatorial guinea

c)DRC

d)central African republic

e)Cameroon

15- the headquarter of the national commission for human rights and liberties in Cameroon is at?

a)bamenda

b)buea

c)yaounde

d) douala

e)garoua

B-SCIENTIFIC KNOWLEDGE

16-the following mechanisms provoke movement of materials through animal cell membrane except?

a)active transport

b)diffusion

c)pinocytosis

d)mass flow

e)none of the above

17-which of the following indicates that a population at a sexual reproduction stage, evolves?

a)the genetic inheritance is static from generation to generation

b)the gene pool shows a change from generation to generation

c)the total variety of genes present in a population constitutes a gene pools

d)organisms of the same species present a variety of gene pools

e)none of the above

18-mushroom and certain plants have a thaloid structure, this means?

a)the body is not differentiated from the roots, stem and leaves

b)the body is flattened dorsoventrally and multicellular

c)the body is eukaryotic and multicellular

d)they are saprotrophs

e) all of the above

19-the pytogenetic classification is based on?

a)organism homologous structure

b)analogous structures of organisms

c)evolutionary relationship of organisms

d)the internal structures of organisms

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20- in biotechnology, the step requiring an eventual genetic engineering of an organism is called?

- a)cloning
- b)scaling
- c)cuval execution
- d)screening
- e)evaluation

21-the hydric potential of a cell is ?

- a)equal to zero when the cell is in pure water and turgescent
- b)greater than that of air
- c)more important when K^+ are actively displaced in the cell
- d)zero because of loss in pressure of turgescence in the hypertonic solution
- e) none of the following

22-the following apply to a child suffering from cretinism except?

- a)mental and physical retardation
- b)insufficient iodine in meal
- c)less thyroxine secretion
- d)the child feeds on fish and sea product
- e)none of the above

23-reverse transcriptase is used in genetic engineering to do which of the following procedures?

- a)artificially synthesize a desired gene
- b)decompose DNA into pieces and pick the desired gene
- c)extract a copy of the DNA gene
- d) do a copy of the DNA from its mRNA
- E) none of the above

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24-some bacteria can efficiently carry out metabolism in the presence or in the absence of oxygen. They are said to be?

- a)aerobes
- b)facultative anaerobes
- c)anaerobes
- d)fermentary microbes
- e)none of the above

25-extinction of a species can be avoided

- a)by destroying habitats
- b)by not protecting species
- c)increasing bioprospecting use
- d)controlling and reducing the impact of modern agriculture
- e)none of the above

26-the following are true of electron transport system except?

- a)occurs in the mitochondrial cristae
- b)involves electrons and protons reducing oxygen in water
- c)involves an oxidative phosphorylation
- d) occurs in the cytoplasm of cells
- e)none of the above

27-a model of inheritance explained by many alleles is?

- a)the ABO blood groups
- b)cystic fibrosis(mucoviscidosis)
- c)down syndrome
- d)hemophilia
- e)Klinefelter's syndrome

28-immunity produced when the body produces antibodies during an exposure

to an infectious agent is ?

- a)natural passive immunity
- b)artificial passive immunity
- c)natural active immunity
- d)artificial active immunity
- e)none of the above

29-which of the following cells could be activated first when the body is invaded by virus?

- a)T cells
- b)Mastocyte
- c)macrophages
- d)neutrophils
- e)eosinophils

30-which of the following statement best summaries the third mosaic model of the cell membrane by surger and Nicolson?

- a)the proteins are in sandwich between the phospholipid layers
- b)the protein molecules are dispersed inside and around the biphospholipid layer
- c)a protein layer between two biphospholipid layer
- d)the phospholipids are in sandwich between two protein layers
- e) none of the above

31-which substance in a car exhaust pipe play a role in acid precipitation

- a)nitrogen oxides
- b)sulphur oxides
- c)carbon oxides
- d)chlorofluorohydrocarbons
- e)water vapour

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32-selection acts indirectly on ?

- a)phenotype
- b)genotype
- c)genome
- d)every allele
- e)none of the above

33- the Mendelian law of independent assortment stands for?

- a)independently during meiosis
- b)by tetrads during mitosis
- c)independently during fertilisation
- d)by tetrads during replication
- e) no answer

34)why it is impossible to eliminate all the recessif alleles that are disadvantageous in a gene pool?

- a)all recessif alleles are not disadvantageous
- b)recessif alleles are present in heterozygote and homozygote individuals
- c)recessif alleles are resistant
- d)only alleles present in recessif individuals are exposed to selection
- e)none of the above

35-which of the following relations does not apply an organism

- a)saprophytism
- b)mutualism
- c)parasitism
- d)symbiosis
- e)none of the above

SECTION B FRENCH (pour les candidats qui ont choisi l'anglais
comme langue de composition)

36. La forme négative de la phrase “Je vois quelque chose.” est:
- A. Je ne vois personne
 - B. Je ne vois jamais
 - C. Je ne vois pas quelque chose
 - D. Je ne vois rien
 - E. Je ne vois plus
37. Il habite îles Caïman
- A. au
 - B. aux
 - C. eau
 - D. eaux
 - E. haut
38. vieil homme a de la dignité.
- A. Cet
 - B. Cette
 - C. Ce
 - D. Ces
 - E. Se
39. accablant discours nous deshonore frangin !
- A. Ce
 - B. Cet
 - C. Cette
 - D. Ces
 - E. Se
40. Ce professeur vient du Nigéria voisin, c'est une.....
- A. Nigérien
 - B. Nigérienne
 - C. Nigérian
 - D. Nigérianne
 - E. Nigériane
41. Chaque année nous organisons une multiple de dans notre village, c'est notre originalité.
- A. Festival
 - B. Festivaux
 - C. Festivals
 - D. Festivales
 - E. Festivale
42. Toute cette journée, nous avons assisté qu'à des jugements.....
- A. fatal
 - B. fatale
 - C. fataux
 - D. fatsals
 - E. fatales
43. Ce terrain était la propriété de notre défunt père, c'est le..... Maintenant.
- A. Notre
 - B. Nature
 - C. Notres
 - D. Nôtre
 - E. Nôtres
44. Il est cher, mais m'est égal.
- A. Ça

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- B. Sa
C. S'a
D. S'as
E. C'a
45. L'immeuble..... il fait référence est ancien.
A. À lequel
B. Auxquels
C. À laquelle
D. Au quel
E. Auquel
46. 56. À vrai dire les gars, noussouvent très fort pour reprendre nos sprits quand l'espoir s'évapore.
A. Crions
B. Criions
C. Crion
D. Creyons
E. Crie
47. 57. j'...mon père demain matin pour l'annoncer ma
A. réussite.
B. appellerai
C. appelerai
D. appellerais
E. appelerais
F. appelerait
48. Si j'avais de l'argent, je en voyage.
A. Partirai
B. Partirait
C. Partirais

- D. Partiras
E. Pars
49. Je heureux, si tu venais plus souvent.
A. Serais
B. Serai
C. Serait
D. Serrais
E. Serrai
50. Quand tu seras parti, ils.....la porte.
A. Fermaient
B. Ferment
C. Fermèrent
D. Fermerons
E. Fermeront



Tel: 652202721

2019 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON

Instructions; for each question or statement below, select the single best answer from the proposals

BIOLOGY

1. Which of these components is found in a prokaryotic cell?
 - A. Mitochondria
 - B. Ribosomes
 - C. Chloroplasts
 - D. Nuclear envelope
 - E. None of the above.
2. Which is the site for enzyme synthesis within the cell?
 - A. Golgi apparatus
 - B. Lysosome
 - C. Ribosome
 - D. Smooth endoplasmic reticulum
 - E. None of the above
3. By which process does glucose get into red blood cells, from plasma?
 - A. Active transport
 - B. Endocytosis
 - C. Facilitated diffusion
 - D. Osmosis
 - E. All of the above
4. A group of cells, similar in structure, which carry out a specific function is called-----
 - A. A clone
 - B. A gland
 - C. An organ
 - D. A tissue
 - E. None of the above
5. Lipids differ from other macromolecules in that they:
 - A. Are much larger
 - B. Are not true polymers
 - C. Do not have any specific structure
 - D. Do not contain carbon
 - E. None of the above
6. The following are true as concerns amino acids, except:
 - A. They are classified as essential and non-essential
7. A fatty acid is unsaturated if it
 - A. Contains hydrogen
 - B. Contains carbon-carbon double bonds
 - C. Contains an amino group
 - D. Is linked to glycogen
 - E. None of the above
8. Incomplete proteins
 - A. Lack essential vitamins
 - B. Are obtained from meat, eggs and cheese
 - C. Lack one or more essential amino acids
 - D. Are a result of overcooking vegetables
 - E. None of the above
9. Production of one RNA molecule from one DNA molecule is known as
 - A. Transcription
 - B. Translation
 - C. RNA splicing
 - D. Replication
 - E. Duplication
10. The two most frequently found pyrimidine bases in DNA are
 - A. Uracil and thymine
 - B. Cytosine and uracil
 - C. Cytosine and thymine
 - D. Adenine and thymine
 - E. Thymine and trypsin
11. Which of the following enzymes are involved in the replication of a leading DNA strand?

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- A. Helicase, DNA polymerase and DNA ligase
B. RNA polymerase, helicase and DNA ligase
C. DNA polymerase, RNA polymerase
D. Helicase, DNA polymerase
E. DNA ligase, RNA polymerase
- 12. Which of these statements correctly describes base pairing in nucleic acids?**
- A. Purine bases are always paired to other purine bases
B. Purine bases can only be paired to pyrimidine bases
C. Adenine can neither be paired to uracil, nor to thymine
D. Hydrogen bonds can only be formed between pyrimidine bases
E. None of the above
- 13. On which of these characteristics in enzyme classification based?**
- A. The type of reaction it catalyses
B. The site where the enzyme is produced
C. The enzyme's site of action
D. The enzyme's primary structure
E. The substrate on which the enzyme acts
- 14. Most enzymes work with only one or just a few substrates. This property is known as**
- A. Enzyme inhibition
B. Temperature coefficient
C. Enzyme specificity
D. Cooperability
E. None of the above
- 15. Which of these binds to the enzyme's active site?**
- A. Allosteric activator
B. Allosteric inhibitor
C. Non-competitive inhibitor
D. Competitive inhibitor
E. None of the above
- 16. To which of these properties can enzyme specificity be ascribed?**
- A. Their high molecular weight
B. Their hydrogen bonds
C. Their pH sensitivity
D. Their surface configuration
- E. All of the above
- 17. In which one of these phases does DNA replication occur?**
- A. The G₁ phase
B. The S phase
C. The G₂ phase
D. The M phase
E. None of the above
- 18. In which phase of meiosis are chiasmata formed?**
- A. Prophase I
B. Metaphase II
C. Anaphase II
D. Metaphase II
E. All of the above
- 19. Meiosis II differs from mitosis in that**
- A. Chiasmata are formed between chromatids of the bivalent
B. Chromosomes split into two chromatids during metaphase
C. Exchange of genetic material occurs between chromatids
D. The chromatids of a separating pair are genetically different.
E. All of the above
- 20. Synapsis is the process in which homologous chromosome pairs-----**
- A. Separate and migrate to the poles
B. Exchange chromosomal material
C. Assemble and are aligned side by side
D. Become shorter and thicker
E. None of the above
- 21. Prior to puberty, in men-----**
- A. FSH levels are higher, than after puberty
B. LH levels are higher, than after puberty
C. Release of GnRH is inhibited by testosterone
D. Spermatogenesis occurs at a very low rate
E. None of the above
- 22. Testosterone is produced in-----**
- A. The seminiferous tubules
B. The anterior hypophysis
C. The spermatozoa
D. The supra-renal glands
E. The interstitial cells of the testis

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23. After ovulation, the mature follicle degenerates, becoming yellowish, giving rise to a -----

- A. degenerative follicle
- B. corpus luteum
- C. Corpus albicans
- D. Tunica albuginea
- E. A cyst

24. Menopause

- A. develops when the follicles become less sensitive to FSH and LH
- B. occurs as a result of raised estradiol levels in women aged between 40 and 50
- C. occurs because too many follicles develop during every cycle
- D. occurs when FSH and LH levels drop
- E. none of the above

25. Sex linked traits

- A. Are carried by autosomes but only expressed in males
- B. Are coded for, by genes located on the sex chromosome
- C. Are found in either sex, following to the species' sex determination systems
- D. In mammals, are always inherited from the mother.
- E. None of the above

26. Which of these proposals is true concerning a gene?

- A. It is a functional unit of heredity
- B. It is some part of a DNA molecule
- C. It is part of the chromosome
- D. It always possesses two alleles
- E. None of the above

27. Why does haemophilia primarily affect men, given that women could be carriers of the causative allele?

- A. The gene is inactive in women
- B. The gene is dominant only in men
- C. The gene is found on chromosome X
- D. The gene is found on chromosome Y
- E. None of the above

28. Which of these could lead to phenotypic variations in organisms of the same genotype?

- A. Continuous variation within the same species
- B. Different varieties within the same species
- C. Different sexes
- D. Different environmental exposure
- E. All of the above

29. Which of these haemoglobin components is correctly matched to its fate after destruction of a red blood cell?

- A. Globin: decomposed into amino acids
- B. Heme: recycled to form a new haemoglobin molecule
- C. Iron: mainly secreted in bile
- D. Iron and heme: converted to bilirubin
- E. None of the above

30. In mammalian nutrition, what is the main role of Vitamin K?

- A. Take part in the formation of visual purple
- B. Take part in calcium and phosphate metabolism
- C. Promote production of blood clotting factors
- D. Prevent skin disorders
- E. None of the above

31. Antibody production occurs in-----

- A. The T cells
- B. The natural killer cells
- C. The B cells
- D. Mastocytes
- E. Basophilic cells

32. Aortic pressure is lowest-----

- A. At the moment corresponding to the first heart sound
- B. At the moment which corresponds to the second heart sound
- C. Just before opening of the atrio-ventricular valves
- D. Just before opening of the semi-lunar valves
- E. None of the above

33. During deglutition in mammals, food is prevented from moving up to the nose by

- A. The oesophagus
- B. The tongue
- C. The soft palate

- D. The epiglottis
- E. The tonsils

34. Peristalsis refers to movement of food within the gut by

- A. Pressure created by water getting into the gut by diffusion
- B. Contraction and relaxation of the oesophageal sphincter
- C. Mucus secretions
- D. Wave-like contractions of smooth muscles
- E. The force of gravity

35. Which of these is a non-digestive enzyme?

- A. Enterokinase
- B. Nucleotidase
- C. Elastase
- D. Chymotrypsin
- E. Maltase

36. Micelles are

- A. Lipids enclosed within bile salts
- B. Produced by the pancreas
- C. Released in the lacteals
- D. Stored in the gall bladder
- E. None of the above

37. Which of these reactions occurs in both aerobic and anaerobic respiration?

- A. Glycolysis
- B. The citric acid cycle
- C. The electron transport chain
- D. Formation of acetyl-CoA
- E. None of the above

38. Conversion of pyruvic acid to acetyl-CoA within the mitochondrial membrane occurs in a reaction known as

- A. Deamination
- B. Hydrolysis
- C. Decarboxylation
- D. Phosphorylation
- E. transformation

39. What is the fate of oxygen in the electron transport chain?

- A. It is reduced to water
- B. It is released in gaseous state
- C. It is utilised as electron carrier
- D. It is utilised to supply the energy needed to produce ATP
- E. None of the above

40. What role do cilia play in the bronchi?

- A. Movement of air in and out of the lungs
- B. Increase surface area for gaseous exchange
- C. Vibrate with air movement to produce sound
- D. Sweep out mucus and trapped particles upward and out of the airways
- E. None of the above

41. Which hepatic homeostatic function is monitored and regulated by the pancreas?

- A. Deamination of amino acids
- B. Glucose release
- C. Iron release
- D. Toxin elimination
- E. Bile release

42. All the following are synthesised in the liver, except

- A. Cholesterol
- B. Plasma albumin
- C. Vitamin D
- D. Urea
- E. None of the above

43. State the role of deamination

- A. Obtain energy from protein
- B. Produce urea
- C. Eliminate excess amino acid
- D. Synthesise amino acids
- E. Produce creatinine

44. In which of the following scenarios will insulin be secreted?

- A. When sugar levels in the liver are low
- B. When sugar levels in the hepatic portal vein are low
- C. When sugar levels in the islets of Langerhans are elevated
- D. When glycogen levels in skeletal muscles are high
- E. All of the above

45. An action potential in a muscle fibre triggers Calcium ion release from the

- A. Actin filaments
- B. Myosin filaments
- C. Sarcolemma
- D. Sarcoplasmic reticulum
- E. None of the above

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46. Motor neurone cell bodies are usually located in

- A. The ventral root
- B. The grey matter
- C. The dorsal ganglion
- D. The white matter
- E. The nerve root

47. Sympathetic nervous stimulation does not lead to

- A. Release of glycogen by the liver
- B. Bronchial dilation
- C. Digestion of food substances within the G.I.T
- D. Increase in heart beats
- E. All of the above

48. Damage of the semi-circular canals alters one's ability to detect

- A. Linear acceleration
- B. Position of the head with respect to the floor

C. Head movements in all directions

- D. Sound waves
- E. All of the above

49. Which of these is not involved in the patellar reflex?

- A. Muscle stretch
- B. A motor neurone
- C. Muscle fascicle
- D. An interneurone
- E. None of the above

50. The following are true about the cones of the eye, except -----

- A. Packed within the fovea
- B. Three types exist
- C. The photosensitive pigment is rhodopsin
- D. Possess high visual acuity
- E. None of the above

51. A solution whose concentration is one molar is called?

- A. Standard solution
- B. Primary standard solution
- C. Molar solution
- D. Dilute solution
- E. None of the above

52. The enthalpy of a reaction does not depend on which of the following propositions?

- A. The quality of the substances involved
- B. The physical state of the reactants and products
- C. The volume of the container
- D. The temperature and pressure at which the reaction is carried out
- E. None of the above

53. The pressure exerted by a vapour on its liquid at equilibrium is called?

- A. Saturated vapour pressure
- B. Vapour pressure
- C. Over saturated vapour pressure
- D. Atmospheric pressure
- E. None of the above

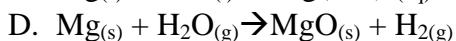
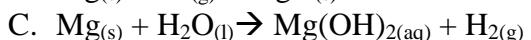
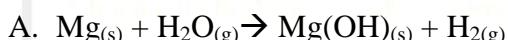
54. Which of the following reactions is not an acid base reaction?

CHEMISTRY



E. None of the above

55. Which of the following reactions are incorrect?



E. None of the above

56. Sulphur and oxygen both belong to the same group. Which of the following propositions better explain why sulphur has multiple oxidation states whereas oxygen has just one?

- A. Because oxygen is in period two, and sulphur is in period three
- B. Because oxygen is a gas whereas sulphur is a solid at room temperature and pressure.
- C. Because sulphur has more allotropes than oxygen
- D. Because sulphur can use the d-orbital for bonding

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E. None of the above

57. A nucleophile is:

- A. A species deficient in electrons
- B. An electron loving species
- C. An electron rich species
- D. An atom which has pairs of electrons
- E. None of the above

58. A free radical is:

- A. An atom which forms covalent bonds
- B. An atom with a positive or negative charge
- C. An atom with an unpaired electron
- D. A homolytic reagent
- E. An atom with pairs of electrons

59. Alkenes can combine in a chemical reaction to form a single molecule. How is this reaction called?

- A. Addition
- B. Saponification
- C. Polymerisation
- D. Esterification
- E. Substitution

60. Pertaining to halogeno-alkanes, which of the following propositions is correct?

- A. They show a reactivity of the order: $\text{RCl} > \text{RBr} > \text{RI}$
- B. They obey the general formula $\text{C}_n\text{H}_{2n+1}\text{X}$
- C. They can be prepared from a HX and alcohol
- D. They produce a nitrile upon reflux with KCN in alcohol
- E. None of the above

61. The carbonyl bond in aldehydes and ketones consist of:

- A. Two sigma bonds
- B. One sigma and one pi bond
- C. Two pi bonds
- D. Sigma bonds
- E. None of the above

62. Which of the following substances would liberate nitrogen gas when treated with nitric acid?

- A. $\text{NH}_2\text{CH}_2\text{COOH}$
- B. CH_3CONH_2
- C. $\text{CH}_3\text{CH}_2\text{NH}_2$
- D. CH_3COCl
- E. None of the above

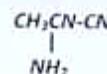
63. A nitrogenous organic compound, X, gives ammonia when heated with a solution of diluted aqueous sodium hydroxide. X could be:

- A. Ethanalide
- B. Ethylamine
- C. Diethylamine
- D. Amino ethanoic acid
- E. None of the above

64. A common characteristic to proteins is that they contain:

- A. An amine group
- B. A carboxylic acid functional group
- C. A dipeptide bond
- D. A peptide bond
- E. All of the above

65. Which characteristic of the molecule



is necessary for its isomer?

- A. Its aliphatic nature
- B. Its alicyclic nature
- C. Its chirality
- D. Its asymmetric nature
- E. None of the above

66. Which of the following ions can not be formed in an aqueous solution, by reacting an acid with an appropriate metal?

- A. Zn^{2+}
- B. Fe^{2+}
- C. Fe^{3+}
- D. Cu^+
- E. None of the above

67. Which of the following species could be acid when dissolved in water?

- A. CH_3NH_2
- B. H_3PO_4^-
- C. NH_4^+
- D. CN^-
- E. All of the above

68. What is the right order of increasing electronegativity for the elements B, Cl, Br, and Al?

- A. $\text{Al} < \text{B} < \text{Br} < \text{Cl}$
- B. $\text{Cl} > \text{Br} > \text{B} > \text{Al}$
- C. $\text{Br} < \text{Cl} < \text{Al} < \text{B}$
- D. $\text{B} < \text{Al} < \text{Br} < \text{Cl}$

- E. None of the above

69. Considering the following equilibrium reaction;



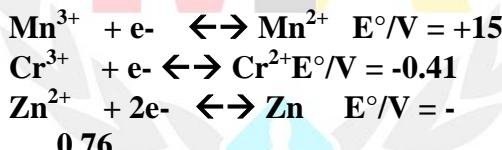
What happens to the equilibrium position when the volume of the reactants is suddenly reduced at constant temperature?

- A. The position of equilibrium will shift to the left
- B. The position of equilibrium will shift towards the right
- C. Heat is absorbed, and so modifies the position of equilibrium
- D. Heat is released
- E. None of the above

70. The enthalpy of combustion of graphite, hydrogen, and ethanol are -393, -286, and -1367 KJ/mol

- A. -139 KJ/mol
- B. -277 KJ/mol
- C. +277 KJ/mol
- D. +554 KJ/mol
- E. +544 KJ/mol

71. Consider the following list of redox potentials



Which of the following statements is most likely to be true?

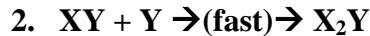
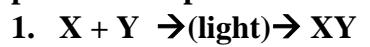
- A. The Zinc will reduce Cr^{3+} to Cr^{2+} and Mn^{3+} to Mn^{2+}
- B. The Zinc will reduce Cr^{3+} to Cr^{2+} but not Mn^{3+} to Mn^{2+}

- C. Mn^{2+} will reduce Zn^{2+} to Zn and Cr^{3+} to Cr^{2+}

- D. Mn^{2+} will reduce Zn^{3+} to Zn and Cr^{3+} to Cr^{2+}

- E. None of the above

72. The gaseous reaction $2\text{X} + \text{Y} \rightarrow \text{X}_2\text{Y}$ takes place in two phases



$$A. \text{ Rate} = [\text{X}]^2[\text{Y}]$$

$$B. \text{ Rate} = [\text{X}][\text{XY}]$$

$$C. \text{ Rate} = \text{K}[\text{X}_2][\text{Y}]$$

$$D. \text{ Rate} = \text{K}[\text{X}][\text{Y}]$$

- E. None of the above

73. Which of the following methods would you expect to have an overall dipole moment?

- 1. CO 2. CCl_4 3. PCl_4 4. CO_2

- A. 1 and 2

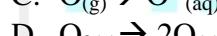
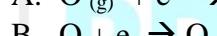
- B. 2 and 3

- C. 2 and 4

- D. 1 and 4

- E. 1 and 3

74. Which of the following procedures is endothermic?



- E. None of the above answers

75. Which of the following compounds is a 3rd period acid oxide on the periodic table?

- A. Na_2O

- B. NO_2

- C. CO_2

- D. SiO_2

- E. None of the above

PHYSICS

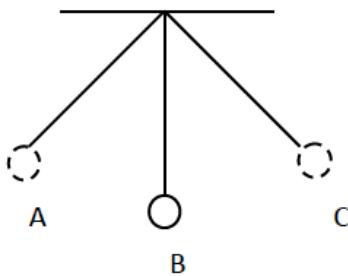
76. The method of dimensions

- A. Doesn't tell you when the equation is wrong
- B. Cannot be used to derive an equation
- C. Has nothing to do with the units
- D. None of the above

77. Consider the diagram below:

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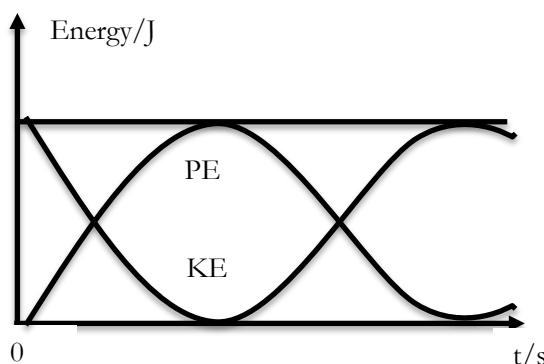
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The bob of the simple pendulum is set in oscillation. If the string cuts when the bob is passing through point B,

- A. The bob will fall vertically from point B.
- B. The bob will go beyond point C before falling.
- C. The path described by the bob will be given by $h = \frac{gx^2}{2u^2}$ where h=height of the bob, u=horizontal velocity of the bob and x=horizontal distance travelled by the bob.
- D. The bob will describe circular motion
- E. None of the above

78. The graph below represents the variation of energy with time for



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- A. A body oscillating freely in air e.g a simple pendulum
- B. A ball bounced on the floor
- C. A simple pendulum oscillating in a windy area
- D. A ball caught in air and caught at starting point
- E. None of the above

79. Two perfectly elastic identical spheres travelling in opposite directions with the same mass and speed of 0.01 kg and 30 m/s respectively, collide head-on on a smooth horizontal surface. Which of the following statements about the motion is true?

- A. The sum of the momenta after collision is 0.06 kgms⁻²
- B. The sum of their momenta before collision is 0.060 kgms⁻²
- C. The sum of their K.E after impact is zero
- D. The sum of the K.E after impact is 9.0 J
- E. None of the above

80. The gravitational force is a conservative force because:

- A. The net work it does on a body to move it round a closed path is zero
- B. The net work it does on a body at rest is 0
- C. It acts downwards
- D. It is a non-contact force

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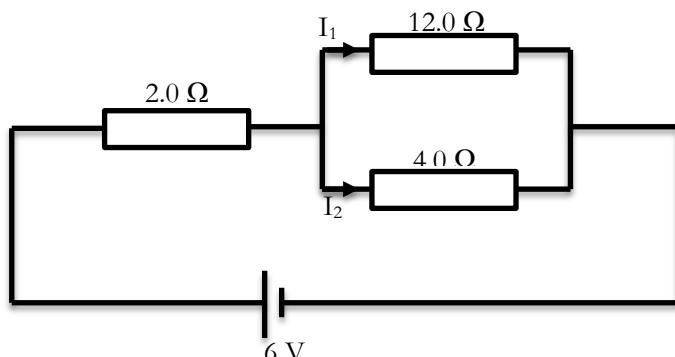
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- E. None of the above
- 81. Which set of forces below are contact forces only?**
- Electric, weight, friction, gravity
 - Viscous, upthrust, electric, gravity
 - Magnetic, friction, weight, tension
 - Tension, viscous, upthrust, friction
- 82. When a massive body explodes into two,**
- The resulting particles always move off with the same speed
 - The particles always move in the same direction
 - The momenta of the two particles are always equal
 - Energy is always conserved
 - None of the above
- 83. The vectors A and B are equal if:**
- They have the same magnitude and direction
 - $\vec{A} \cdot \vec{B} = AB\cos\theta$
 - $\vec{A} \times \vec{B} = AB\sin\theta$
 - $\vec{A} \cdot \vec{B} = AB\sin\theta$
 - None of the above

- 84. Consider the equation $\Delta Q = \Delta U + \Delta W$ where the symbols represent their usual meanings. ΔU represents**

- The heat or energy given to a system
- The external work done
- The mean kinetic energy
- The change in internal energy
- None of the above

Consider the diagram below in answering questions 85-86



- 85. What is the combined resistance of the 12Ω and 4Ω resistors?**
- 1.0Ω
 - 2.0Ω
 - 3.0Ω
 - 4.0Ω
 - None of the above
- 86. What is the total resistance of the above circuit?**
- 5.0Ω
 - 6.0Ω

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- C. 1.0Ω
- D. 4.0Ω
- E. 18.0Ω

87. In a P.E separation curve, minimum P.E occurs when:

- A. The molecules gain P.E
- B. Forces change from repulsive to attractive
- C. Forces change from attractive to repulsive
- D. $r = r_0$
- E. None of the above

88. Two radioactive isotopes A and B have half-lives 10 minutes and 15 minutes respectively. Freshly prepared samples of each isotope initially contain the same number of atoms as one another. After 30 minutes, the

ratio $\frac{\text{the number of atoms in A}}{\text{the number of atoms in B}}$ is

- A. 0.5
- B. 3.0
- C. 0.45
- D. 1
- E. None of the above

89. Which of the following are the essential parts of an atomic bomb?

- A. Uranium and neutrons
- B. Radium and polonium
- C. Uranium and photons
- D. Uranium and alpha particles
- E. None of the above

90. The f series of bright lines produced on a dark background when excited atoms fall to their ground state, is known as

- A. Atomic spectrum
- B. Line absorption spectrum
- C. Line emission spectrum
- D. Band emission spectrum
- E. None of the above

91. When the current passing through the nichrome element of an electric fire is very small the resistance is found to be 50.9Ω , room temperature being 20°C . In use, the current is 4.17 A on a 240 V supply. The rate of energy transfer by the element is:

- A. $1.0 \times 10^3 \text{ J/s}$
- B. $1.0 \times 10^3 \text{ J/s}$
- C. $2.5 \times 10^{-3} \text{ J/s}$
- D. $2.5 \times 10^3 \text{ J/s}$
- E. None of the above

92. Semiconductors have a negative temperature coefficient of resistance. This means that:

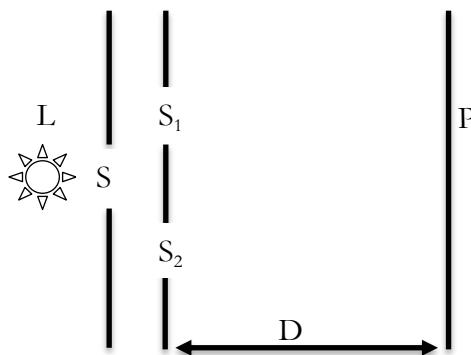
- A. Their resistance increases with decrease in temperature
- B. Their resistance increases with increase in temperature
- C. Their resistance decreases with decrease in temperature
- D. Their resistance decreases with increase in temperature
- E. None of the above

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Questions 93-95

In the diagram below, a lamp L with a straight filament producing white light is placed behind a narrow slit, S. S_1 and S_2 are two narrow slits and Young's fringes are seen on screen P.



93. The fringes are brightest when:

- A. P is moved closer to S_1 and S_2
- B. Slits S_1 and S_2 are closer together
- C. Slit S is parallel to S_1 , S_2
- D. The filament is 90° to S
- E. None of the above

94. If the fringes are 1.0 mm apart when the distance D to screen P is 0.8 m and $S_1S_2 = 0.4$ mm, then the wavelength of the light from L is

- A. 5.0×10^{-7} m
- B. 2.5×10^{-7} m
- C. 2.0×10^{-6} m
- D. 5.0×10^{-7} m
- E. 2.5×10^{-7} m

95. The bright fringes seen in P are:

- A. centrally white with several colored spectra on one side
- B. centrally white with several colored spectra on both sides
- C. colored in the centre with blue closer to the middle than red
- D. colored in the centre with red closer to the middle than blue

Directions for questions 96-97

For each of the following questions, one or more of the responses given are correct. Decide which of the responses is (are) correct, then choose:

- A. if 1 and 2 are correct
- B. if 2 and 3 are correct
- C. if 1 only is correct
- D. if 3 only is correct
- E. if 2 only is correct

96. Physical properties shared by both radio waves and sound waves are:

1. Both can be reflected
2. Both can be diffracted
3. Both can be polarized

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97. Which of the following may improve long distance optical fibre communication system?

1. Information transmitted is in analogue form
2. Signals are carried by monochromatic light
3. The fibre link has regenerators

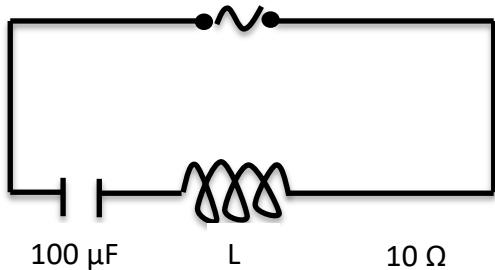
98. A planet has a radius 3/2 that of the earth and a density of 1/3 that of the earth. If a man jumps 1.5 m on the earth, the approximate height he might jump on the planet is:

- A. 0.5 m
- B. 3 m
- C. 2 m
- D. 4.5 m
- E. 5.5 m

99. The units NC^{-1} for electric field strength is equal to

- A. NV^{-1}
- B. Vm^{-1}
- C. Nkg^{-1}
- D. Ms^{-1}
- E. None of the above

100. Determine the value of L in Henry in the circuit below to resonate at 100 Hz



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- A. 1
- B. $\frac{1}{4\pi^2}$
- C. $4\pi^2$
- D. $\frac{1}{2\pi}$
- E. $\frac{1}{4\pi}$

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CAMEROON**

BIOLOGY

- 1. Which of the following organelles always contain DNA?**
 - A. Centriole
 - B. Golgi apparatus
 - C. Lysosome
 - D. Mitochondrion
 - E. All of the above
- 2. Which of the following will exocrine cells expect to contain as a result of their function?**
 - A. Increased number of DNA
 - B. Increased amount of rough endoplasmic reticulum
 - C. Increased number of lysosomes
 - D. Large mitochondria
 - E. None of the above
- 3. What distinguishes a prokaryotic cell from a eukaryotic cell?**
 - A. Prokaryotic cells have a cell wall and anucleus
 - B. Prokaryotic cells have no membrane boundorganelles
 - C. Prokaryotic cells have a centriole
 - D. Prokaryotic cells have no ribosomes
 - E. None of the above
- 4. Which of the following best describes the general structure of a cell membrane?**
 - A. Proteins sandwiched between two layers ofphospholipids
 - B. Proteins embedded in two layers of phospholipids
 - C. A layer of protein coating a layer ofphospholipids
 - D. Phospholipids sandwiched between twolayers of protein
 - E. None of the above
- 5. How do glandular cells differ from non-glandular cells?**
 - A. Glandular cells contain increased amount ofDNA
 - B. Glandular cells contain increased amounts ofendoplasmic reticulum
- C. Glandular cells contain increased number oflysosomes**
- D. Glandular cells have larger mitochondria**
- E. All of the above**
- 6. The most common type of cartilage is**
 - A. Yellow elastic
 - B. White fibrous
 - C. Brown fibrous
 - D. Hyaline cartilage
 - E. None of the above
- 7. A peptide bond is formed between**
 - A. An aldehyde group and an amino group
 - B. An aldehyde group and a carboxyl group
 - C. An aldehyde group and an ester group
 - D. A carboxyl group and an amino group
 - E. None of the above
- 8. The secondary order of protein structure is**
 - A. The sequence of amino acids in thepolypeptide chain
 - B. The formation of peptide bonds betweenthe amino acids
 - C. The coiling of the polypeptide chain
 - D. The folding of the coded polypeptide chain
 - E. None of the above
- 9. Most polysaccharides are composed of chains of continuous**
 - A. Cellulose units
 - B. Hexose units
 - C. Sucrose units
 - D. Pentose units
 - E. Amino acids
- 10. Why do proteins have buffering effects in cells?**
 - A. Because they are polar
 - B. Because they are amphoteric
 - C. Because they form colloidal solutions
 - D. Because they contain basic amino acids
 - E. None of the above
- 11. What makes a fatty acid an acid?**
 - A. It does not dissolve in water

- B. It is capable of bonding with other molecules to form fat
- C. It has a carboxyl group that donates a hydrogen ion to a solution
- D. It is a polymer made of many smaller units
- E. All of the above
- 12. The “primer” required to initiate synthesis of a new DNA strand consists of**
- A. RNA
- B. DNA
- C. An okazaki fragment
- D. A structural protein
- E. None of the above
- 13. The nitrogenous bases present in RNA are the same as those present in DNA , except that**
- A. Adenine replaces cytosine
- B. Adenine replaces thymine
- C. Uracil replaces adenine
- D. Uracil replaces thymine
- E. None of the above
- 14. RNA processing**
- A. Is the same as transcription
- B. Is the event that occurs after RNA is transcribed
- C. Is the rejection of old, worn-out RNA
- D. Pertains to the function of tRNA during protein synthesis
- E. None of the above
- 15. Which of the following phases in mitosis is essentially the opposite of prophase in terms of nuclear changes?**
- A. Telophase
- B. Metaphase
- C. S-phase
- D. Interphase
- E. Anaphase
- 16. In a typical cell cycle, cytokinesis generally overlaps in time with which stage?**
- A. S-phase
- B. Anaphase
- C. Metaphase
- D. Prophase
- E. Telophase
- 17. Meiosis is similar to mitosis in that:**
- A. Homologous chromosomes synapse
- B. DNA replicates before the division
- C. The daughter cells are diploid
- D. Sister chromatids separate during anaphase
- E. All of the above
- 18. After a sperm penetrates an egg, a fertilization membrane forms. This membrane**
- A. Secretes important hormones
- B. Enables the fertilized egg to implant in the wall of the uterus
- C. Prevents more than one sperm from entering the egg
- D. Attracts additional sperm to the egg
- E. None of the above
- 19. The site of spermatogenesis in the male is**
- A. Ductus deferens
- B. Seminiferous tubules
- C. Epididymis
- D. Cowper's gland
- E. Prostate gland
- 20. All of the following statements concerning sertoli cells are true, except:**
- A. They support the maturing sperm
- B. They protect the maturing sperm
- C. They produce testosterone
- D. They supply nutrition to the maturing sperm
- E. None of the above
- 21. Menopause:**
- A. Develops when the ovarian follicles become less responsive to FSH and LH
- B. Results from elevated oestradiol levels in 40 to 50 year old women
- C. Occurs because too many follicles develop during each cycle
- D. Occurs when FSH and LH levels decline
- E. All of the above
- 22. A woman who is a carrier of haemophilia had phenotypically normal parents and is married to a man without the recessive haemophilia allele. Which one of the following statements is true?**
- A. Her father must have been a carrier of haemophilia
- B. Her mother also possessed the gene
- C. All of her sons will be haemophiliacs
- D. All of her daughters will carry the recessive gene

- E. None of the above
- 23. Which of the following describes symptoms of sickle cell anaemia?**
- A. Poor blood circulation due to abnormal haemoglobin molecules
 - B. Sterility in females
 - C. Failure of blood to clot
 - D. Failure of chloride ion transport system
 - E. All of the above
- 24. _____ is the transfer of normal genes into body cells to correct a genetic defect.**
- A. Reverse transcription
 - B. Nucleic acid hybridization
 - C. Gene mutation
 - D. Gene therapy
 - E. None of the above
- 25. All of the following are components of blood plasma, except:**
- A. Nitrogen
 - B. Sodium ions
 - C. Platelets
 - D. Water
 - E. Potassium ions
- 26. All of these substances are required for normal red blood cell production, except:**
- A. Folate
 - B. Vitamin K
 - C. Iron
 - D. Vitamin B12
 - E. None of the above
- 27. Blood returning to the mammalian heart in a pulmonary vein will drain first into**
- A. Vena cava
 - B. Left ventricle
 - C. Right ventricle
 - D. Right atrium
 - E. Left atrium
- 28. The papillary muscles of the heart**
- A. Are attached to the chordae tendineae
 - B. Are found in the atria
 - C. Contract to close the foramen ovale
 - D. Are attached to the semi-lunar valves
 - E. None of the above
- 29. Increased parasympathetic stimulation of the heart**
- A. Increases the force of ventricular contraction
- 30. Macrophages**
- A. Are large phagocytic cells that outline neutrophils
 - B. Develop from mast cells
 - C. Often die after a single phagocytic event
 - D. Have the same functions as eosinophils
 - E. All of the above
- 31. Oxygen is mostly transported in the blood**
- A. Dissolved in plasma
 - B. Bound to blood proteins
 - C. Within bicarbonate blood ions
 - D. Bound to blood glucose
 - E. Bound to haem portion of haemoglobin
- 32. Which blood vessels change their resistance to blood flow to regulate distribution of blood to other organs?**
- A. Arteries
 - B. Arterioles
 - C. Capillaries
 - D. Veins
 - E. Veinules
- 33. When a man swallows, the food is prevented from going up to the nasal cavity by the**
- A. Oesophagus
 - B. Tongue
 - C. Soft palate
 - D. Epiglottis
 - E. None of the above
- 34. All of these glands secrete saliva into the oral cavity except?**
- A. Submandibular glands
 - B. Gastric glands
 - C. Sublingual glands
 - D. Parotid glands
 - E. None of the above
- 35. Trypsinogen, a pancreatic zymogen secreted into the duodenum can be activated by**
- A. Chymotrypsin
 - B. Enterokinase
 - C. Secretin

- D. Trypsin
E. Gastrin
- 36. Bile**
- A. Is an important enzyme for the digestion of fats
 - B. Is made by the gall bladder
 - C. Contains breakdown products from haemoglobin
 - D. Contains organic but no inorganic bile salts
 - E. All of the above
- 37. During deglutition (swallowing)**
- A. Movement of food occurs primarily from gravity
 - B. The swallowing center in the medulla oblongata is activated
 - C. Food moves from the mouth into the oesophagus involuntarily
 - D. The soft palate closes off the opening into the larynx
 - E. All of the above
- 38. In cellular respiration, the greater number of ATP is generated by**
- A. Glycolysis
 - B. The Krebs cycle
 - C. The electron transport chain
 - D. Fermentation
 - E. Hydrolysis
- 39. All of the following are involved in the voluntary control of breathing except**
- A. Bronchial tubes
 - B. Carotid bodies
 - C. Medulla oblongata
 - D. Aortic bodies
 - E. None of the above
- 40. Both glucose and appropriate enzymes are necessary for the process of glycolysis to begin. Which additional compound must also be present?**
- A. Acetyl coenzyme A
 - B. ATP
 - C. Pyruvate
 - D. Reduced NAD
 - E. NADPH
- 41. Which of the following processes will occur in the cell cytoplasm?**
- A. Glycolysis
 - B. Pyruvate oxidation
- C. The Kreb's cycle
D. The electron transport chain
E. None of the above
- 42. In a eukaryotic cell, most of the enzymes of the Kreb's cycle are located in the**
- A. Plasma membrane
 - B. Inner mitochondrial membrane
 - C. Cytosol
 - D. Mitochondrial matrix
 - E. None of the above
- 43. What do muscle cells gain from the conversion of pyruvate?**
- A. ATP and lactate
 - B. ATP and recycled NAD⁺
 - C. CO₂ And lactate
 - D. ATP and alcohol
 - E. ATP and water
- 44. Chemoreceptors sensitive to blood CO₂ concentration are present in**
- A. The subclavian veins
 - B. The hypothalamus
 - C. The pituitary gland
 - D. The vena cava
 - E. The carotid arteries
- 45. As a result of the activity of insulin, there is**
- A. Increase uptake of glucose by muscles
 - B. Decrease uptake of glucose by cells
 - C. The presence of glucose in urine
 - D. Deposition of fat in blood vessels
 - E. None of the above
- 46. Which homeostatic function of the liver is controlled and monitored in the pancreas?**
- A. Deamination of amino acids
 - B. Release of glucose
 - C. Release of iron
 - D. Removal of toxins
 - E. Secretion of bile
- 47. The greatest volume of water is reabsorbed from the nephron by the:**
- A. Proximal tubule
 - B. Loop of Henle
 - C. Distal tubule
 - D. Collecting duct
 - E. Convoluted tubule
- 48. When striated muscle fibres contract:**

- A. The Z lines are pulled closer together
 B. The I band remains the same
 C. The A band becomes shorter
 D. The H zone widens slightly
 E. All of the above
- 49. All the following are found in the inner ear, except**
- A. The three semicircular canals
 B. The ear ossicles
 C. The cochlea
- 51. Which of the following chemical equations is wrong?**
- A. $C_6H_5COOH + H_2O \rightarrow C_6H_5OO^- + H_3O^+$
 B. $N_3 + H_2O \rightarrow NO^- + H_3O^+$
 C. $HCl + H_2O \rightarrow Cl^- + H_3O^+$
 D. $H_2SO_4 + 2H_2O \rightarrow 2H_3O^+ + SO_4^{2-}$
 E. None of the above
- 52. What is the name of a particle carrying no charge and a mass about equal to that of a hydrogen atom?**
- A. Neutron
 B. Isotope
 C. Proton
 D. Electron
 E. None of the above
- 53. Isotopes have the same atomic number but a different**
- A. Number of shells
 B. Mass number
 C. Proton number
 D. Electron number
 E. None of the above
- 54. Through analysis in a chemistry laboratory, it was found that a compound contains 2.33g of sodium, 3.24g of oxygen. What will the simplest formula of this compound be?**
- A. Na_2O_3
 B. Na_2O_2
 C. Na_2SO_4
 D. $NaSO_3$
 E. $NaSO_4$
- D. The saccules
 E. The organ of corti
- 50. A spinal nerve takes nerve impulses**
- A. To the central nervous system
 B. Away from the central nervous system
 C. Both to and away from the central nervous system
 D. Only inside the central nervous system
 E. None of the above
- CHEMISTRY**
- 55. How many moles of hydroxide ions are present in a 6g sample of magnesium hydroxide ($M_r = 58$)?**
- A. 0.2
 B. 0.3
 C. 0.4
 D. 0.5
 E. 0.6
- 56. In nitric acid, the bonding between oxygen and the hydrogen atom is**
- A. Dative covalent
 B. Simple covalent
 C. Metallic covalent
 D. Ionic
 E. None of the above
- 57. Which of these molecules or ions has a trigonal planar shape?**
- A. BF_3
 B. PF_3
 C. ClO_3^-
 D. NH_4^+
 E. None of the above
- 58. Van der Waals forces are induced forces which come into play due to a slight movement of**
- A. Charges
 B. Ions
 C. Electrons
 D. Protons
 E. Neutrons
- 59. A student used 50cm³ of ethanol in a gas bottle to heat a beaker containing 100cm³**

- of H₂O. In this experiment, the student might have been working to:**
- Determine the heat of solution
 - Determine the enthalpy of combustion of ethanol
 - Determine the enthalpy of combustion of methanol
 - Determine the heat of neutralization
 - None of the above
- 60. Consider the equation for the complete combustion of liquid butane: C₄H_{10(l)} + 13/2O_{2(g)} → 4CO_{2(g)} + 5H₂O_(g). The entropy of the system increases because of an increase in:**
- Space available
 - Temperature
 - Number of particles
 - Pressure
 - Humidity
- 61. What volume would 65cm³ of a gas collected at 40°C and 75mmHg occupy at STP?**
- 54.9cm³
 - 56.9cm³
 - 57.9cm³
 - 55.9cm³
 - 53.9cm³
- 62. According to the Avogadro's law, the volume of a gas at constant temperature and pressure is directly proportional to the number of**
- Particles
 - Ions present
 - Molecules present
 - Electrons
 - None of the above
- 63. How can the enthalpy of the system N₂O_{4(g)} ⇌ 2NO_{2(g)} ΔH = +ve be increased at constant temperature?**
- By increasing the pressure of the system
 - By reducing the pressure of the system
 - By increasing the temperature of the system
 - By decreasing the temperature of the system
- E. None of the above**
- 64. A student wishes to establish whether the reaction 2_(s) + Cu²⁺_(aq) → Cu_(s) + Ag⁺_(aq), will occur. This reaction can only take place if the:**
- e.m.f is reduced
 - e.m.f is positive
 - e.m.f is large
 - Temperature increases
 - None of the above
- 65. A substance which readily gives up its protons and hence tends to be highly ionized in an aqueous solution is called:**
- An acid
 - A strong acid
 - A base
 - A strong base
 - None of the above
- 66. A reaction in which the enthalpy of the products is greater than the enthalpy of the reactants is called**
- An endothermic reaction
 - An exothermic reaction
 - A homogeneous reaction
 - A heterogeneous reaction
 - A normal reaction
- 67. Select from the following an element using given outer electronic configuration which forms an acidic oxide**
- 3s² 2p¹
 - 3s² 3p³
 - 3s² 3p⁵
 - 3s² 3p²
 - 3s² 3p⁴
- 68. In the reaction of HI with concentrated sulphuric acid, the acid is acting as:**
- An oxidizing agent
 - A reducing agent
 - A neutralizing agent
 - A proton donor
 - None of the above
- 69. A ligand is.....which has a lone pair of electrons which is used for a coordinate bond.**

- A. An ion
- B. A molecule
- C. An atom
- D. An anion or molecule
- E. None of the above

70. Which of these is not one of the uses of ammonia?

- A. Manufacture of ammonium sulphate
- B. Manufacture of nitric acid
- C. Manufacture of matches and gun powder
- D. Nylon production
- E. None of the above

71. Fractional crystallization is used to separate two solids that are soluble in:

- A. Water
- B. Ethanol
- C. The same solvent
- D. Methanol
- E. All of the above

72. An addition reaction is one in which two or more compounds combine to give a

- A. Dimer
- B. Single product
- C. Polymer

76. Two electric charges $-6\mu C$ and $+6\mu C$ are located respectively in two points A and B, 1 metre apart. The electric field is null at point C; where C is located?

- A. Located in the middle of segment AB
- B. Located outside the segment AB at 1 metre apart from A
- C. Located outside segment AB at 1 metre apart from B
- D. Located outside the line AB
- E. None of the above

77. A generator of electromotive force 24V supplies a circuit having in series a motor (18V, 7.5Ω) and an incandescent lamp (3Ω). The intensity of the current in the circuit is 0.5A. the value of the internal resistance of the generator is

- A. 23.5Ω
- B. 32.5Ω

- D. Nylon
- E. None of the above

73. Monohydric alcohols contain,

- A. One hydroxyl group
- B. Two hydroxyl groups
- C. Three hydroxyl groups
- D. One carbonyl group
- E. Four hydroxyl groups

74. A condensation reaction is one in which two compounds undergo addition followed by elimination of either

- A. Water or another compound
- B. Chlorine or another compound
- C. Sulphur or another compound
- D. Nitrogen or another compound
- E. All of the above

75. Decarboxylation is the loss of from a carboxylic acid to form a hydrocarbon

- A. Water
- B. Sulphur dioxide
- C. Carbon dioxide
- D. Carbon monoxide
- E. None of the above

- C. 25.5Ω

- D. 2.5Ω
- E. 1.5Ω

78. An electric motor operating with a voltage of 100V provides a mechanical power of 240W. this motor which is crossed by a current of 2.5A has an e.m.f of

- A. 300V
- B. 2V
- C. 96V
- D. 48V
- E. None of the above

79. In a parallel plate capacitor, the electric field vector

- A. Has a direction perpendicular to the plates
- B. Has a direction parallel to the plates
- C. Is directed in a direction of the increasing potentials
- D. Is directed in a direction parallel to

- the plates
- E. None of the above
- 80. Calculate the impedance of a coil of resistance 10Ω and inductance $90mH$ supplied by a sinusoidal voltage of frequency $50Hz$.**
- A. 8.5Ω
 B. 0.05Ω
 C. 3.45Ω
 D. $2.8 \times 10^1\Omega$
 E. None of the above
- 81. The value of the e.m.f induced in a coil of negligible resistance of $4.5\mu V$. What is the value of the voltage at the terminals of this coil?**
- A. $3.5 \mu V$
 B. $6.3 \mu V$
 C. $5.3 \mu V$
 D. $4.5 \mu V$
 E. None of the above
- 82. One rolls up $314m$ isolated copper wire of radius $1mm$ in joint turns around a cylindrical core with a diameter of $10cm$. the number of turns of this solenoid is:**
- A. 5 turns
 B. 500 turns
 C. 1000 turns
 D. 1500 turns
 E. None of the above
- 83. A domestic iron ($220V$, $1000W$) functioning without interruption from 4pm to 6:30pm consumes electrical energy of :**
- A. 1.5×10^9J
 B. 9×10^9J
 C. 22×10^9J
 D. 9×10^6J
 E. None of the above
- 84. If the atomic nucleus $^{234}_{90}Th$ emits a Q^+ particle, the resultant nucleus will contain**
- A. Neutrons 234 and protons 91
 B. Neutrons 234 and protons 89
 C. Neutrons 91 and protons 91
 D. Neutrons 148 and protons 82
 E. Neutrons 143 and protons 91
- 85. The corpuscular character of light is highlighted by:**
- A. Diffraction
 B. Luminous interferences
 C. Refraction
 D. Dispersion
 E. Photoelectric effect
- 86. For a given photoemissive cell, which of the following is correct?**
- A. The output electric current depends on the wavelength of radiation used
 B. The threshold frequency does not depend on the metal of the cathode but on the metal of the anode
 C. The threshold frequency depends on the number of photons arriving per second on the cathode
 D. The intensity of the output current is more important when one lights the cell with visible light than with ultraviolet light
 E. All of the above
- 87. What is the mode of decay of a ^{14}C nucleus?**
- A. Beta emission
 B. Alpha emission
 C. Positron emission
 D. Electron emission
 E. Gamma emission
- 88. What are the values of the wavelengths limiting the visible spectrum of electromagnetic waves expressed in nm?**
- A. 380 and 750
 B. 385 and 785
 C. 400 and 700
 D. 395 and 795
 E. None of the above
- 89. The radioactivity of an element is influenced by**
- A. Its chemical nature
 B. Its bonding energy per nucleon
 C. Its electronegativity
 D. The Avogadro's number
 E. None of the above
- 90. Which of the following is not an S.I unit?**
- A. Meter
 B. Kilogram



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- C. Gallon
- D. Pascal
- E. Joule

91. The origin of Laplace's force is

- A. Thermodynamics
- B. Atomic
- C. Electromagnetic
- D. Mechanics
- E. Nuclear power

92. In a vacuum and in the same region,

- A. Heavy bodies falls less quickly than lightbodies
- B. Light bodies fall less quickly than heavybodies
- C. Light bodies fall faster than heavy bodies
- D. Heavy bodies fall faster than light bodies
- E. All the bodies fall in the same manner.

93. An elevated has a total mass of 1.8tons. at the start of the ascending phase, the resistance to its displacement is 12% of its weight and its acceleration has a value of $0.2g$ where g is the acceleration due to gravity ($g=9.78\text{m/s}^2$). The magnitude of the force of traction exerted by the cables is

- A. $23.24 \times 10^3\text{N}$
- B. $21.50 \times 10^3\text{N}$
- C. $21.12 \times 10^3\text{N}$
- D. $24.23 \times 10^3\text{N}$
- E. None of the above

94. Two balls B1 and B2 are allowed to fall from the same horizontal plane at a height of 25m to the ground. At the initial moment, B1 is released without speed whereas B2 is launched with a horizontal speed of 5m/s. At $t=1.5\text{s}$,

- A. The height of B1 is higher than that of B2
- B. The height of B2 is higher than that of B1
- C. The heights of the two balls are equal
- D. The magnitude of the speed of the two ballsare equal
- E. None of the above

95. The work done by a force perpendicular to its displacement is:

- A. Negative
- B. Positive
- C. Null
- D. Maximum

- E. None of the above.

For Questions 96 to 98

A ball is launched from a point O, on a horizontal ground with a velocity v_0 inclined at an angle α to the horizontal. Neglecting air resistance and assuming that the ball is a point mass.

96. During the motion of the ball, the acceleration vector

- A. Remains parallel to the flight path and in thesame direction.
- B. Remains parallel to the flight path and in theopposite direction
- C. Remains perpendicular to the flight path
- D. Changes direction at the top of thetrajectory
- E. None of the above

97. At the top of the trajectory, the speed is:

- A. Null
- B. Vertical
- C. Minimal
- D. Maximum
- E. None of the above

98. The height of the trajectory at the top is:

- A. Independent of V_0
- B. Independent of the angle α
- C. Proportional to V_0
- D. Inversely proportional to V_0
- E. Proportional to the square of V_0

99. A car moves with a speed of 90km/h. At which height should it fall without initial speed to reach the same speed? Given $g=10\text{m/s}^2$

- A. 0.8m
- B. 1.25m
- C. 31.25m
- D. 0.03m
- E. 3.125m

100. The electrical energy WE received by a receiver whose terminal voltage is 3.0V when it is traversed by a current of intensity 1.0A during 20mn is:

- A. 3W
- B. $6 \times 10^{-1}\text{J}$
- C. $6 \times 10^{-2}\text{J}$
- D. 6J
- E. None of the above

PAPER II:
GENERAL KNOWLEDGE AND FRENCH

A: GENERAL KNOWLEDGE

14. Which of the following is not a specialized agency of the United Nations organization?
- A. International Labour Organization (ILO)
 - B. United Nations Development Programme (UNDP)
 - C. International Court of Justice
 - D. World Health Organization (WHO)
 - E. Amnesty International
15. The Cameroon citizenship can be acquired by an individual through which of the denomination?
- A. Nomination
 - B. Nationalization
 - C. Naturalization
 - D. Neutralization
 - E. None of the above
16. Multipartism was reintroduced in Cameroon in which of the following years?
- A. A. 1985
 - B. B. 1989
 - C. C. 1992
 - D. D. 1996
 - E. E. 1990
17. The green colour on the National Flag of Cameroon stands for:
- A. Independence
 - B. Fatherland
 - C. Unity
 - D. The rich forest vegetation
 - E. Integration
18. What is the surface area of Cameroon?
- A. A. 475,442km²
 - B. B. 475,000km²
 - C. C. 375,422km²
 - D. D. 375,400km²
 - E. E. None of the above
19. A state is defined by all the following characteristics, except one, which one?
- A. Territory
 - B. Policy
 - C. Sovereignty
 - D. Government
 - E. Definite population
20. The council of ministers in Cameroon is presided over by which of the following authorities?
- A. President of the National Assembly
 - B. President of the Senate
 - C. President of the Republic
 - D. Prime Minister, Head of government
 - E. President of the Constitutional council

B- SCIENTIFIC KNOWLEDGE

21. The resolving power of or a resolution of a microscope may be defined as:
- A. The degree of sharpness of the image produced by the microscope
 - B. The size of the smallest object which can be seen using the microscope
 - C. The greatest distance between two objects at which they can be seen in the same field of view
 - D. The smallest distance between two objects at which they can be seen to be separated
 - E. None of the above
22. Which of the following processes is an example of active transport?
- A. Influx of sodium ions into a nerve axon during the conduction of a nerve impulse
 - B. Movement of sodium ions from glomerular filtrate into blood plasma
 - C. Movement of potassium ions from blood plasma into the lumen of a Bowman's capsule
 - D. Shift of chloride ions across the membrane of red blood cell
 - E. None of the above
23. Which of the following statements contain the two main functions of microscopes?
- A. Magnify and colour the images of objects
 - B. Magnify and concentrate the images of objects
 - C. Magnify and resolve the images of objects

- D. Magnify and amplify the images of objects
E. None of the above
- 24.** How do mitochondria differ from chloroplasts?
- A. ATP is synthesized only in mitochondria
 - B. DNA is found in chloroplasts
 - C. Membrane-bound enzymes are found only in mitochondria
 - D. NADP is found only in chloroplasts
 - E. None of the above
- 25.** Which of the following factors will tend to increase membrane fluidity?
- A. A greater proportion of unsaturated phospholipids
 - B. A lower temperature
 - C. A relatively high protein content in the membrane
 - D. A greater proportion of relatively large glycolipids compared to lipids having smaller molecular weights
 - E. None of the above
- 26.** Which of the following is an example of passive immunity?
- A. A nurse gets stuck with a needle containing blood from a patient with tuberculosis, gets a like illness and a few years later tests positive for anti-TB antibodies
 - B. A child receives a vaccination for polio consisting of inactivated polio-virus
 - C. An adult exposed to a certain influenza strain will not become sick again because he was exposed to the strain as a child
 - D. A baby born to a woman who has antibodies for hepatitis may be temporarily resistant to the virus
 - E. None of the above
- 27.** What stimulates causes the atria of the heart to release atrial natriuretic factor?
- A. A rise in blood pressure
 - B. A drop in blood pressure
 - C. A drop in blood pH
 - D. A rise in blood osmolarity
 - E. None of the above
- 28.** Photosynthesis is a redox process in which
- A. CO₂ is reduced and water is oxidized
 - B. CO₂, NADP+ and water are reduced
 - C. O₂ acts as an oxidizing agent and water as a reducing agent
 - D. All of the above
 - E. None of the above
- 29.** What is the function of nitrifying bacteria in the soil?
- A. Oxidation of ammonium compounds to nitrates
 - B. Oxidation of nitrogen gas to nitrates
 - C. Reduction of ammonium compounds to nitrates
 - D. Reduction of nitrates to nitrites
 - E. None of the above
- 30.** Which of the following states the correct formula for finding the net increase in a population?
- A. (Births - Deaths) - (Immigration + Emigration)
 - B. (Births - Deaths) + (Immigration - Emigration)
 - C. (Births + Deaths) - (Immigration + Emigration)
 - D. (Births - Immigration) + (Deaths + Emigration)
 - E. None of the above
- 31.** The study of fossils is known as:
- A. Fossilization
 - B. Embryology
 - C. Paleontology
 - D. Lichenology
 - E. Archaeology
- 32.** All of the following statements are consistent with Darwin's theory of natural selection, except:
- A. Individuals in a population exhibit variations some of which can be passed along to the offspring
 - B. Organisms change during their lifespan to better fit their environment and these changes can be passed along to the offspring
 - C. Natural selection can lead to speciation
 - D. Individuals that reproduce most successfully are more likely to have offspring that also reproduce successfully if the environment remains stable
 - E. None of the above

above

33. What is petrification?

- A. It is the conversion of hard body parts, e.g bones, teeth and shells, into rocks
- B. It is the decomposition of the soft body parts of dead organisms
- C. It is the decomposition of the hard body parts of dead organisms
- D. It is the preservation of whole bodies of dead organisms
- E. None of the above

34. The continued occurrence of sickle cell disease with malaria in parts of Africa is due to:

A. Continual mutation

B. Gene flow between populations

C. Relative fitness of the heterozygote

D. Disruptive selection

E. All of the above

35. Which one of the following would cause phenotypic variations among organisms of the same genotype?

- A. Mutation
- B. Different sexes
- C. Exposure to different environments
- D. Continuous variation within the species
- E. All of the above

C- FRENCH LANGUAGE

Instructions: Questions 36-40: Lisez chaque phrase et choisissez la bonne réponse pour la question qui suit.

36. Mon feu papa était un soldat. «feu» veut dire:

- A. Qui vit
- B. Qui est mort
- C. Qui est bon
- D. Qui est mauvais
- E. Qui est méchant

37. Les genres ont émis une bouffée de rire. «Bouffée de rire» veut dire :

- A. Etouffer de rire
- B. Aimer le rire
- C. Arrêter de rire
- D. Eclater de rire
- E. Aucune des réponses ci-dessus

38. Il saura si tu le dis la vérité. «Saura» vient du verbe

- A. Savior
- B. Devoir
- C. Sauter
- D. Sauver
- E. Aucune des réponses ci-dessus

39. Il va contempler le monument de la Réunification. «Contempler» veut dire:

- A. Voir
- B. Regarder
- C. Jeter un clin d'œil
- D. Regarder avec soin
- E. Aucune des réponses ci-dessus

40. Attachez vos ceintures. «attachez» est conjugué

A. Au présent

B. Au futur

C. A l'imparfait

D. Au présent de l'impératif

E. Au passé composé

Instructions: Questions 41-45: choisissez la bonne réponse pour compléter chaque phrase.

41. Ces femmes-ci vont à l'église, alors que vont au marché.

- A. Celles-là
- B. Celle-là
- C. Ceux-ci
- D. Celui-là
- E. Ceux-là

42. Nous mangeons.....banane s avec plaisir

- A. Cettes
- B. Cette
- C. Ces
- D. Ce
- E. Cet

43. Elle souhaite que sa mère vite au champ

- A. Aller
- B. Ailles
- C. Aillent
- D. Aille

E. Va

44. Il est possible

qu'elles.....encore en
route.

- A. Soit
- B. Sois
- C. Soyez
- D. Soient
- E. Sont

45. Il faut que tu.....ton devoir.

- A. Finisses
- B. Finis
- C. Finissait
- D. Finir
- E. Finit

***Instructions: Questions 46-50: choisissez
la bonne réponse pour compléter chaque
phrase ci-dessous:***

46. Il est interdit deici.

- A. S'arrêté
- B. S'arrête
- C. S'arrêter
- D. S'arrêtions
- E. S'arrêtez

47. Onde
viande et de légumes.

- A. Se nourrissais

B. Se nourrir

C. Se nourrissaient

D. Se nourri

E. Aucune des réponses ci-dessus

48. Il y'afemmes au
Cameroun

- A. Beaucoup des
- B. Beaucoup de
- C. Beaucoup
- D. Beaucoup d'
- E. Aucune des réponses ci-dessus

49. J'aiargent que
vous

- A. Plus d'
- B. Plus de l'
- C. Plus
- D. Plus des
- E. Aucune des réponses ci-dessus

50.enfants avez-
vous madame?

- A. Combien de l'
- B. Combien des
- C. Combien de
- D. Combien d'
- E. Aucune des réponses ci-dessus

**2017 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN
CAMEROON**

BIOLOGY

Instructions: For questions 1 to 20, choose the letter corresponding to the best answer.

1. Which neurotransmitter is released by the post-ganglion neuron of the neuro-sympathetic system?

- A. Acetylcholine
- B. Noradrenaline
- C. Endorphin
- D. Dopamine
- E. None of the above

2. How many lungs in a human body?

- A. One
- B. Two
- C. One
- D. Four
- E. None of the above

3. What are the nails made of?

- A. Elastin
- B.
- C. Keratin
- D. Plastin
- E. None of the above

4. What is the name of the largest part of the human brain?

- A. The cerebellum
- B. The posterior brain
- C. The hypothalamus
- D. The brain
- E. None of the above

5. What are the ligaments in the knee joint

- A. The anterior ligament and the posterior cruciate ligament
- B Oblique popliteal ligaments and arched popliteal ligaments
- C. Lateral ligaments and collateral ligaments
- D. Anterior cruciate ligament and collateral medial ligament
- E. None of the above

6. The lower dimensions are above the region

- A. Lumbar
- B. Epigastric
- C. Hypogastric
- D. Hypochondriac
- E. None of the above

7. The system returns tissue fluids to the heart.

- A. Circulatory
- B. Lymphatic
- C. Integumentary
- D. Histological
- E. None of the above

8. Which of the following organs would not be bordered by the peritoneum?

- A. The heart
- B. The stomach
- C. The intestines
- D. The liver
- E. None of the above

9. The heart is found specifically in

- A. The thoracic cavity
- B. The mediastinum
- C. The pleural cavity
- D. The peritoneal cavity
- E. None of the above answers

10. Vitamin B1 deficiency causes

- A. Rickets
- B. Nyctalopia
- C. Beriberi
- D. Pellagra
- E. All of the above

11. the sugar in the RNA is; the sugar in DNA is

- A. Deoxyribose, ribose
- B. Ribose, deoxyribose
- C. Ribose, phosphate
- D. Ribose, uracil
- E. None of the above

12. Which of the elements is not present in the cell membrane:

- A. Cholesterol
- B. Phospholipids
- C. Galactose
- D. Proteins
- E. None of the above

13. This hormone is only produced in the human body when a woman is pregnant:

- A. Estrogen
- B. HCG
- C. Progesterone
- D. FSH
- E. LH



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14. Non-essential amino acids

- A. Are stored in the body
- B. occasionally
- C. Can be produced in the body
- D. Can be taken as a supplement
- E. Not important

15. Carbon monoxide is dangerous**because**

- A. It binds strongly to hemoglobin making it unavailable to oxygen
- B. It binds to plasma, making it unavailable to carbon dioxide
- C. It increases the blood PH level, causing a person to hyperventilate
- D. Monoxide e carbon is not dangerous, we have it in our body normally
- E. It binds strongly to plasma giving good production of red blood cells

16. Which of the following functions takes place in the liver?

- A. Glycogen storage
- B. Plasma protein synthesis
- C. Bile production
- D. Drug detoxification
- E. All of the above

17. An antigen is:

- A. A chemical messenger that is released by cells infected with the virus
- B. A lymphocyte responsible for cell-mediated immunity
- C. Something that covers inside the lungs causing infection
- D. A protein or other molecule that is recognized as not itself
- E. A yellow and thick white liquid

18. Which of the following contract together to pump blood:

- A. The right atrium with the right ventricle and the left atrium with the left ventricle
- B. The right atrium with the left atrium and the right ventricle with the left ventricle
- C. The tricuspid valve and the mitral valve
- D. The aorta and the pulmonary artery
- E. The tricuspid, mitral and stigma valves

19. The skeletal muscle is:

- A. Voluntary and having the form d 'a brooch
- B. Voluntary and striated
- C. Involuntary and in the form of a pin
- D. Involuntary and striated
- E. All of the above

20. The junction between a neuron and the next one or between a neuron and an**effector is called:**

- A A synapse
- B. A dendrite
- C. A neurotransmitter
- D. A ventricle
- E. A jep junction

Instructions for questions 21-30: Answer with A if 1,2 and 3 are true; B if**1 and 3 are true; C if 2 and 4 are true; D if only 4 is true; E if all the answers are true.****21. DNA replication**

- 1. Is in the G2 phase
- 2. Is semi-conservative
- 3. Is conservative
- 4. Leads to the synthesis of two DNA molecules

22. GlycolysisTakes

- 1.place in the cytoplasm
- 2. A takes place in the mitochondria
- 3. Leads to ATP synthesis
- 4. Produces CO2

23. The genotype

- 1. Corresponds to all the genes carried by chromosomes
- 2. Is the same in identical twins
- 3. Is transmitted unchanged to daughter cells during mitosis
- 4. Corresponds to the entire DNA molecule

24. The alleles of a gene

- 1. Have different nucleotide sequences
- 2. Always lead to different types of phenotype
- 3. Come from mutations
- 4. Exists only under two forms

25. Metabolism

- 1. Represents all the enzymatic reactions taking place in the cell
- 2. Consists of destruction and synthesis reactions
- 3. Uses metabolites and energy
- 4. Corresponds to all the activities of cells

26. A clone

- 1. Consists of all cells with the same s functions
- 2. Consists of all organisms or cells from the same strain and with genetic information
- 3. Is only obtained from vertebrates
- 4. Can only be obtained by grafting the nucleus to an enucleated somatic cell

27.**29. menopause corresponds to:**

- The reduction in ovarian follicle reserves
- The decrease in the production of gonadotropins
- The reduction and end of the secretion of sex hormones
- The end of the functioning of the uterus

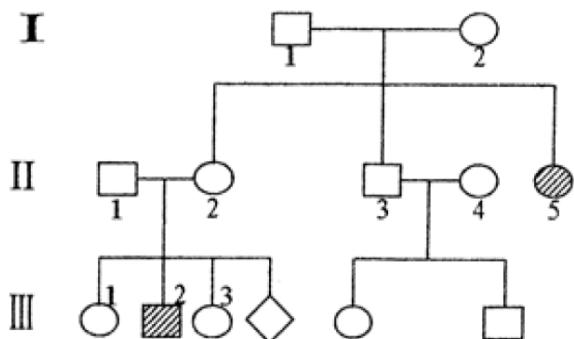
30. The hyperglycemic hormones

- Are secreted in the endocrine part of the pancreas
- Activate glycogenolysis
- Activate glycogen synthesis
- Use the nervous system during secretion

Instruction: the following diagram concerns questions 31-35 choose the correct answer for each question.

Consider the following pedigree relating to the transmission of an inherited disease.

In black : the sick individual



31. The allele responsible for this disease is:

- Dominants
- Recessives
- Codominants
- Lethal
- No answer above

32. The gene involved in the transmission of this disease is located on:

- A specific part of the X chromosome
- A specific part of the Y chromosome
- An autosome
- The 23rd chromosome
- No answer above

33. The probability of individual III3 of being a carrier of 1 allele responsible for the disease is :

- 1/3
- 2/3
- 1/4
- 3/4
- 1.0

34. The probability of a child being born by a couple (H1, H2) being sick is:

- 1/3
- 2/3
- 1/4
- 1/2
- 3/4

35. If the probability of a heterozygous person taken at random from the population is 1/10, the probability of a couple (H1, H2) having a sick child is:

- 1/2
- 1/20
- 1/600
- 1/120
- No answer above

Questions 36-50: Choose the best answer

36. Which system helps regulate the temperature and protect the body?

- Urinary
- Respiratory
- Integumentary
- Skeletal
- No answer above

37. the organ which among the following is part of more than one system is:

- The esophagus
- The stomach
- The pancreas
- The small intestine
- The brain

38. The osmotic phenomenon

- Means the passage of cations through a biological membrane
- Always means the passage of water through a cell membrane
- Always occurs from the medium hypotonic to hypertonic medium
- No response above

39. In a contracted skeletal muscle, one of the following changes the length. Which ?

- Line Z
- Band A
- Band I
- Myosin filament

E. Simultaneously bands A and I

40. With regard to the cranial skeleton:

- It is made of four flat bones
- It consists of three parietal bones and a frontal bone
- It is made of three pariетals and an



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- occipital
D. All of the above.
E. No of the above.

41. The building blocks of nucleic acid are known as:

- A. Nucleosides
B. Nucleotides
C. Nitrogen bases
D. Phosphates
E. No response above

42. The pepsin secreted by the gastric glands loses its activity in the small intestine because:

- A. The medium has become acid
B. The medium has become Alkaline
C. The medium has become neutral
D. It competes with trypsin
E. No answer above

43. About the Bohr effect,

- A. It occurs in testicles
B. A high pressure of CO₂, hemoglobin is more effective in releasing O₂
C. it is made of the head, body and flagellum which helps in its movement nt
D. At high CO₂ voltage, the O₂ dissociation curve moves down
E. No answer above

44. The heart muscle is called:

- A. The pericardium
B. The sarcolemma
C. The myocardium
D. The ventricular muscle
E. The periosteum

45. The nerve impulses are effectively unidirectional due to:

- A. Dendritic responses
B. Cell body metabolism
C. Neurotransmitter release at the termination of the axon
D. Calculation function of an axonal mound
E. No response above

46. The secretion of the exocrine gland of

the pancreas is controlled by:

- A. The level of glycemia
B. Secretin
C. A gene
D. The level of calcemia
E Insulin

47. Active natural immunity can be acquired through:

- A. An infection
B. Vaccination
C. Injection of prepared antibodies
D. Passage of antibodies from the mother to the fetus through the placenta
E No answer above

48. From the start, a girl has:

- A. 45 chromosomes + 1 X chromosome
B. 44 ch romosomes + 1 chromosome X
C. 44 chromosomes + 2 chromosome X
D. 44 chromosomes + 1 chromosome and 1 chromosome Y
E. 46 chromosomes + 12 chromosome X

49. Choose the exact proposition:

- A. Subject with blood group A ne can receive only blood from subjects of blood groups A and AB
B. Subject with blood group B can only receive blood from subjects of blood groups B and AB
C. Subject with blood group AB can receive blood from subjects of blood groups O, A and AB
D. Subject with blood group O can receive blood from subjects of blood groups O, A and AB
E. Rhesus positive blood cannot transfuse to the rhesus negative recipient
- 50. White blood cells consist of:**
- A. Lymphocytes, monocytes and neutrophils
B. Lymphocytes, erythrocytes and platelet
C. Lymphocytes, platelets
D. Erythrocytes and platelets only
E. None of the answers below

CHEMISTRY

Instructions: choose the best answer.

Question 51-54:

Consider the equilibrium reaction below: $2\text{SO}_3\text{ (g)} \leftrightarrow 2\text{SO}_2\text{ (g)} + \text{O}_2\text{ (g)}$
(endothermic)

How will the equilibrium amount of 2SO_3 change in each of the following situations?

51. Oxygen is added

- A. Decreases



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- B. Increases
- C. Remains unchanged
- D. Decreases and then increases
- E. None of the responses below

52. The temperature is decreased

- A. Decreases
- B. Increases
- C. Remains unchanged
- D. Decreases then increases
- E. None of the responses below

53. A little argon, an inert gas, is added at constant pressure:

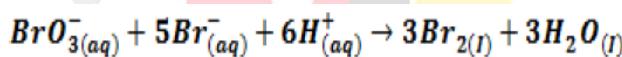
- A. Decreases
- B. Increases
- C. Remains unchanged
- D. Decreases and then increases
- E. None of its responses below

54. The container volume is decreased

- A. Decreases
- B. Increases
- C. Remains unchanged
- D. Decreases then increases
- E. None of the answers below

Question 55-58:

Consider the reaction below:



55. L oxidation state of bromine in is:

- A. 1
- B. 2
- C. 5
- D. 3
- E. 4

56. The oxidation state of Bromine in Br-:

- A. 1
- B. 0
- C. -2
- D. -1
- E. 2

57. The oxidizing agent in this reaction is:

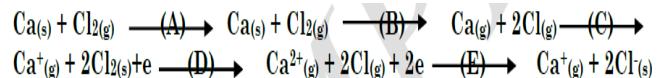
- A. BrO₃⁻
- B. Br-
- C. H +
- D. Br₂
- E. No answer is right

58. The reducing agent in this reaction is :

- A.
- B. Br-
- C. H +
- D. Br₂
- E. No answer is right

Question 59-63:

Considered the reaction below:



59. The energy A of calcium is:

- A. The vaporization
- B. The dissociation
- C. The sublimation
- D. The fission
- E. No answers below

60. The energy B of chlorine is:

- A. The second dissociation
- B. The dissociation
- C. The second sublimation
- D. The first ionization
- E. No answers below

61. the energy (C) of calcium is:

- A. Atomization
- B. Vaporization
- C. The first ionization
- D. The second sublimation
- E. No answers below

62. The energy (D) of calcium is:

- A. The second atomization
- B. The second ionization
- C. Electronic affinity
- D. The first ionization
- E. No answers below

63. The energy (E) of chlorine is :

- A. Atomization
- B. Dissociation
- C. Sublimation
- D. Electronic affinity
- E. First ionization

64. A compound of formula C₇H₈ is:

- A. Toluene
- B. Benzene
- C. Butene
- D. Pentene
- E. Ethylbenzene

65. A molecule is:

- A. A group of atoms linked by ionic bonds
- B. A group of atoms linked by covalent bonds
- C. A group of ions linked by covalent bonds
- D. A group of atoms linked by metallic bonds
- E. A group of ions linked by metallic bonds

66. The definition of the mole is:

- A. The quantity of any substance which occupies a volume of 24dm³ at room temperature
- B. The quantity of any substance containing the same number of identical entities as there are



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exactly carbon entities in 12g of carbon isotope-12

- C. The number of mo atom molecule in exactly 12g of carbon-12 isotope
- D. The number of molecules in exactly 2g of hydrogen at room temperature and pressure
- E. None of the above.

67. C_nH_{2n+2} is the general formula for a homologous series. Which substance meets this characteristic?

- A. Acetylene
- B. Benzene
- C. Propane
- D. Toluene
- E. None of the above

68. The enthalpy of hydration of magnesium ion equation is:

- A. $Mg^{2+}(s) + aq \rightarrow Mg^{2+}(aq)$
- B. $Mg^{2+}(g) + aq \rightarrow Mg^{2+}(aq)$
- C. $Mg^{2+}(aq) \rightarrow Mg^{2+}(g) + aq$
- D. $Mg^{2+}(aq) \rightarrow Mg^{2+}(s) + aq$
- E. $Mg^{2+}(g) \rightarrow Mg^{2+}(s)$

69. Which of the following substances is capable of damaging the ozone layer?

- A. NaCl
- B. CO₂
- C. C₂HF₃
- D. C₂F₃Cl₃
- E. CCl₄

70. Which of the following changes will cause the next greatest increase in exothermic reaction rates?



- A. The temperature decrease by 15%, the decrease by 15% in the initial concentration of N₂ and O₂
- B. The temperature increase by 15% of the initial concentration of N₂ and O₂ remains the same
- C. The temperature increase of 15%, increase of 15% of the initial concentration of NO
- D. The temperature increase of 15%, increase of

15% of the concentration initial of N₂ and O₂

E. None of the above

71. A reaction of a zinc bar with iron ion III in aqueous solution can be represented as
$$2Fe^{3+}(aq) + Zn(s) \rightarrow 2Fe^{2+}(aq) + Zn^{2+}(aq)$$
Which of the following statements is the most complete description of this reaction?

- A. Iron (III) is reduced
- B. Zinc is being oxidized
- C. Iron (III) is oxidized while zinc is reduced
- D. Iron (III) is reduced while zinc is oxidized
- E. None of the above

72. The atom formed by the decay of carbon-14 is:

- A. Oxygen-18
- B. Berilium-10
- C. Boron-14
- D. Nitrogen-14
- E. Carbon-13

73. Which of the following ions contains one or more odd electrons?

- A. Cu²⁺
- B. Cu⁺
- C. Zn²⁺
- D. Ca²⁺
- E. Na⁺

74. Which of the reactions represents both the standard enthalpy of zinc oxide formation and the standard enthalpy of zinc combustion?

- A. $2Zn(s) + O_2(g) \rightarrow 2ZnO(s)$
- B. $Zn(s) + 1/2O_2(g) \rightarrow ZnO(s)$
- C. $Zn(s) + O(g) \rightarrow ZnO(s)$
- D. $2Zn(s) + 1/2O(g) \rightarrow 2ZnO(s) \rightarrow ZnO(s)$
- E. None of the above

75. Given the equation $NH_4 + H_2O \rightarrow NH_4^+ + OH^-$ the water acts as:

- A. the base
- B. the proton acceptor acidC.
- D. the electron donor
- E. None of the above

PHYSICS

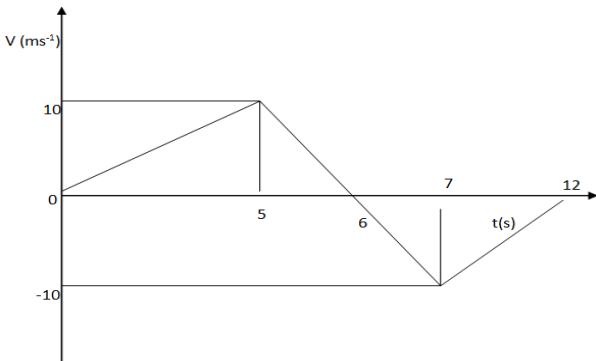
Instruction: choose the best answer

the speed of a body in rectilinear movement varies as shown in the figure below



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76. What is the number of phases of movement of this body?

- A. 3
- B. 4
- C. 2
- D. 5
- E. 7

77. What is the acceleration of the body in its second phase of movement?

- A. -10m.s⁻²
- B. -2m.s⁻²
- C. -20m.s⁻²
- D. -4m.s⁻²
- E. -5m.s⁻²

78. What is the acceleration of the body in his fourth phase of the movement?

- A. 10m.s⁻²
- B. -2m.s⁻²
- C. -20m.s⁻²
- D. -4m.s⁻²
- E. -5m.s⁻²

79. What is the distance traveled by the body?

- A. 20m
- B. 40m
- C. 50m
- D. 60m
- E. 30m

80. What is the decay time of 3/10 of radioactivity constant λ

- A. $\frac{-1}{\lambda} \ln \frac{7}{10}$
- B. $\frac{-1}{\lambda} \ln \frac{3}{10}$
- C. $\frac{-1}{\lambda} \ln \frac{1}{10}$
- D. $\frac{-1}{\lambda} \ln \frac{10}{7}$
- E. $\frac{-1}{\lambda} \ln \frac{10}{3}$

81. A cord is connected to a point O, source of sinusoidal vibration of shape

$y_0 = \text{asin}100\pi x$ $a > 0$. What is the vibration at a point A of the rope such that

$AO = 15\text{cm}$?

- A. $y_A = \text{asin}100\pi x$
- B. $y_A = -\text{asin}100\pi x$
- C. $y_A = \text{asin}(100x - \frac{\pi}{2})$
- D. $y_A = \text{asin}(100x + \frac{\pi}{2})$
- E. Aucune réponse ci-dessus

Question 82-84:

Natural uranium contains two isotopes

$^{218}_{92}\text{U}$ et $^{215}_{92}\text{U}$ in different proportions.

The first disintegration of the isotope $^{218}_{92}\text{U}$ is of the α type. The periodic table gives:

^{88}Ra ; ^{89}Ac ; ^{90}Th ; ^{92}U ; ^{93}Np ; ^{94}Pu ; $C = 3 \times 10^8 \text{ ms}^{-1}$, $h = 6.62 \times 10^{-34} \text{ Js}$; $1\text{Mev} = 1.60 \times 10^{-13} \text{ kg}$

82. Which of the following statements represents the equation for this reaction?

- A. $^{238}_{92}\text{U} \rightarrow {}_2^4\text{He} + {}_{90}^{234}\text{Th}$
- B. $^{238}_{92}\text{U} \rightarrow {}_0^1n + {}_{92}^{235}\text{U}$
- C. $^{238}_{92}\text{U} \rightarrow {}_1^0e + {}_{94}^{238}\text{Pu}$
- D. $^{238}_{92}\text{U} \rightarrow {}_1^4P + {}_{94}^{238}\text{Pu}$

83. It is assumed that this is isolated and initially at rest. Using the conservation of the momentum expressed as a function of V_1 the rate of recoil of the resulting nucleus, m_1 here is the mass of the resulting nucleus.

- A. $V_2 = (m_2 / m_1) V_1$
- B. $V_2 = (m_1 / m_2) V_1$
- C. $V_2 = (m_1 - m_2) V_1$
- D. $V_2 = (m_2 - m_1) V_1$
- E. $V_2 = (m_1 \cdot m_2) V_1$

84. What is the expression of the total energy E_c of the particle, as a function of the kinetic energy E_{c1} of the particle α ?

- A. $E_c = (\frac{m_1}{m_2}) E_{c1}$
- B. $E_c = (1 + \frac{m_2}{m_1}) E_{c1}$
- C. $E_c = (\frac{m_2}{m_1}) E_{c1}$
- D. $E_c = (1 + \frac{m_1}{m_2}) E_{c1}$

E. Aucune des réponses ci-dessus.

85. What is the capacity of a parallel plate capacitor with a surface area of 4cm^2 and a thickness of 0.2mm if the insulating liquid inserted inside the plates has a dielectric constant $K = 1000$?

- A. 17.7nF
- B. $177\mu\text{F}$
- C. 17.7pF
- D. 17.7F

E. $17.7\mu F$

86. The air temperature on a particular day is $26^{\circ} C$. an air bubble trapped in a tube by a thin layer of liquid expands freely if the assembly is heated to what temperature of the volume of the air bubble changes from simple to double?

- A. $13^{\circ} C$
- B. $26^{\circ} C$
- C. $52^{\circ} C$
- D. $78^{\circ} C$
- E. $25^{\circ} C$

87. A wave moving on the surface of the water at a wavelength of 2 m, its amplitude is 0.1 m and its propagation frequency 0.5 Hz. What is the speed of the wave?

- A. 0.2m / s
- B. 1m / s
- C. 0.4m / s
- D. 20m / s
- E. 4m / s

88. If the frequency of a harmonic oscillator doubles by what factor does the maximum acceleration change -she ?

- A. 2
- B. Π
- C. 4
- D. $\sqrt{2}$
- E. 6

89. A simple pendulum has a period T on the earth. If this pendulum was used on a planet X, where the acceleration of gravity is on the earth, its period would be:

- A. $T / 2$
- B. $2T$
- C. $4T$
- D. $T / 4$
- E. $3T$

90. Two sine waves of the same frequency propagate in the same direction are superimposed. If their respective amplitudes are 6 and 8 cm and their phase difference is $\pi / 2$ rad, what is the amplitude of the resulting wave?

- A. 14.0 cm
- B. 10.0 cm
- C. 2.0 cm
- D. 6.93 cm
- E. 12.0 cm

91. Two resistance resistors 40Ω and 60Ω are connected in parallel. Their equivalent resistance is:

A. 20Ω

- B. 100Ω
- C. 24Ω
- D. 50Ω
- E. 74Ω

92. a certain radioactive element has a half-life of 20 days while $7/8$ of the atom initially present is disintegrates is:

- A. 20 Days
- B. 17.5 days
- C. 40 Days
- D. 30 Days

93. the energy released by the nuclear bomb that destroyed the city of Hiroshima was equivalent to 12 Kiloton of TNT That is- i.e. $9.0 \cdot 10^{26}$ Mev. The mass which was converted into energy in this explosion was:

- A. $1.6Kg$
- B. $1.0 \times 10^{19} Kg$
- C. $1.6 g$
- D. $120 kg$
- E. $120 g$

94-95: the wire of a pendulum simple encounter the nail located at point C and 50 cm below the suspension point.

94. What is the angle between the pendulum wire and the vertical during the deflection of the pendulum?

- A. $65^{\circ} 32'$
- B. $45^{\circ} 32'$
- C. 65°
- D. $60^{\circ} 32'$
- E. 45°

95. What is the tension at the point reached by the mass?

- A. 2,5N
- B. 0,405N
- C. 2N
- D. 1,160N
- E. 1,5N

96. A projectile is launched with an initial speed of 600 m / s forming an angle of 30° with the vertical. What is the flight time of the projectile before it hits the ground?

- A. 60s
- B. 103.92s
- C. 30s
- D. 50s
- E. 40s

97. A capacitor with a capacity of $25\mu FC$ connected in series with a non-inductive resistance of 40Ω through an alternative

source of alternating voltage $V(t) = 100t\sqrt{2}\sin 100\pi t$. What is the value of the current flowing through the circuit?

- A. 2.50A
- B. 3.53A
- C. 2A
- D. 4.50A
- E. 4.90A

98. Two charges q and $3q$ located at point A and B respectively, are separated by a distance $a > 0$. At what distance measured from point A is the electrostatic field zero?

- A. $a / 2$
- B. $a / 3$
- C. $a(1 + \sqrt{3})$
- D. $a(1 - \sqrt{3})$
- E. None of the above answers

Question 99-100

An alternating voltage source of 50Hz voltage value efficient 120 V supplies an RLC Circuit whose elements are connected in series. The inductance, resistance and capacitance values are $L = 0.25H$, $R = 500\Omega$ and $C = 4\mu F$ respectively.

99. The circuit impedance is:

- A. 975Ω
- B. 874.67Ω
- C. 775.68Ω
- D. 675Ω
- E. 6.75Ω

100. The quality factor of the circuit is:

- A. 0.16
- B. 0.2
- C. 0.8
- D. 0.5
- E. 0.9

PAPER2:

GENERAL KNOWLEDGE AND FRENCH. GENERAL CULTURE AND CIVICS

1. Which country first colonized Cameroon?

- A. United states of America
- B. Great Britain
- C. France
- D. Germany
- E. Portugal

2. What is the significance of 20th may 1972 to Cameroon?

- A. It is the day all political parties in Cameroon united to form a single party
- B. It is the day referendum creating a Unitary state in Cameroon
- C. It is the day Mr JOHN NGU FONCHA was relieved from his function as vice president of Cameroon
- D. It is the day president Adhijou resigned from power
- E. None of the above.

3. Which of the following are the law making institutions in Cameroon?

- A. The national assembly and the senate
- B. Supreme court and the constitutional council
- C. Presidency of the republic and the prime ministry
- D. The social and economic council and senate
- E. The national assembly and the presidency of the republic.

4. The regional capital of the Adamawa region is?

- A. Maroua
- B. Garoua
- C. Bertoua
- D. Ngaoundere
- E. Ngoaoundal.

5. Which of the following is the largest plantation in Cameroon?

- A. HEVECAM
- B. SOCAPALM
- C. CDC
- D. SODECOTON
- E. SOSUCAM.

6. On which day ,month and year did the people of former west Cameroon vote in a Plebiscite?

- A. 11 February 1951
- B. 11 February 1960
- C. 11 February 1961
- D. 11 February 1965
- E. 11 February 1967

7. The institution created in 2002 by the Cameroon government with the task to monitor elections was?

- A. National commission on human rights and freedom

- B. National elections observatory
- C. National independence electoral commission
- D. Elections Cameroon
- E. Transparency international.

8. Which constitution made provision for decentralisation in Cameroon?

- A. The 1961 federal constitution
- B. The 1972 unitary constitution
- C. The 1996 constitution
- D. The 2008 constitution
- E. None of the above.

9. Which of the following is not of importance with respect to the birth certificate of Cameroon

- A. Important in establishing Cameroonian identity
- B. Determine the age of a person
- C. Enable people to participate in elections
- D. Required at police checkpoints
- E. Required for obtaining identity cards?

10. Which NGOs report on the fight against Boko-Haram has been at base of a controversy in our country?

- A. Transparency international
- B. Amnesty international
- C. The world bank
- D. The African development agency
- E. None.

11. How many municipal councils are there in Cameroon?

- A. 260
- B. 259
- C. 258
- D. 360
- E. 58

12. Whom of the following has not been a prime minister in Cameroon?

- A. Achidi Achu
- B. Mafany Musonge
- C. Paul Biya
- D. Felix Moumie
- E. Belo Bouba Maigari.

13. The constitutional successor of the president of the republic?

- A. President of the senate

- B. The president of the national assembly
- C. Prime minister
- D. President of the supreme court
- E. None.

14. In which year was there a failed coup d`etat in Cameroon?

- A. September 2001
- B. April 1984
- C. November 1982
- D. October 1961
- E. None

15. The largest country in the world?

- A. RDC
- B. Algeria
- C. Russia
- D. USA
- E. Canada.

16. The sport discipline that opposes two or four players on both sides of a net

- A. Golf
- B. Handball
- C. Tennis
- D. Cricket
- E. Baseball.

17. Is not part of the colours that makes up the rainbow?

- A. Red
- B. Orange
- C. Blue
- D. Pink
- E. Violet

18. It is of tradition that the president of the republic addresses the nation in one of these occasions.

- A. Christmas
- B. National day
- C. Youth day
- D. Womens day
- E. None

19. Which of the following is the minister of small and medium size industries and social economies?

- F. Basile Atangana Kouna
- G. Pierre Ismael Bdoumg- mkkpatt
- H. Laurent Serge Etoundi Ngwa

- I. Magdaleine tchuente
 J. Eloundou Essomba Gaston
- 20. Which of the following countries was the host of 2018 worldcup?**
- A. Qata B. Brazil
 C. Japan
 D. Argentina
 E. None of the above

- 21. What process is CO₂ removed from the atmosphere by plants?**

- A. Respiration
 B. Combustion
 C. Photosynthesis
 D. Decomposition
 E. All of the above

- 22. The actual growth rate of a population is calculated by**

- A. Adding up all environmentalresistant factors
 B. Subtracting the death plus emigration rates from the birth plus immigration rate
 C. Subtracting the death ratefrom the generation time
 D. Birth rate alone
 E. None of the above

- 23. Which among the following microrganisns cause cholera?**

- A. Vibrio leeprae
 B. Vibrio cholerae
 C. Shigella shigella
 D. Salmonella typhi
 E. Salmonella paratyphi

- 24. Most antibiotics are isolated from which of the following?**

- A. Viruses
 B. Microorganisms
 C. Organs and tissues of someanimals
 D. Plants
 E. Soil

- 25. Which of the following diseases is not preventable by vaccination?**

- A. Measles

SCIENTIFIC FIELD

- B. Whooping cough
 C. Poliomyelitis
 D. Syphilis
 E. Tuberculosis
- 26. Which of the following insects is the vector of the agent responsible for sleeping sickness?**

- A. Sand fly
 B. Dragon fly
 C. Tse-tse fly
 D. House fly
 E. Grasshopper

- 27. Among the following which is the fundermental unit of hereditary?**

- A. Gene
 B. Atom
 C. Molecule
 D. Cell
 E. DNA

- 28. In which department or service of the hospital are patients first received?**

- A. Outpatient
 B. Medecine
 C. Sugary
 D. Maternity
 E. Mortuary

- 29. Plasmodium spp is?**

- A. An accidental parasite
 B. An erratic parasite
 C. An obligate parasite
 D. A facultative parasite
 E. All of the above

- 30. Which of the following methods is used to preserve food by slowing down metabolic processes of food borne microbes?**

- A. Freezing
 B. Lyophilisation
 C. None ionising radiation
 D. Pasteurisation

- E. Sterilisation
- 31. The use of immunoglobulins remains the mainstay of**
- Passive prophylaxis
 - Active prophylaxis
 - Treatment of diseases
 - All of the above
 - None of the above
- 32. The best indicator of central value when one or more of the lowest or highest observation are wide apart or not so evenly distributed is called the**
- Mode
 - Mean
 - Median
 - Range
 - Standard deviation
- 35. CD-ROM stands for**
- Compactable read onlymemory
 - Compact data read onlymemory
 - Compactable disc read onlymemory
 - Compact disc read onlymemory
 - None of the above
- 36. Les course sont terminés.vous pouvez rentrer!**
- Dont
 - Si non
 - Comme
 - Donc
 - Desormais
- 37. Germain et moi sommes allés.....**
nos amis en ville ce matin
- Rencontres
 - Recontrées
 - Rencontrez
 - Renconter
 - Rencontre
- 38. Nous jouons sur un. de tennis**
- Court
 - Cour
 - Cours
- 33. Which of the following is not an input for a computer?**
- Speakers
 - Mouse
 - Scanner
 - Keyboard
 - All of the above
- 34. Which of the following device can both feed data into and accept data from a computer**
- Arithmetic logical unit(ALU)
 - Central processing unit(CPU)
 - Input-output devices
 - Printing devices
 - All of the above
- 39. Marie et. frères ont voyage**
- Ces
 - Ses
 - S`est
 - C`est
 - Cet
- 40. Ils prennent soins de lui.il ne soit pas triste**
- Pour qu`
 - Parce qu`
 - Affin qu`
 - A cause qu`
 - Aucun
- 41. Roberto.....a remis la cle hier soir**
- La

B. Lui

C. L`a

D. L`ai

E. Leures

42. Le chirurgien a employe une paire de lors de l'operation

A. Scisseau

B. Ciseau

C. Sciseau

D. Cisseau

E. Autres

43. L`être humain a cinq.....

A. Senses

B. Sens

C. Sense

D. Sence

E. Sences

44. Un neurologue traite les problems de.....

A. Naires

B. Nerves

C. Nerfs

D. Ner

E. Ners

45. La me reste unemaritime

A. Voie

B. Voix

C. Voir

D. Voir

E. Voit

46. C`est une ressortissant.....Mozambique

A. Du

B. De la

C. De

D. De l`

E. Des

47. Je vais à l'ecole. velo

A. En

B. Au

C. A

D. Sur

E. Dans

48. Je ai demandé de venir demain matin

A. Luer

B. Leur

C. Luers

D. Leurs

E. Autres

49. Je me.....mal ce matin

A. Sans

B. Sens

C. Sent

D. Cent

E. Sents

50. Ces vêtements sur le lit sont a moi et mon frère.Ce sont les.....

A. Siens

B. Tiens

C. Notres

D. Notres

E. Leurs



2016 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN CAMEROON

BIOLOGY

Choose the exact answer

1- The viruses are:

- A. eukaryotes
- B. prokaryotes
- C. Mandatory parasites
- D. Organisms with their own metabolism e) no answer is right

2- What nitrogen base is not a component of DNA?

- A. Adenine
- B. Cytosine
- C. Guanine
- D. Thymine
- E. Uracil

3- Which of the following is the stimulator of the heart?

- A. AV node
- B. Purkinje fibers
- C. The AV beam D. The AV node
- E. None

4- In metaphase I, a cell contains:

- A. 23 DNA molecules and 23 Chromatids
- B. 46 DNA molecules and 46 Chromatids
- C. 92 DNA molecules and 92 Chromatids
- D. 92 DNA molecules and 46 Chromatids
- E. 92 DNA molecules and 23 Chromatids

5- Vaccination:

- A. Is an exploitation of the immune memory
- B. Induces a immediate protection
- C. Consists in the injection of specific antibodies
- D. Is a curative act
- E. No proposition is exact

6- The function of the ileum is:

- A. To absorb the nutritive substances
- B. Absorption of vitamin B12 and bile salts
- C. Introduce bile and pancreatic juice
- D. Absorb alcohol and aspirin
- E. Absorb lipids

7- The role of iodine in salt is to:

- A. Prevent diabetes
- B. D avoid simple goiter
- C. Prevent Addison's disease
- D. Prevent Cushing's syndrome
- E. Prevent hypertension

8- In the mammalian cell cycle, the DNA synthesis takes place during:

- A. The S phase
- B. The G1 phase
- C. The mitotic phase
- D. The G2 phase
- E. None

9- What substance are the nails made of?

- A. Elastin
- B. Cuticle
- C. Keratin
- D. Plastin
- E. None of the proposals is correct

10- Some amino acids cannot be synthesized by the human body and must be provided by food. Those are :

- A. Basic amino acids
- B. Essential amino acids
- C. Non-essential amino acids
- D. Fatty acids
- E. None

11- During mitosis, the maximum chromosome condensation is:

- A. At the start of prophase
- B. Telophase
- C. Metaphase
- D. Interphase
- E. Phase G2

12- In humans, enzymes:

- A. Supplied by food
- B. Synthesized by the body
- C. Very active at 0 ° D. Destroyed at 100 °
- E. Reversibly
- F. Identical at any age

13- Mutations

- A. Can only affect germ cells
- B. Modifies the sequence of a gene
- C. Is always transmitted to the offspring
- D. Always has a selective advantage
- E. None

14- Which of the following physiological variations are related to gender?

- A. Albinism
- B. Blood group
- C. Sickemia
- D. Hemophilia
- E. None

15- In women who have a 23-day cycle, ovulation takes place around:

- A. Day 14Day
- B. 13 day
- C. 9th day
- D. 5th day
- E. 11th day

16- The hormone glucagon is:

- A. Hypoglycaemic
- B. Hyperglycaemic
- C. A hormone that promotes lipid synthesis
- D. A hormone that promotes glycogenogenesis
- E. Secreted by Langerhans β cells

17- In humans, spermatogenesis

- A. Occurs in the seminiferous tubes
- B. Begins puberty and ends 60 years
- C. Continues from the age of puberty
- D. A 30 days
- E. Is not centrifugal in the seminiferous tubes

18- The following elements are all constituents of DNA except:

- A. Phosphate
- B. Glucose
- C. Adenine
- D. Guanine
- E. Cytosine

Questions 19 and 20 relate to the pedigree below, in black is considered to be sick.

19- The allele responsible for this disease is:

- A. Dominant
- B. Codominant
- C. Recessive
- D. Lethal
- E. None of the answers is correct

20- The probability that individual III 3 is carrying the allele of the disease is:

- A. $1/3$
- B. $2/3$
- C. $1/4$
- D. $3/4$
- E. 1

Instructions for questions 21 and 22.

Choose:

- A. If 1,2 and 3 are correct
- B. If only 1 and 3 are correct
- C. If 1 and 3 are correct
- D. If only 4 is correct
- E. If 1, 2, 3 and 4 are correct

21- Which of the following functions can be associated with the plasma membrane glycoproteins?

- A. Determination of blood groups
- B. Binding sites for toxins and bacteria

- C. Contribution to the binding of the sperm to the ovum
- D. Increased absorption efficiency

22- Alleles of a gene:

- A.different nucleotide sequences
- B.the same nucleotide sequence
- C. Always lead to different phenotypes
- HaveHaveD. Originate from mutations
- Choose the exact answer

23- Regarding spermaphytes:

- A. These are seed plants
- B They are flowering plants
- C. Perform double fertilization
- D. Are cryptogams
- E. Three propositions are correct

24- Bacteria

- A. Is a eukaryote
- B. Has no nucleus
- C. Has no cytoplasm
- D Is not ancell
- E.No answer is right

25- The following organic molecules are composed of carbons except

- A. Carbohydrates
- B. Proteins
- C. Lipids
- D. Carbonates
- E. None answer is just

26- Amino acids are called amphoteric p ar:

- A. The absence of the amine and carboxylic groups
- B. The presence of the amine group
- C. The presence of the amine and carboxylic groups
- D. No answer is correct

27- Crossing-over:

- A. Occurs randomly at any time during meiosis
- B. Can in some cases occur during mitosis
- C. Ensures intra-chromosomal mixing during meiosis
- D. Cannot exist in haploid organisms
- E. None

28- L the neck bone is called:

- A. The collarbone
- B. The sternum
- C. The coracoid
- D. The hyoid
- E. None

29- Which of the following characteristics is not associated with skeletal muscle?

- A. It gets tired quickly

- B. Its fibers are striated
- C. It is subjected to the will
- D. It is a muscle with slow contraction
- E. It can be activated by reflex

30- Which organelle among these is often absent in the neuron?

- A. Centriole
- B. MitochondriaGolgi
- C.apparatus
- D. Ribosome
- E. None

31- Which of the following elements may be absent in a reflex arc?

- A. Sensitive neuron
- B. Effector
- C. Central nervous system (integration center)
- D. An association neuron
- E. A sensory receptor

32- Which hormone is secreted by the adrenal medulla?

- A. Cortisol
- B. Adrenaline
- C. Aldosterone
- D. Testosterone
- E. None

33- A child born AB negative rhesus

- A. Has agglutinins Anti-A, Anti-B and Anti-Rhesus
- B. Has no agglutinin in plasma
- C. Has Anti-O agglutinins only
- D. Has Anti-Rh agglutinins only
- E. None of the above

34- Elevation in blood pressure could be attributed to all of these causes except:

- A. Increased systolic volume
- B An increase in heart rate
- C. An increase in the duration of atrial diastole
- D. A constriction of arterioles
- E. None

35- What is the main target cell of HIV

- A. Plasmocyte
- B. Erythrocytes
- C. Lymphocytes
- D. Monocytes
- E. T4 lymphocyte

36- The sound vibrations are transmitted in the following order:

- A. Pavilion, auditory canal, eardrum, ossicles, round window, cochlea
- B. Pavilion, auditory canal, eardrum, ossicles, oval window, semicircular canals
- C. Pavilion, ear canal, eardrum, bone lets,

auditory nerve

- D. Eardrum, ossicles, auditory nerve, telencephalon
- E. Eardrum, ossicles, auditory nerve, midbrain

37- Which factor among these has no effect on basic metabolism?

- A. Amount of thyroxine in the blood
- B. The sex of the individual
- C. Age
- D. Type of activity
- E. Body surface

38- Which of the following structures is a sexual structure in humans?

- A. Gonades
- B. Gametes
- C. Large shoulder
- D. vesicles
- E. None

39- A characteristic of living organisms is sensitivity. This term is defined by:

- A. The international change in the position of the organism
- B. The change in the number and / or size of cells
- C. The ability to react to an excitement
- D. None of the answers below n is correct

40- What system helps regulate temperature and protect the body?

- A. Urinary
- B. Respiratory
- C. Integumentary
- D. Skeletal
- E. None

41- DNA is:

- A. Contained in the nucleus throughout the living one
- B. Is free in the cell cytoplasm in all organisms
- C. Is absent in prokaryotes
- D. Exists in all living organisms
- E.genetic information

Carries42- What is the correct order in the arrangement of the structures for the entry of air into the lungs?

- A. Larynx, trachea, bronchi, bronchiole,
- B. Larynx, bronchi, trachea, bronchiole
- C. Larynx, trachea, bronchioles, bronchibronchi
- D. Larynx, alveoli,, trachea

43- An increase in systematic blood pressure in the carotid sinus causes:

- A. Cardio moderation

- B. Cardio acceleration
- C. An increase in ejection volume
- D. A decrease in ejection volume
- E. blood pressure

High44- The creation of post synaptic potential depends on:

- A. Only neurotransmitter
- B. Only from the receptor for neurotransmitter
- C. From the receptor / neurotransmitter complex
- D. All of the aboveabove
- E. None of theis correct

45- Which of the following statements distinguishes eukaryotic cells from prokaryotic cells?

- A. Ability to tolerate the presence of oxygen
- B. Presence of organelles bound by membranes
- C. Ability to carry out photosynthesis
- D. Presence of ribosomes
- E. None

46- Mitochondria

- A. Conduits cellular respiration
- B. Decomposes ATP to produce energy forcells
- C. Contains granules and mitochondrial ridges
- D. All the above answers are correct
- E. No answers are correct

47- During the menstrual cycle, what is the main source of progesterone in the women ?

- A. The ovarian cortex
- B. The anterior pituitary gland

C. The corpus luteum

- D. The uterus
- E. The ovary

48- In general, of the cell cycle requires the least time

- A. G1
- B. G2
- C. S
- D. M (Mitosis)
- E. None

49- What is the process by which matter leaves the blood from the liquid of the nephron?

- A. Filtration
- B. Ultrafiltration
- C. Reabsorption
- D. Secretion
- E. Diffusion

50- Which of the following sentences best describes the structure of the cell membrane?

- A. Two layers of proteins with a layer of lipids between the layers of proteins
- B. Two layers of lipids with the proteins between the layers of lipids
- C. A double layer of lipid molecules forming a matrix with proteins suspended in the matrix of lipidslipids
- D. A single layer of proteins on the outside and a layer ofon the inside
- E. None

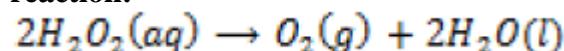
CHEMISTRY

Choose the exact answer

51- The quenching of test portion

- A) consists in adding water to the reaction medium
- B) Consists of vaporizing the reaction medium
- C) Means the sudden cooling of the reaction medium
- D) None of the propositions is exact

52- Which of the following propositions is false: the iron ions III Fe³⁺ (aq) and the platinum Pt (s) catalyze the equation reaction:



- A) The catalysis by platinum is a heterogeneous catalysis
- B) The catalysis by iron ions III Fe³⁺ (aq) is a heterogeneous catalysis.

C) Catalysis by iron ions III Fe³⁺ (aq) is a heterogeneous catalysis.

D) Ions iron III Fe³⁺ (aq) and the platinum catalyze under different phases

53- More generally, the equation of the assay reaction of an AH acid with soda is

- A) A(aq)+HO⁻ (aq) → AH⁻(aq) + H₂O(l)
- B) AH(aq) + H₂O(l) → A⁻ (aq) + H₃O⁺(l)
- C) AH(aq) + HO⁻(aq) → A⁻(aq) + H₂O(l)
- D) A⁻(aq) + H₂O(l) → AH(aq) + OH⁻(l)

54- Among the following aqueous solutions whose content is described which has a buffering capacity?

- A) $HCOONa/HCOONH_4$
 B) HCl/NaOH
 C) H_2SO_4/H_2SO_4
 D) $KB(OH)/B(OH)$
 E) $HCN/CaCN_2$

55- The mixture of $V = 100\text{mL}$ of a weak monoacid ($\text{Pka} = 5$ and $C_1 = 4 \times 10^{-2}\text{mol / L}$) and with a strong monobase ($\text{Pkb} = 8$ $C_2 = 4 \times 10^{-2}\text{mol / L}$) gives:

- A) At the half-equivalence $\text{pH} = \text{pka}$
 B) At the equivalence $\text{Ph} = 7 + \frac{1}{2} \text{Pka} + \frac{1}{2} \log C_2$
 C) The base is predominant therefore $\text{pH} = \text{pKa} + \log ([\text{acid}] - [\text{base}]) / [\text{base}]$
 D) At half equivalence $\text{pH} = 8$
 E) Just after equivalence the pH is still slightly acid

56- In the, the bromine is reduced by exchanging

- A) 2 electrons and 1 proton
 B) 5 electrons and 6 protons
 C) 10 electrons and 1 proton
 D) 15 electrons
 E) None

57- The colored indicators are:

- A) Acid-basic chemical species B) Oxidizing-reducing chemical species C) Neutral chemical species D) Are acid species

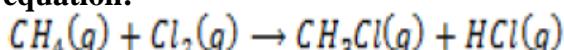
58- The electronic configuration of the carbon element in the ground state is:

- a) $1s^2 2s^1 2p^3$
 b) $1s^2 2s^2 2p^2$
 c) $1s^1 2s^1 2p^4$
 d) Néant

59- Carbon question

- A) The carbon atom has 4 electrons on its valence layer
 B) The valence of the nitrogen element is 5
 C) All of the benzene carbon atoms are hybridized sp
 D) All the carbon atoms of the alkene $\text{CH}_2 = \text{C} = \text{CH}_2$ are hybridized sp^3

60- Methane generates in the presence of dichlor and light chloromethane and hydrogen chloride according to the equation:



This reaction (1) is exothermic.

- A) This reaction is an elimination reaction
 B) This reaction is an addition reaction

- C) The molar energy of this reaction is of positive sign
 D) None

Question 61-62

The pH of an arterial blood sample is 4.42. Following an acidification of 10mL of blood, 3.91mL of (corrected for standard temperature and pressure) is produced.

61- What is the concentration of in the blood?

- A) $2,65 \cdot 10^{-2} M$
 B) $5,2 \times 10^{-2} M$
 C) $3,65 \times 10^{-2} M$
 D) $7,7 \times 10^{-2} M$
 E) $2,65 \times 10^{-2} M$

62- What are the respective concentrations of CO_2 and HCO_3^- dissolved?

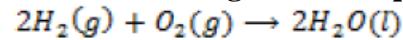
- A) $2,53 \times 10^{-2} M$ et $1,21 \times 10^{-2} M$
 B) $1,21 \times 10^{-3} M$ et $2,51 \times 10^{-3} M$
 C) $1,325 \times 10^{-2} M$ et $1,325 \times 10^{-2} M$
 D) $2,53 \times 10^{-2} M$ et $1,21 \times 10^{-3} M$
 E) Néant

63- Which substance is represented by the formula: $\text{CH}_2 = \text{CH}_2$

- A) Butane
 B) Propane
 C) Ethene
 D) Methane
 E) Acetylene

Question 64-65

Let the following reaction equation:



In the initial state, there has 2 mol of hydrogen H_2 and 1.5 mol of oxygen O_2 . We note x the progress of the reaction

64- The quantity of oxygen remaining at an instant t of the evolution of the system is

- A) $2-x$
 B) $1,5-x$
 C) $1,5-2x$
 D) x
 E) $2x$

65- The quantity of dihydrogen remaining at an instant t in the evolution of the chemical system is

- A) $1x$
 B) $2-2x$
 C) $0,5-2x$
 D) X

E) 2x

66- The nitrogen atom ($Z = 7$) has:

- A) 7 valence electrons
- B) 2 valence electrons
- C) 5 valence electrons
- D) 1 valence electron
- E) 3 valence electrons

67- The nitrogen atom has

- A) 0 doublet non-binding
- B) 1 non-binding doublet
- C) 2 non-binding doublets
- D) 3 non-binding doublets
- E) 5 non-binding doublets

68- In the methane molecule of formula CH_4 . The central carbon atom is:

- A) At the top of a triangular base pyramid formed by the hydrogen atoms
- B) At the center of a square whose hydrogen atoms are the vertices
- C) At the center of a tetrahedron whose hydrogen atoms are the vertices
- D) At the center of a trapezoid whose hydrogen atoms are the vertices
- E) None of the propositions is exact

69- At the wavelength, $\lambda = 750 \text{ nm}$ I absorbance of a solution of a colored species of molar concentration $C = 5 \times 10^{-4} \text{ mol / L}$ introduced into a tank of length $l = 1.0 \text{ cm}$ is worth 0.75. At this wavelength, the molar absorption coefficient of the species is to

- A) $2 \text{ mol}^{-1} \text{ L} \cdot \text{cm}^{-1}$
- B) $1.5 \text{ mol}^{-1} \text{ L} \cdot \text{cm}^{-1}$
- C) $1.5 \times 10^3 \text{ mol}^{-1} \text{ L} \cdot \text{cm}^{-1}$
- D) $1500 \text{ mol}^{-1} \text{ L} \cdot \text{cm}^{-1}$
- E) Aucune des propositions n'est exacte

70- In water, butan-1-ol is:

- A) Less soluble than hexan-1-ol

PHYSICS

1- Two beads of mass M and m ($M > m$), comparable to material points are released without initial speed) a height h from the ground, in a region where the gravity field is constant. The air resistance is neglected. Which of the following statements is correct?

- A) The ball M reaches the ground first
- B) The ball m reaches the ground first
- C) The two balls reach the ground simultaneously
- D) The order of arrival on the ground depends on the latitude of the location of the

B) Less soluble than propan-1-ol

C) Less soluble than butane

D) More soluble than ethanol

71- The gillepis formula of H_2O , NH_3 and CH_4 is respectively

- A) AX_2E_2 ; AX_2E_2 ; AX_2E_3
- B) AX_2E_2 ; AX_3EI ; AX_4
- C) AX_2E_3 ; AX_3EI ; AX_4
- D) AX_2E_4 ; AX_3EI ; AX_4

72-

a) An oxidant is a chemical species capable of yielding one or more electrons agent is a chemical

b) A reducing species capable of yielding one or more electrons

c) An oxidant is a chemical species capable of gaining one or more protons.

d) A reducing agent is a chemical species capable of gaining one or more protons

e) None of the propositions is exact.

73- A compound contains a nitrogen atom and its analysis gives 72.3% of carbon; 10.7% hydrogen and 16.9% nitrogen. Its molecular formula is

- a) $\text{C}_5\text{H}_9\text{N}$
- b) $\text{C}_6\text{H}_8\text{N}$
- c) $\text{C}_5\text{H}_{10}\text{N}$
- d) $\text{C}_6\text{H}_8\text{N}_2$

74- Calculate the pH of solutions composed of a mixture of 1M acetic acid + 0.5M sodium acetate

- a) Exothermic
- b) Is endothermic
- c) Athermic
- d) Neutral

experiment

E) None of the propositions is exact

2- A mass m , subjected to the terrestrial gravity field of value $g = 9.81 \text{ N / kg}$ can move without friction from a point A to any other point C by following two different paths :

Path 1: the vertical path AB then the horizontal path BC ($BC = a$)

Path 2: The path along the segment AC of length b

We denote by the work of the weight in each of the two cases. Make a diagram and



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indicate which of the proposed expressions is correct:

- A) $W_1 = W_2$
- B) $W_1 = mgb$
- C) $W_2 = mga$
- D) $W_1 > W_2$
- E) Néant

78- For a uniform circular motion:

- A) Acceleration is zero
- B) The speed vector remains constant
- C) The acceleration vector is centripetal
- D) The acceleration vector is tangential
- E) The acceleration vector is constant

79- In a reference frame of origin O, a mobile M is in motion under the action of a force. Among the quantities below, relating to the mobile, which is not dependent on the frame of reference in which we study the movement

- A) The mass
- B) The position vector
- C) The acceleration
- D) The kinetic energy
- E) The speed

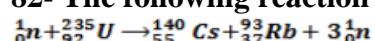
80- In a geocentric repository assumed to be Galilean, a terrestrial satellite describes a circular orbit of radius R.

- A) The standard of its speed is constant
- B) Its acceleration is zero
- C) Its period of revolution is proportional to the radius
- D) If the satellite is geostationary, its speed is zero
- E) We could place a satellite of the same speed on the same trajectory

81- The image of an object very far away (at infinity) through a converging lens is always found:

- A) In the focal plane object of the lens
- B) In the focal plane image of the lens
- C) After the focal plane image of the lens
- D) Before the focal plane object of the lens
- E) None of the propositions are exact

82- The following reaction equation



- A) Is a fission reaction
- B) E st a fusion reaction
- C) Is a spontaneous nuclear reaction
- D) Is a chemical reaction caused
- E) None

83- A flat capacitor is subjected to a voltage of 12V. Its plates are separated by a

distance $d = 1.0\text{cm}$. The value of the electrostatic field between the metal plates is equal to:

- A) 12 V.m^{-1}
- B) $0,12 \text{ V.m}^{-1}$
- C) $1,2 \times 10^3 \text{ V.m}^{-1}$
- D) $0,083 \text{ V.m}^{-1}$

84- Data: $g = 10 \text{ N.kg}^{-1}$; we choose an axis (Oz) oriented upwards. The potential energy of gravity being chosen as zero at sea level, that of a 100kg mass diver at the depth of 50m a value of

- mA) 50J
- B) $5.0 \times 10^4 \text{ J}$
- C) -50J
- D) -50kJ
- E) None

85- Are 2 electrolyzers connected in series: the first contains silver nitrate, the second copper sulphate. At the end of $t = 32 \text{ min } 45 \text{ s}$, 6.3 g of silver is deposited at the cathode of the first electrolyser $F = 96500\text{C}$. $M_{\text{Ag}} = 108 \text{ g/mol}$; $M_{\text{Cu}} = 63.6 \text{ g/mol}$. What is the intensity of the current?

- A) 1A
- B) 2.6A
- C) 2.7A
- D) 2.9A

86- The energy of a capacitor is written:

- A) $E = \frac{1}{2}CU^2$
- B) $E = \frac{1}{2}qU^2$
- C) $E = \frac{1}{2}qU$
- D) $E = \frac{1}{2}CU$

Question 87-88-89

A constant spring, arranged horizontally, has a fixed end and a free end. A mass wagon comes up against the latter with a speed v . Numerical values: $k = 100\text{N/m}$; $m = 0.5\text{kg}$, $v = 1\text{m/s}$, $u = 0.8\text{m/s}$.

87- What is the maximum deformation of the spring?

- A) 2.07cm
- B) 7.07cm
- C) 70.7cm
- D) 7.07m

88- How long does the wagon last in contact with the spring?

- A) 22s
- B) 2.2s
- C) 0.12s

D) 0.22s

89- How long does it take for the speed of the wagon to go from value v to value u?

A) 0.05s) 0.5s

B

C) 5s

D) 50s

90- An object 2m high is located 2.2m from a converging lens with a focal length of 4m. What will be the height of the image formed?

A) -1.29m

B) 1.29m

C) 20m

D) 2 V / m

E) 10m

91- An object is located 60cm from the main focus of a converging lens with a focal length of 30cm, what are the nature and the meaning of the image obtained?

a) Virtual and straight

b) Virtual and inverted

c) Real and straight

d) Real and inverted

e) None of these answers

Questions 92, 93, 94 are related

We have a photoelectric cell with an extraction threshold of 2.4eV. It is lit by a polychromatic beam made up of two wavelength radiations

$$\lambda_1 = 430\text{nm} \text{ et } \lambda_2 = 580\text{nm}$$

92- The work is:

A) $2,84 \cdot 10^{-19}\text{J}$

B) $1,84 \cdot 10^{-19}\text{J}$

C) $3,84 \cdot 10^{-19}\text{J}$

D) $4,84 \cdot 10^{-19}\text{J}$

93- Calculate the maximum speed of the electrons torn from the cathode

A) $4,14 \cdot 10^7 \text{m.s}^{-1}$

B) $4,14 \cdot 10^3 \text{m.s}^{-1}$

C) $4,14 \cdot 10^9 \text{m.s}^{-1}$

D) $4,14 \cdot 10^7 \text{m.s}^{-1}$

94- The stopping potential is worth:

A) -0.49V

B) 0.9V

C) 0.49V

D) -0.45V

95- A thin converging lens with a focal length of 20cm has a vergence of:

A) 5 diopters

B) 0.5 diopters

C) 0.05 diopters

D) 50 diopters

96- The fission of a uranium 235 nucleus releases an energy of 200MeV on average. A nuclear reactor provides a power of 1300MW. The yield from the transformation of nuclear energy into thermal energy is 30%. Mass of an atom of uranium 235; m = 235.0435u. Calculate the annual consumption of uranium 235 (in tonnes from the reactor)

A) $1,56 \cdot 10^3 \text{kg}$

B) $1,66 \cdot 10^3 \text{kg}$

C) $2,66 \cdot 10^3 \text{kg}$

D) $10,66 \cdot 10^3 \text{kg}$

97- The second, the meter, the kilogram and the ampere are the units of the international system. The equivalent unit of the joule is:

A) $\text{kg.m}^{-1}\text{s}^{-2}$

B) $\text{kg.m}^2\text{s}^{-1}$

C) Kg.m.s^{-2}

D) $\text{kg.m}^2\text{s}^{-1}$

E) $\text{kg.m}^2\text{s}^{-2}$

98- Unit of the power P

A) W.s^{-1}

B) W

C) W.s

D) V.A.h

E) N.kg^{-1}

99- The resistance R in a circuit is used to:

A) Increase the sensitivity of the ammeter

B) Increase the capacity of the capacitor

C) Decrease the capacity of the capacitor

D) Reduce the f.e.m. in circuit

100- In an alternator, there is transformation of:

A) Electrical energy into mechanical energy

B) Mechanical energy into electrical energy

C) Mechanical energy into chemical energy

D) Chemical energy into energy mechanical

E) None of the propositions is correct

**2015 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING IN
CAMEROON**

BIOLOGY

1. Which organelle is involved in the energy production of a prokaryotic cell?

- A. The chloroplast
- B. The nucleus
- C. The mitochondrion
- D. The endoplasmic reticulum
- E. None of the above

2. The body tissues are organized into

- A. Cells
- B. Body systems
- C. Organs
- D. Organelles
- E. None of the above answers

3. Which of the following statements distinguishes eukaryotic cells from prokaryotic cells?

- A. Ability to tolerate the presence of oxygen
- B. Presence of organelles bound by membranes
- C. Ability to perform photosynthesis
- D. Presence of ribosomes
- E. None of the above

4. Which of the structures below is not found in the nucleus?

- A. Functional ribosomes
- B. Chromatin condensing into chromosomes
- C. The nucleolus producing ribosomal RNA
- D. The nucleoplasm instead of the cytoplasm
- E. None of the above

5. The mitochondria

- A. Continues cellular respiration
- B. Breaks down ATP to produce energy for cells
- C. Contains granules and mitochondrial ridges
- D. All of the above
- E. None of the above

6. For cells where carbon dioxide crosses the membrane plasma by simple diffusion, what determines the speed at which carbon dioxide

enters the cell?

- A. The concentration of carbon dioxide on each side of the membrane
- B. The amount of ATP produced by the cell
- C. The amount of carrier protein in the membrane
- D. The concentration of hydrogen ions on each side of the membrane
- E. None of the above

7. The peripheral proteins of cell membranes

- A. Can be ionically dissociated without rupture of membrane
- B. Are only located outside of membrane
- C. Also called transmembrane proteins
- D. Are carrier proteins cell membranes
- E. None of the above

8. Which of the following is a structural part of the eukaryotic cell membrane?

- A. Triglycerides
- B. Phospholipids
- C. ATP
- D. More than one of these
- E. None of the above

9. Which of the following best describes RNA transfer?

- A. The process by which RNA is assembled from a strand of DNA
- B. The attraction of a binding protein (agglutinate) and other transcription factors to inform RNA polymerase where it's attach and start manufacturing RNA
- C. Removal of introns from mRNA
- D. Step by step addition of amino acids to a growing chain of polypeptide
- E. None of the above

10. Which of the following is true for translation in human cells?

- A. It takes place at ribosomes
- B. RNA_m is "read" two bases both
- C. The process takes place before translation
- D. DNA polymerase is required



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- fortranslation
E. None of the above

11. The enzyme pepsin which helps digest proteins is produced and excreted in the stomach. Which of the following statements would be true of the enzyme?

- A. The enzyme works best at 100 ° C
- B. The enzyme works best at a neutral pH (pH 7)
- C. The enzyme is also used to digest carbohydrates
- D. Without the enzyme digestion of proteins would be slowed down
- E. The enzyme is also used to digest lipids

12. What is the name used to designate a chemical which competes with a substrate for a place at the active site of an enzyme?

- A. The prosthetic group
- B. The reversible inhibitor
- C. The competitive inhibitor
- D. The finished product inhibitor
- E. None of the above

13. Which of the following would least affect the effectiveness of an enzyme?

- A. Temperature
- B. Concentration of substrate
- C. Concentration of enzyme
- D. Original activation energy of the system
- E. None of the above

14. Which of the following is not true regarding the inhibition of the enzyme?

- A. In competitive inhibition, the inhibitor binds with the active site of the enzyme
- B. In non-competitive inhibition, the inhibitor binds to the allosteric site of the substrate
- C. In irreversible inhibition, a poison binds to the enzyme so that it can never work again
- D. Most inhibitors work reversibly
- E. Competitive inhibitors usually look like substrate

15. A non-protein organic molecule securely linked to the active site of a enzyme is:

- A. An apoenzyme
- B. A coenzyme
- C. A haloenzyme
- D. A prosthetic group
- E. None of the above

16. To get the energy from starch and glycogen, the body must start with:

- A Hydrolyze starch to glucose and glycolysis
- B. Hydrolyze both starch and glycogen to glucose
- C. Convert both starch and glycogen to fatty acid
- D. Remove the nitrogen atoms from two molecules
- E. None of the above

17. Which of the following Are organelles that work in converting energy into chemically usable form in cells?

- A. Endoplasmic reticulum
- B. Mitochondria
- C. Chloroplast
- D. B and C at the same time
- E. A and B at the same time

18. Name two aerobic respiration products which are considered as waste

- A. Carbon and oxygen
- B. Dioxide of carbon and carbonic acid
- C. Carbon dioxide and water vapor
- D. Lactic acid and alcohol
- E. None of the above

19. Which of the following statements produces ATP by phosphorylation of the substrate?

- A. Glycolysis
- B. The Krebs cycle
- C. The electron transport system
- D. The Calvin cycle
- E. None of the above

20. The contractions that propel food forward in the digestive tract are called:

- A. Chyme
- B. Peristalsis
- C. Reflux
- D. Amylase
- E. None of the above

21. When pyruvate is converted to acetyl-CoA, which of the following is



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also produced?

- A. NADH and carbon dioxide are made
- B. NADH and ATP are made
- C. Carbon dioxide and ATP are made
- D. NADH is made
- E. None of the above

22. Which of the following is the main subject of the process of cellular respiration?

- A. Produce ATP
- B. Produce reduced NAD molecules
- C. Break down glucose
- D. Ferment alcohol
- E. None of the above

23. Which of the following statements produces a waste product called lactic acid?

- A. Glycolysis
- B. Anaerobic respiration in human muscle cells
- C. Aerobic respiration in human muscle cells
- D. Alcohol fermentation
- E. None of the above

24. The process known as glycolysis takes place in what part of the cell?

- A. In the nucleus
- B. In the cytoplasm
- C. In the mitochondria
- D. In the extreme surface of the mitochondria
- E. None of the above

25. Which part of aerobic respiration produces the greatest amount of ATP?

- A. The electron transport chain
- B. The Krebs cycle
- C. Alcoholic fermentation
- D. Lactic acid fermentation
- E. None of the above

26. What role does the nervous system play in digestion?

- A. It stimulates the motor neurons to take impulses from the brain and spinal cord
- B. It stimulates the secretion of saliva, stomach acids and hormones
- C. It stimulates the pacemaker to speed up or slow down
- D. It regulates respiration
- E. None of the above responses

27. The two divisions of the nervous autonomic system are:

- A. Parasympathetic and somatic
- B. Sympathetic and somatic
- C. Peripheral and parasympathetic
- D. Sympathetic and parasympathetic
- E. None of the above responses

28. The sense of balance is housed in:

- A. The middle ear
- B. The vestibular apparatus
- C. The outer ear
- D. bones
- E. None of the above

29. So that the light rays fall on the retina under normal conditions,

- A. The eyeball must increase in diameter
- B. The lens must become thinner
- C. All the rods must be activated
- D. All the cones must be activated
- E. No answers above

30. Which of the following structures converted are the vibrations of sound in nerve impulses?

- A. The cochlea
- B. The eardrum
- C. The bones of the ear
- D. The auditory nerve
- E. None of the above

31. The term that best describes the embryonic hormone that maintains the secretion of progesterone and estrogen from the corpus luteum (during the first trimester of pregnancy is:

- A. Luteinizing hormone (LH)
- B. Progesterone
- C. Human chorionic gonadotropin
- D. Gonadotrophin releasing hormone (GnRH)
- E. No responses above

32. Which of the following propositions is incorrectly paired with its function?

- A. Seminiferous tubules add fluid containing mucus, fructose, and prostaglandin to sperms
- B. Scrotum encloses the testicles held above the abdominal cavity



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C. Epididymis Stores sperm

D. Prostate gland Adds alkaline secretion to sperm
E None of the above are incorrectly matched

33. During the menstrual cycle, what is the main source e of progesterone in women?

- A. The adrenal cortex
- B. The anterior pituitary gland
- C. The corpus luteum
- D. The uterus
- E. The ovary

34. What are the three phases of the ovarian cycle?

- A. Embryo, fetus and newborn
- B. First, second and third trimesters
- C. Menstrual, proliferative and secretory
- D. Follicular, ovulatory and luteal
- E. None of the above

35. The anterior pituitary hormone that stimulates maturation of the follicle in the ovary during the start of the menstrual cycle is:

- A. Luteinizing hormone (LH)
- B. Follicle stimulating hormone (FSH)
- C. Gonadotrophin releasing hormone (GnRH)
- D. Estrogens
- E. Progesterone

36. In general, the of the cell life cycle requires the least time

- A. Phase G1
- B. Phase G2
- C. Phase S
- D. Phase M (division)
- E. None of the above

37. The longest phase of mitosis is which of these?

- A. Prophase
- B. Metaphase
- C. Anaphase
- D. Telophase
- E. None of the above

38. During meiosis, the diploid number of chromosomes is reduced to the haploid number in:

- A. Ovules only
- B. Polar bodies only

C. In sperm and egg cells
D. In sperm production only
E. None of the above

39. What you see when you look is a way to identify:

- A. Phenotype
- B. Genotype
- C. Genome
- D. Allotype
- E. None of the above

40. What is the process behind any genetic difference in a clone?

- A. The independent assortment
- B. The mutation
- C. Crossing over and recombination
- D. Only A and C are correct
- E. None of the above

41. In humans, the removal and storage of excess glucose in blood is one of the main functions:

- A. of the liver
- B. of the kidneys
- C. of the pancreas
- D. of the large intestine
- E. of the muscles

42. What structure of mammalian skin is not involved in regulating temperature?

- A. The sebaceous glands
- B. The nerve endings
- C. The erector muscles
- D. The blood capillaries
- E. None of the above

43. The alveolar bags and the bypassed tubes of nephrons are similar because:

- A. Both have a supply rich blood
- B. Both have cells covered with cilia
- C. Both are freely permeable to dissolved substances
- D. Both have cells with a high metabolic rate
- E. None of the above

44. What is the process by which materials are returned to the blood from the liquid in the nephrons?

- A. Filtration
- B. Ultrafiltration
- C. Reabsorption
- D. Secretion
- E. Diffusion

45. What is the name of the structure that carries fluid from the

kidney to the bladder?

- A. The pelvis
- B. The ureter
- C. The collecting duct
- D. The urethra
- E. None of the above

46. Which of the following statements best describes the functions of blood?

- A. It helps to give the human body structure and support (support)
- B. It helps to excrete waste via the urinary system
- C. It transports oxygen from the lungs and nutrients from the digestive system to cells
- D. It helps in the formation of secondary sexual characteristics including the production of sperm and eggs
- E. None of the above

47. Which blood vessels are directly involved in carrying blood from the heart?

- A. The veins
- B. The venules
- C. The arteries
- D. The capillaries
- E. None of the above

48. What is the stored energy required to operate the sodium-potassium pump?

- A. ATP

B. Kinesics

- C. Energy of movement
- D. B and C at the same time
- E. A and B at the same time

49. Which of the following sentences best describes the structure of the cell membrane?

- A. Two protein layers with the lipid layers between the protein layers
- B. Two lipid layers with the proteins between the lipid layers
- C. A double layer of lipid molecules forming a matrix with protein molecules suspended in the matrix of lipids
- D. A single layer of proteins on the outside and a single layer of lipids on the inside
- E. None of the above

50. An artery has a thicker wall than a vein because artery

- A. Must contract rhythmically to pump blood forward
- B. Must resist high blood pressure
- C. Has no valve to prevent blood reflux
- D. Must contract rhythmically to pump blood forward and does not have valves to prevent blood reflux
- E. Has no valves to prevent blood reflux and must resist high blood pressure

CHEMISTRY

1. Arrange the following acids in ascending order of acidity

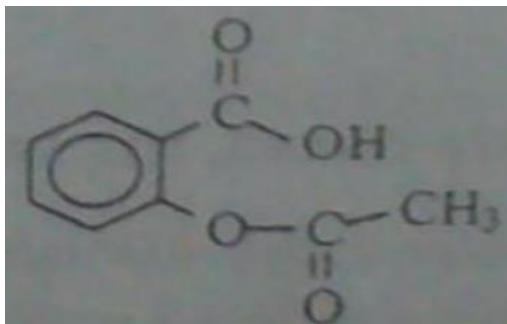
- 1) Acid trichloroethanoic
- 2) Acid ethanoic
- 3) Dichloroethanoic acid
- 4) Chloroethanoic acid
- a. 2,4,3,1
- b. 1,2,3,4
- c. 1,3,4,2
- d. 4,3,2,1
- e. § 4.3.1.2

2. The Friedel and Crafts reaction (alkylation) in the presence of an appropriate catalyst results in the substitution of a hydrogen atom by an alkyl group. Which of the equations below**correctly represents the reaction of Friedel and Craft?**

- a. $C_6H_{12} + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_{11} - C_2H_5 + HCl$
- b. $C_6H_{12} + C_2H_5Cl \xrightarrow{I_2} C_6H_{11} - C_2H_5 + HCl$
- c. $C_6H_6 + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_5 - C_2H_5 + HCl$
- d. $C_6H_6 + C_2H_4Cl_2 \xrightarrow{AlCl_3} C_6H_5 - C_2H_5 + HCl$
- e. $C_6H_6 + C_2H_5Cl \xrightarrow{AlCl_3} C_6H_5 - C_2H_5 + HCl$

3. Aspirin is a drug widely used in Cameroon. Its scientific name is acetylsalicylic acid. Its molar mass is 180g / mol. Its structure is:

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The mole of aspirin contains a carboxylic acid function and a:

- a. Amide function
- b. Ester function
- c. Anhydride acid function
- d. Ketone function
- e. Ether function

4. The difference between an emission and absorption spectrum is that:

- a. The emission spectrum has a dark background while the absorption spectrum has a colored background
- b. The absorption spectrum has a dark background while the emission spectrum has a colored background
- c. The emission spectrum is red while the absorption spectrum is white
- d. The absorption spectrum is white while the emission spectrum is red.
- e. None of the above.

5. What is the frequency of light of wavelength 432nm given that C = 3 × 10⁸ms⁻¹

- a. $1.44 \times 10^{-15} \text{ Hz}$
- b. $1.44 \times 10^3 \text{ Hz}$
- c. $1.30 \times 10^{20} \text{ Hz}$
- d. $8.39 \times 10^{11} \text{ Hz}$
- e. $6.94 \times 10^{14} \text{ Hz}$

6. Which of the following sentences is true concerning the titration of a weak acid by a strong base?

- at. At the equivalence point, the pH is 7
- b. The number of moles of acid is greater than the number of moles of base at the equivalence point
- c. The number of moles of base is greater than the number of moles of acid at the equivalence point
- d. The number of moles of acid is equal to the number of moles of base at the equivalence point

e. The solution is acidic at the equivalence point.

7. When solutions of barium chloride and sodium sulfate are mixed, the spectator ions in the resulting reaction are:

- a. Ba^{2+} et SO_4^{2-}
- b. Ba^{2+} et Cl^-
- c. Na^{2+} et SO_4^{2-}
- d. Na^{2+} et Ba^{2+}
- e. Na^+ et Cl^-

8. The ionic product of water (K_w) at 80 ° C is 25×10^{14} . The pH of the neutral solution at this temperature is:

- a. 7.5
- b. 7
- c. 6.5
- d. 6.3
- e. None of the answers below

9. 15mL of a 0.01mol / L sodium hydroxide solution is added to 10mL of CH_3COOH solution. The final solution obtained is:

- a. Basic
- b. Acid
- c. Neutral
- d. Stamp
- e. None of the above

10. What is the mass of aluminum sulfate ($\text{Al}_2(\text{SO}_4)_3$) required to prepare 500mL of the 0.2 mol / L sulfate ions in an aluminum sulfate solution given Al (27), S (32), and O (16)

- a. 11.4g
- b. 34.2g
- c. 102.6g
- d. 5g
- e. 15g

11. What is the concentration of sodium ions in a solution obtained by dissolving 3.55g of Nasalt₂SO₄ in 200mL of water given that: Na (23g), S (32) and O (16)?

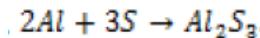
- at. 0.125M
- b. 0.500M
- c. 0.250M
- d. 0.025M
- e. 0.013M

12. 6.4g of sulfur reacts with 4.1g of aluminum to produce aluminum sulfate,



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Since S (32g / mol) and Al (27g / mol), the mass of aluminum sulfate obtained is to:

- a. 10.50g
- b. 10.00g
- c. \$ 11.39g
- d. 6.20g
- e. 19.20g

13. Consider the following equations:

- i) $CuO + H_2 \rightarrow Cu + H_2O$
- ii) $NH_3 + HCl \rightarrow NH_4Cl$
- iii) $2H_2 + O_2 \rightarrow 2H_2O$
- iv) $ZnO + 2HCl \rightarrow ZnCl_2 + H_2O$

- a. All of the above equations are redox reactions
- b. None of the above equations is a redox reaction
- c. Only equation (i) above is a redox reaction
- d. Equations (ii) and (iv) are not redox reactions
- e. Equations (ii) and (iii) are not redox reactions

14. During a redox reaction

- a. The strongest oxidizing agent always reacts with the weakest reducing agent
- b. The weakest oxidizing agent always reacts with the weakest reducing agent
- c. The weakest oxidizing agent always reacts with the strongest reducing agent
- d. The most powerful oxidizing agent always reacts with the most powerful reducing agent
- . Any oxidizing agent reacts with any reducing agent

15. What is the name of the product of the reaction in which one mole of C_2H_2 reacts with 2 moles of HBr?

- at. Bromoethene
- b. 1,2-Dibromoethane
- c. 1,1-Dibromoethane
- d. 1,2-Dibromo-ethene
- e. None of the above.

16. Given the following pairs of isometric compounds

- i) $CH_3 - CH_2 - COH$ et $CH_3 - CO - CH_3$
- ii) $CH_3 - C_6H_4 - NH_2$ et $C_6H_5 - CH_2 - NH_2$
- iii) Acide cis-butenedioïque et acide trans butenedioïque
- iv) Butenol et butanone

What is the pair of stereoisomers?

- at. i)
- b. iii)
- c. ii)
- d. iv)
- e. None

17. The ionization energy of an atom is:

- a. The number of electrons on the outermost layer of the atom
- b. The ease with which an atom can lose an electron
- c. The ease with which atoms can combine to form molecules
- d. The charge on the nucleus
- e. None of the above

18. Which of the following correctly describes the equilibrium constancy of the reaction in which H_2 and O_2 in the gas phase combine to form H_2O gas?

- a. $Kc = \frac{[H_2O]}{[H_2][O_2]}$
- b. $Kc = \frac{[H_2O]^2}{[H_2][O_2]}$
- c. $Kc = \frac{[H_2O]^2}{[H_2]^2 [O_2]}$
- d. $Kc = \frac{[H_2][O_2]}{[H_2O]}$
- e. $Kc = [H_2O]$

19. Which of the following pairs of solutions in equal quantity could produce a buffer solution?

- at. NaOH and HCl
- b. HCl and NaCl
- c. NH_3 and NH_4Cl
- d. NaOH and HF
- e. HCl and

20. The oxidation numbers of nitrogen in the following compounds: are respectively:

- a. -1, -5, -2 and -3
- b. +2, +1, -2 and -3
- c. +1, +5, -2 and -3
- d. +2, -1, +2 and -3
- e. None of the above

21. Which of the following N_2O , HNO_3 , N_2H_4 et NH_3 contains an organic acid?

a. Vinegar

b. Bleach

c. Sodium bicarbonate

d. Battery acid

e. None of the above

22. In which of the following compounds does Mn have an oxidation state of -4?

a. $MnCl_2$

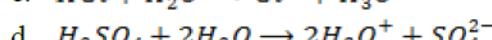
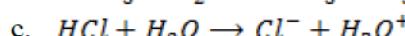
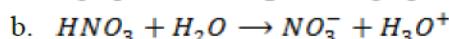
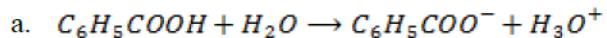
b. MnO_2

c. $MnSO_4$

d. $KMnO_4$

e. None of the above

23. Which of the following chemical equations is wrong?



e. Aucune des réponses ci-dessus

24. How much energy in calories is released if the water temperature increases by $6^\circ C$?

a. $1,2 \times 10^2 cal$

b. $1,2 \times 10^3 cal$

c. $2,25 \times 10^3 cal$

d. $4,5 \times 10^3 cal$

e. Aucune des réponses ci-dessus

PHYSICS

1- A physical equation is dimensionally homologous when:

A. It has good units

B. The dimensions on the left side = dimension on the right side

C. The equation has no dimensionless quantity

D. The equation can be divided using the dimensions

E. None of the above answers

2- The result of two forces in the figure below is:

A. 1N

B. 7N

C. 5N

D. 12N

E. None of the above answers

3 - A stone weighing 60kg is twisted around a horizontal circle on a 5m long rope. If it accelerates to $80m/s^2$, its maximum angular velocity is:

A. $16 rad.s^{-1}$

B. $8 rad.s^{-1}$

C. $50 rad.s^{-1}$

D. $400 rad.s^{-1}$

E. Aucune des réponses ci-dessus

4- The gravitational force is a conservative force because:

A. The net work that it does on a body to move it around a firm path is equal to zero

B. The net work it does at rest is equal to zero

C. It acts downward (downward)

D. It is a contactless force

E. All of the above

5- When two bodies collide elastically,

A. They catch on and move away with velocity

B. Their energies increase considerably

C. The momentum and kinetic energy are retained

D. The coefficient of restitution is less than E All the above answers

6- The zones in the thermometer which are defined or specified and clearly separated by points stated / standardare:

A. The fixed points

B. The temperature scales

C. The thermal point

D. The thermodynamic scale

E. None of the above

7- A gas is suppressed by a force that does 20J work on gas. Then it is allowed to cool when the energy of 15J is transferred.

What is the variation of the internal energy of the gas?

A. -5J

B. 10J

C. 5J

D. -10J

E. 15J

8- A charge of $1.6 \times 10^{-10} C$ is placed in a homogeneous electric field of intensity $2.0 \times 10^5 NC^{-1}$. How important is the electric force exerted on the charge?

- A. $3,2 \times 10^5 N$
- B. $1,8 \times 10^5 N$
- C. $3,2 \times 10^{-5} N$
- D. $1,8 \times 10^{-5} N$
- E. Aucune des réponses ci-dessus

9- An inexhaustible source of energy can also be called

- A. Primary source
- B. Secondary source
- C. Renewable source
- D. Non-renewable source
- E. None of the above

10- What is the function of the control rods in a nuclear reactor ?

- A. Regulate the reaction
- B. Adjust the use of heavy water
- C. Regulate the neutrons
- D. Control the graphite
- E. None of the above

11- Two gas molecules have velocities of 1km.s^{-1} respectively and 9 km.s^{-1} . What is the square root of the average speed of these two molecules?

- A. 2 km.s^{-1}
- B. $\sqrt{3}\text{ km.s}^{-1}$
- C. 4 km.s^{-1}
- D. $\sqrt{41}\text{ km.s}^{-1}$
- E. Aucune des réponses ci-dessus

12- The kinetic theory of gases gives the formula $Pv = \frac{1}{3}(NmV^2)$ for the pressure P exerted by a gas enclosed in a volume V.

The term Nm represents:

- A. The mass of one mole of the gas
- B. The mass of the gas present in the volume V
- C. The average mass of a gas molecule
- D. The total number of molecules present in volume V
- E. None of the above.

13- During nuclear fission, energy is released. Why ?

- A. It is due to a mass defect which is converted into energy
- B. It is due to a mass effect which is converted to joules
- C. It is because the process can be radioactive
- D. It is because that a neutron can be converted into an proton
- E. None of the above

14- Metals have positive resistance

temperature coefficients. This means that:

- A. Their resistance increases with a drop in temperature
- B. Their resistance increases with a rise in temperature
- C. Their resistance decreases with a drop in temperature
- D. Their resistance decreases with a rise in temperature
- E. None of the above

15- A radioactive sample has a half-life of 15 minutes; What percentage of the sample will remain after 45 minutes?

- A. $\frac{1}{7}x\frac{100}{1}$
- B. $\frac{6}{7}x\frac{100}{1}$
- C. $\frac{1}{8}x\frac{100}{1}$
- D. $\frac{7}{8}x\frac{100}{1}$

- E. Aucune des réponses ci-dessus

16- Waves can be classified on the basis of the mode of transmission as:

- A. Transverse or longitudinal waves such as sound and light waves respectively
- B. Mechanical or electromagnetic waves
- C. Waves whose particles vibrate in a line of propagation of the displacement of the wave
- D. The waves which need a material medium for the propagation or can move in the vacuum at the speed of light
- E. None of the above answers

Questions 17-19 : The figure below shows a parallel beam of white light which arrives on the PQ surface of a rectangular glass block. The block has a refractive index n_2 and is immersed in a clear liquid with the refractive index n_1 .

17- Which of the following sentences is true?

- A. If n_1 greater than n_2 , the white light would be reflected at the PQsurface
- B. If n_1 is less than n_2 , the white light could be partially reflected at the PQsurface
- C. The beam emerging from the RS surface will be converging
- D. The beam emerging of the surface RS will be diverging
- E. None of the above.

18- Which of the following sentences is

true?

- A. The rays emerging from the RS surface are a spectrum going from red to purple
- B. The rays striking the PQ surface are separated into a spectrum going from red to purple
- C. The rays striking RS are separated into a spectrum going from red to purple with red closer to PR
- D. The rays striking RS are separated into a spectrum going from red to purple with purple closer to PR
- E. None of the above

19- The white light is replaced by a source of monochromatic light. If the oblique angle on the surface PQ is θ , which of the following is the angle of refraction of the surface RS?

- A. $n_2 \sin \left(\frac{\pi}{2} - \theta \right)$
- B. $\frac{n_1}{n_2} \sin \left(\frac{\pi}{2} - \theta \right)$
- C. $n_1 \sin \left(\frac{\pi}{2} - \theta \right)$
- D. $\left(\frac{\pi}{2} - \theta \right)$
- E. $\frac{n_2}{n_1} \sin \left(\frac{\pi}{2} - \theta \right)$

20- Which of the following propositions shows that sound waves are longitudinal waves?

- A. Waves can be reflected
- B. Waves can be refracted
- C. Waves cannot move in a vacuum
- D. Waves cannot be polarized
- E. None of the above above

Instructions : for each question, choose the best answer among the options offered.

21- Which of these sentences is not true about the gravitational field?

- A. It is a conservative field
- B. It is a vector field
- C. It cannot be masked
- D. It does not obey the inverse square law
- E. It can be masked

22- All the satellites used for the communication have a period of:

- A. 360 days
- B. 24 days
- C. 1 month
- D. 10 days
- E. 100 days

23- The gravitational potential of a mass weighing 150kg at a certain point is $-6.0 \times 10^7 \text{ kg}$. Its potential energy is:

- A. $3.0 \times 10^7 \text{ J}$
- B. $9.0 \times 10^9 \text{ J}$
- C. $9.0 \times 10^7 \text{ J}$
- D. $3.0 \times 10^9 \text{ J}$
- E. $6.0 \times 10^7 \text{ J}$

24- When an ammeter is well damped:

- A. Small currents can be measured
- B. Reading can be done quickly
- C. It is very precise
- D. Large currents can be measured
- E. None answers above

25- The capacitors in series each have the same charge and the same potential difference across each of them when in parallel. The energy stored in a charged capacitor is given by:

- A. $\frac{1}{2} QV$
- B. $\frac{1}{2} QV^2$
- C. $\frac{1}{2} Q^2 / C$
- D. $\frac{1}{2} Q^2 V^2$
- E. $\frac{1}{2} Q^2 / V^2$

PAPER II:

GENERAL KNOWLEDGE & LANGUAGE

A. SCIENTIFIC FIELD

1. Which interaction best illustrates the concept of mutualism?
 - A. Aphids feeding on rose leaves
 - B. Nitrogen-fixing bacteria in root nodules of legumes
 - C. Infectious bacteria living in the blood of humans
 - D. Wolves and arctic foxes feeding on snowshoe rabbits
 - E. None of the above

2. In the carbon cycle, carbon is transferred from animals to plants by which of the following?
 - A. Carbon dioxide
 - B. Oxygen
 - C. Sugars
 - D. Water
 - E. Oxygen and water
3. By what process is carbon dioxide

- removed from the atmosphere?
- Combustion
 - Decomposition
 - Respiration
 - Photosynthesis
 - All of the above
4. Which of the following is a sequence found in the nitrogen cycle?
- Nitrogen in the soil-->air-->plants-->animals
 - Nitrogen in the soil-->animals-->plants-->fungi
 - Nitrogen in air-->plants-->animals-->bacteria
 - Nitrogen in the air-->bacteria-->plants-->animals
 - None of the above
5. Which of the following is an example of an ecological succession?
- Spring followed by summer
 - Tadpole becoming frog
 - Meadow replacing a pond
 - Predator eating prey
 - All of the above
6. What is the main suspected environmental problem associated with the burning of fossil fuels?
- Depletion of fresh water
 - Depletion of ozone
 - Global cooling
 - Global warming
 - None of the above
7. Why can many different species coexist in an ecosystem when they are competing for limited resources?
- Each species is found in a different biome.
 - Each species occurs in a slightly different habitat
 - Each species occupies a different niche
 - Each species comprises a different population
 - None of the above
8. Which of the following is not an ecosystem or a definition of one?
- All organisms, sometimes hundreds of species, in a given area
 - A leaf that has fallen to the ground
 - A tropical rainforest
 - The kelp birds of Southern Australia
 - All the above
9. Species that are non-native to a particular ecosystem and whose introduction has caused economic or environmental harm are called?
- Pioneer species
 - Disclimax species
 - Invasive species
- D. Secondary species
- E. None of the above
10. The actual growth rate of a population is calculated by
- Adding all the environmental resistance factors
 - Subtracting the death plus emigration rates from the birth plus immigration rates
 - Subtracting the death rate from the generation time
 - Birth rate alone
 - None of the above
11. Which of the following types of organisms would be most appropriately classified as a member of the Kingdom fungi?
- Algae
 - Bacteria
 - Fish
 - Mould
 - None of the above
12. A man diagnosed with Parkinsonism suspected that pollution at his workplace (a mill) may be to blame. Which of the following statements would lend to greatest support to his suspicion?
- A survey of workers at the mill reveals many cases of illness
 - A survey of workers at the mill and at other similar mills reveals many cases of illness.
 - The incidence of illness is higher among the mill workers than among age-matched workers in non-polluted workplaces.
 - The national average of Parkinsonism is lower than that among workers at the mill.
 - All of the above
13. Which of the following is an example of competitive exclusion?
- Two fish species cannot live in the same habitat
 - An introduced plant species will exclude a similar native species
 - Two parasite species cannot occupy the same host
 - Territorial individuals will exclude others of the same species
 - All of the above
14. Which of the following organisms serves as decomposers in the ecosystem?



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- A. Bacteria and viruses
 B. Fungi and bacteria
 C. Viruses and protests
 D. Fungi and viruses
 E. All the above
- 15.** Which of the following causes cholera?
 A. *Vibrio leprae*
 B. *Vibrio cholera*
 C. *Shigella shigella*
 D. *Salmonella typhi*
 E. *Salmonella paratyphi*
- 16.** Which of the vaccines protects against tuberculosis?
 A. BCG
 B. Polio
 C. Diphtheria
 D. Small pox
 E. Immunoglobulins
- 17.** Most antibodies are isolated from
 A. Viruses
 B. Microorganisms
 C. Organs and tissues of some animals
 D. Plants
 E. Soil
- 18.** What is the name of the protein found in the viral envelope?
 A. Spikes
 B. Capsid
- 22.** Which are the law-making bodies in Cameroon?
 A. National Assembly and Senate
 B. Supreme Court and Constitutional Council
 C. Presidency of the Republic and PM's Office
 D. Economic and Social Council and Senate
 E. The Executive
- 23.** State the month and year in which Cameroon was admitted into the Commonwealth of Nations.
 A. February 1990
 B. October 1993
 C. October 1961
 D. May 1972
 E. November 1995
- 24.** The institution created by the government in 2002 with the task to monitor elections was.
 A. National Commission on Human Rights and Freedom
 B. National Elections Observatory
 C. National independence Electoral Commission
- C. Capsomer
 D. Globular protein
 E. None of the above
- 19.** Which of the following diseases is not preventable by vaccination?
 A. Measles
 B. Whooping cough
 C. Poliomyelitis
 D. Syphilis
 E. Tuberculosis
- 20.** The best indicator of central tendency when one or more of the lowest or highest observation are wide apart or not so evenly distributed is called the
 A. Mode
 B. Mean
 C. Median
 D. Range
 E. Standard deviation
- 21.** The most frequently occurring observation in a series is the
 A. Mode
 B. Mean
 C. Median
 D. Range
 E. Standard deviation
- 22.** Which United Nations organ was largely responsible for the settling of the Bakassi Crisis between Cameroon and Nigeria by passing a verdict handing over the disputed territory to Cameroon?
 A. Security Council
 B. General Assembly
 C. C. Conflict Resolution Commission
 D. D. Secretary General
 E. E. International Court of Justice
- 26.** Which constitution made provision for decentralization in Cameroon?
 A. The 1961 Federal Constitution
 B. B. The 1972 Unitary Constitution
 C. C. The 1996 Constitution
 D. D. The 2008 constitution
 E. E None of the above
- 27.** Which ministry is charged with the implementation of decentralization in Cameroon?



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- A. Ministry of Decentralization
 B. Ministry of Local Government
 C. Ministry of Territorial Administration
 D. Ministry of Territorial Administration and Decentralization
 E. None of the above
- 28.** Which of the following is not of importance with respect to Birth Certificate in Cameroon?
- A. Important in establishing Cameroon nationality
 B. Determine the age of a person
 C. Enable people to participate in elections
 D. Required at Police Check points
 E. Required for obtaining an Identity Card
- 29.** With respect to death registration in Cameroon, all the following are correct except one, which one
- A. Legal record of the fact of death
 B. Provides family members with peace of mind and documentation of cause of death
 C. Source for national mortality statistics
 D. Justification of divorce
 E. Application for Insurance benefits
- 30.** Which of the following countries is the world's largest emitter of Carbon dioxide in the atmosphere?
- A. China
 B. United States of America
 C. Russia
 D. India
 E. Britain
- 31.** All the following are reasons for studying civics except
- A. To know your duties
 B. To know your responsibilities

FRENCH

36. Les enfants _____ de balayer la cour.

- A. Viens
 B. Vient
 C. Venez
 D. Viennent
 E. Viendront

37. Tu _____ ton travail avant de partir; d'accord?

- A. Finis
 B. Finit
 C. Finissions
 D. Finissent
 E. Finiront

38. Les étudiants _____ au cours les samedis

- C. To know your rights
 D. To be patriotic
 E. To enhance your potentials

32. Which judiciary institution is found in the 1996 constitution of Cameroon but is yet to go operational?

- A. Constitutional Assembly
 B. Constitutional Council
 C. Senate
 D. National Assembly
 E. Supreme Court

33. Who among the following women was the pioneer female president in Africa

- A. Ellen Johnson Serliff
 B. Joyce Banda
 C. Edith Kah Walla
 D. Wagari Marthai
 E. Francoise Fonning

34. Which political party formed a coalition with the New Deal Government Immediately after the 1992 legislative election

- A. MDR
 B. UNDP
 C. UPC
 D. CDU
 E. CUP

35. What computer software is commonly used for presentation?

- A. Microsoft Office Word
 B. Microsoft Office PowerPoint
 C. Microsoft Office Outlook
 D. Microsoft Office Publisher

E. Microsoft Office Excel

martins

- A. Vais
 B. Allons
 C. Vont
 D. Allez
 E. Va

39. Elles _____ Inès et Rita

- A. S'appelles
 B. S'appellent
 C. S'appelle
 D. S'appeler
 E. S'appellerons

40. Son oncle travaille à _____ hôtel Hilton. Il

- ne se plaint pas trop.
- A. Le
B. La
C. Les
D. L'
E. Des
- 41.** Le surveillant général doit trouver une punition.....élèves têteux
- A. Au
B. Pour les
C. Des
D. Aux
E. Les
- 42.** Cette fille va.....Mozambique
- Instructions : Les chiffres dans le passage suivant correspondent aux mots qui manquent.**
Complétez le passage en choisissant les mots justes dans les listes proposées.
- Alida 44 une bonne fille. Elle aime 45 Aider sa mère. Elle peut 46 tout le travail sans être fatiguée. Elle aime 47 jouer avec 48 petit frère. Parfois, elle appelle 49 camarades de classe pour l'aider 50 chercher du bois pour sa mère. Aussi
- | | | |
|---|---|--|
| <p>45.</p> <p>A) Toujours
B) Quand
C) De
D) Pour
E) À</p> <p>46.</p> <p>A) Fait
B) Fait
C) Fais
D) Faire
E) Fera</p> <p>47.</p> <p>Aussi
Plus
Pour
Comme
À</p> | <p>48.</p> <p>A) B)
C)
D)
E)</p> <p>49.</p> <p>A) B)
C)
D)
E)</p> <p>50.</p> <p>A) B)
C)
D)
E)</p> | <p>Presque chaque année</p> <p>A. À
B. B. en
C. C. au
D. D. à la
E. E. vers</p> <p>43. Anna est née à Varsovie.....Pologne, et elle y vit.</p> <p>A. En
B. Au
C. Aux
D. À
E. Dans</p> <p>Leurs.
Ses
Son
Sa
Sont
Tous
Quelques
Toutes
Tout
Quelles
Pour
En
De
À
Dans</p> |
|---|---|--|



**2014 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING
IN CAMEROON**

**PAPER I: BIOLOGY, CHEMISTRY & PHYSICS
BIOLOGY**

INSTRUCTIONS: for questions 1-37, choose the letter corresponding to the best correct answer

1. Which among the following elements is not essential for the survival of an organism?
 - A. Water
 - B. Oxygen
 - C. Gravity
 - D. Osmotic pressure
 - E. Nutrients
2. Which type of lipid make up the material of the cell membrane?
 - A. Triglyceride
 - B. Steroids
 - C. Vitamin d
 - D. Phospholipids
 - E. Prostaglandins
3. Which of the following statements concerning enzymes is not true?
 - A. The same molecule of an enzyme can be used several times
 - B. The enzymes belong to the biochemical class of proteins
 - C. For a chemical reaction to take place in a cell, it is necessary that the enzyme specific for the reaction be present
 - D. The molecules of enzymes are very resistant to heat and changes in ph
 - E. Only certain parts of the enzyme molecule serve as a recognition site for the substrate on which it acts
4. Which nitrogenous base is not a component of DNA?
 - A. Adenine
 - B. Cytosine
 - C. Guanine
 - D. Thiamine
 - E. Uracil
5. The essential element for the correct functioning of the thyroid gland is:
 - A. Iodine
 - B. Iron
 - C. Copper
 - D. Selenium
 - E. Zinc
6. Which element is present in all proteins but is not part of carbohydrates nor proteins?
 - A. Carbon
 - B. Oxygen
 - C. Hydrogen
 - D. Nitrogen
 - E. None
7. Which of the following characteristics is not associated with the skeletal muscle?
 - A. It gets tired rapidly
 - B. It has striated fibres
 - C. It is voluntary
 - D. It contracts slowly
 - E. It can be activated by the reflex pathway
8. When a striated muscle contracts, only one of the following does not shorten. Which one?
 - A. Myofibril
 - B. Actin and myosin filaments
 - C. Musclefibre
 - D. Sarcomere
 - E. None
9. Which of the following organelles is usually absent in neurons?
 - A. Nucleus
 - B. Centriole
 - C. Microfilaments
 - D. Endoplasmic reticulum
 - E. None
10. Which statement is not true among the following?

- A. The axon of the unipolar neurone is particular in that, it conducts impulses towards the cell body
- B. All motor neurons are multipolar
- C. Bipolar neurons are only found in certain sense organs
- D. Unipolar neurons do not have dendrites
- E. Multipolar neurons are very abundant in organisms
- 11.** Which among the following elements can be absent in a reflex arc?
- A. A sensory neurone
- B. An effector
- C. A central nervous system
- D. A relay neuron
- E. A sensory receptor
- 12.** Which of the following statements apply to the autonomic nervous system but not to the somatic nervous system?
- A. Axons release acetylcholine
- B. Axons are myelinated
- C. Effectors are muscle fibres
- D. Enable internal organs to function properly
- E. None
- 13.** Which hormone is secreted by the adrenal cortex?
- A. Adrenaline
- B. Cortisol
- C. Aldosterone
- D. Testosterone
- E. None
- 14.** What is the best indicator of the capacity of blood to transport oxygen?
- A. Number of white blood cells it contains
- B. Number of red blood cells it contains
- C. The hemoglobin content in blood
- D. The total volume of blood in an individual
- E. None
- 15.** A new born baby who has the blood group AB negative:
- A. Possess anti A agglutinins, anti B and anti Rh
- B. Does not possess any agglutinins in its plasma
- C. Possess only anti O agglutinins
- D. Possess only Rh agglutinins
- 16.** Which of the following depolarizes immediately after the sinoatrial node?
- A. The atria
- B. The ventricles
- C. The atrioventricular node
- D. The cardiac muscle
- E. None
- 17.** A rise in arterial pressure can be attributed to all the following causes except:
- A. An increase in stroke volume
- B. An increase in heart rate
- C. An increase in the duration of ventricular diastole
- D. Constriction of the arterioles
- E. None
- 18.** Which among the following characteristics is not associated with the natural killer cells?
- A. They form part of the second line of defense
- B. They can attack any abnormal or foreign cell
- C. They are phagocytes
- D. Secrete substances that destroy infected cells
- E. They are a type of lymphocytes
- 19.** The main target cell of the HIV is:
- A. T helper cells
- B. T cytotoxic cells
- C. Phagocytes
- D. B lymphocytes
- E. All
- 20.** Large amount of carbon dioxide transported in blood towards the lungs is in the form:
- A. Linked to Hb in the RBC
- B. Bicarbonate ions in the RBC
- C. Bicarbonate ions in plasma
- D. Dissolved in water in plasma
- E. None
- 21.** The pH of chyme that enters the duodenum is adjusted by:
- A. Bile
- B. Intestinal juice
- C. Pancreatic enzymes
- D. Secretions rich in bicarbonates that are released by the pancreatic cells
- E. None
- 22.** Complete the following sentence. During

- glycolysis, there is oxidation of and reduction of
- Coenzyme, glucose
 - ATP, ADP & glucose
 - Oxygen, glucose
 - Coenzyme, pyruvate
 - Oxygen
- 23.** Which among the following doesn't have an effect on the basal metabolism?
- Quantity of thyroxine in blood
 - Sex of an individual
 - Age
 - The type of activities
 - body surface
- 24.** Can a molecule of a substance that doesn't enter the nephron during filtration be seen in urine?
- Yes, if the molecule was reabsorbed
 - Yes, if the molecule was secreted by the nephron
 - Yes, only in the case of a renal problem
 - No, all substance contained in urine must have undergone filtration
 - None
- 25.** Among the following, which one is the accessory genital organ in man?
- Gonads
 - Gametes
 - Broad shoulders
 - Seminal vesicle
 - None
- 26.** Which of the following association is not correct?
- Clitoris and penis
 - testis and ovary
- 31.** DNA:
- Is contained in the nucleus of all living cells
 - Is free in the cytoplasm of all living cells
 - Does not exists in prokaryotes
 - Exists in all living beings
 - Is the carrier of genetic information
- 32.** Cells:
- Always possess a membrane

- Seminiferous tubules and corpus luteum
 - Fallopian tubes and vas deferens
 - None
- 27.** One characteristic of living things is responsiveness. This term is defined as:
- An internal change in an organism's position
 - The changing of absorbed substances into soluble forms
 - An increase in the number of and/or size of cells
 - The ability to react to a stimulus
 - None
- 28.** In a feedback system, the Monitors change in a controlled condition and send inputs to the
- Control center; receptor
 - Control center; effector
 - Receptor; control center
 - Effector; control center
 - None
- 29.** Which system helps regulate temperature and protects the body?
- Urinary
 - Respiratory
 - Integumentary
 - Skeletal
 - All of the above
- 30.** What structure lies within the right INGUINAL region of the abdomino- pelvic cavity?
- Right lobe of the liver
 - Caecum
 - Gall bladder
 - Urinary bladder
 - None
- 31.** Always possess a cytoplasm
- Always possess a cell wall
 - Always possess a nucleus
 - Always has at least one chromosome
- 33.** Which is the correct listing order of the structures as air passes through on the way to the lungs?
- Larynx, trachea, bronchi, bronchioles
 - Larynx, bronchi, trachea, bronchioles

- C. Larynx, trachea, bronchioles, bronchi
D. Larynx, alveoli, bronchi, trachea
E. None
34. When glucose is catabolized to pyruvic acid, most of the energy derived from it is:
- A. Stored as ATP
 - B. Stored temporarily as NADH₂
 - C. Retained in pyruvic acid
 - D. Retained as carbon dioxide
 - E. None
35. An increase in blood pressure in the carotid sinus will cause:
- A. Cardio moderation
 - B. Cardio acceleration
 - C. An increase in the stroke volume
 - D. A decrease in the stroke volume
 - E. Arterial hypertension
36. The carotid artery and the aortic arch:
- A. Have baroreceptors
 - B. Have chemoreceptors
 - C. Are empty points
 - D. Are cholinergic centres
 - E. Are vasopressin effectors
37. The creation of the post synaptic potential depends on:
- A. Only the neurotransmitter
41. The equilibration function of the ear is assured by:
- A. The external ear
 - B. Middle ear
 - C. The internal ear
 - D. Three above alternatively
 - E. Three above simultaneously
42. The normal diuresis is about:
- A. 1litre/24h
 - B. 1.5litres/24h
 - C. 3litres/24h
 - D. 4litres/24h
 - E. 5litres/24h
43. The kidney is covered by the renal capsule which secretes a hormone. Which one?
- A. Glucagon
 - B. Somatostatin
 - C. Cortisol
- B. Only the receptor of the neurotransmitter
C. On the neurotransmitter/receptor complex
D. All of the above
E. None
38. With regards to the different type of nerves:
- A. Three types exist: spinal, thoracic and cranial
 - B. Thethoracic nerves leave the spinal cord through two roots
 - C. There are 32pairs of spinal nerves
 - D. There are 7pairsof lumbars nerves
 - E. The radial nerve is a spinal nerve
39. The cerebellum has as function:
- A. The coordination of movement and equilibration
 - B. Cardiac regulation
 - C. Regulation of sleep
 - D. All are correct
 - E. None is correct
40. The layer that regenerates the cells of the skin is called:
- A. The corneous layer
 - B. The granulous layer
 - C. The basal layer
 - D. The epidermic layer
 - E. The internal layer
- D. Renin
E. Stigmene
44. Urine formation in the kidneys of humans begins in the:
- A. Bowman's capsule
 - B. Urinary bladder
 - C. urethra
 - D. Glomerulus
 - E. None
45. Neoglucogenesis:
- A. Is the synthesis of glycogen by the liver
 - B. Is the synthesis of glucose from non-glycosidic sources
 - C. Is the liberation of glucose from glycogen
 - D. Is the utilization of glucose by cells
 - E. Exists especially in the liver

- 46.** Which of the following cannot oxidise glucose?
- Liver
 - Brain
 - Heart
 - Erythrocyte
 - None
- 47.** The secretion of the exocrine gland of the pancreas is controlled by which of the following?
- Blood sugar levels
 - Secretin
 - A gene F.
 - Blood calcium levels
 - Insulin
- 48. Menstruation:**
- Is the complete destruction of the endometrium
 - Is provided by an increased level of ovarian hormones
 - Is preceded by an increase in pituitary hormones
 - Is triggered by the rupture of a mature follicle

- 49.** During the sexual cycle, oestrogens:
- Are responsible for the formation of the uterine lining
 - Do not activate the motor function of the myometrium
 - Do not stimulate the secretion of GnRH
 - Are produced by the corpus luteum
 - Do not bring about negative feedback during the cycle
- 50. Normal fertilization in the human species:**
- Corresponds to the union of a normal male gamete 44 autosomes + X or 44 autosomes + Y with a normal female gamete 44 autosomes + X
 - Enables the establishment of the diploid, characterized by 4n
 - Occur between a gamete 22 autosomes + X or Y and a gamete 44 autosomes + X
 - Does not enable the correction of chromosomal errors occurring meiosis
 - None

CHEMISTRY

FOR EACH QUESTION BELOW, CHOOSE THE CORRECT ANSWER FROM THE DIFFERENT OPTIONS PROPOSED

51. Which of the solutions below have the highest hydroxide ion concentration?

- 0.1m hcl
- 0.1m h₂so₄
- Solution of ph = 5
- Solution of ph = 12
- Pure water

52. Which of the chemical equations below is wrong?

- C₆H₅COOH + H₂O = C₆H₅COO⁻ + H₃O⁺
- HNO₃ + H₂O = NO₃⁻ + H₃OO⁺
- HCL + H₂O = CL⁻ + H₃O⁺
- H₂SO₄ + 2H₂O = 2H₃O⁺ + SO₄²⁻
- none

Questions 53-55: the pH of a sample of arterial blood is 7.42. upon acidification of 10ml of the blood, 5.91ml of CO₂ (corrected for STP) are produced.

53. What is the total concentration of dissolved CO₂ in the blood?

- A. $2.65 \times 10^{-2} M$
- B. $5.7 \times 10^{-2} M$
- C. $3.65 \times 10^{-3} M$
- D. $7.7 \times 10^{-2} M$
- E. $2.65 \times 10^{-2} M$

54. What are the concentrations of dissolved CO₂ and HCO₃⁻ respectively?

- A. $2.52 \times 10^{-2} M$ and $1.21 \times 10^{-2} M$
- B. $1.21 \times 10^{-3} M$ and $2.53 \times 10^{-2} M$
- C. $1.325 \times 10^{-2} M$ and $1.325 \times 10^{-3} M$
- D. $2.53 \times 10^{-2} M$ and $1.21 \times 10^{-3} M$
- E. None

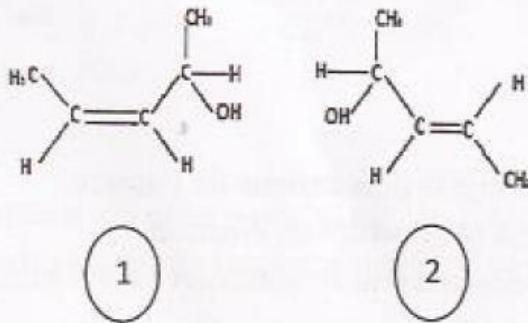
55. What is the partial pressure of the dissolved CO₂ in mmHg?

- A. 20.11mmHg
- B. 84.02mmHg
- C. 45.75mmHg
- D. 40.22mmHg
- E. 35.22mmHg

56. Which compound is represented by the formula H₂C=CH₂?

- A. Butane
- B. Propane
- C. Ethane
- D. Methane
- E. Acetylene

57. Consider the organic compounds whose structures (1) and (2) are shown below:



Compounds with structures (1) and (2) are:

- A. Position isomers
- B. Chain isomers
- C. Enantiomers
- D. Diastereoisomers
- E. Images of each other through a mirror

Questions 58 and 59. A voltmeter is attached to an iron-copper battery. The circuit diagram of the battery is: (-)Fe(s)/Fe²⁺/Cu²⁺/Cu(s)(+). The potential difference measured by the voltmeter is U= 0.76V

58. To which electrode have we connected the V terminal of the voltmeter?

- A. Silver electrode
- B. Copper electrode
- C. Iron electrode
- D. Gold electrode
- E. None

59. What is the value of the electromotive force (emf) of this battery?

- A. 1.26V
- B. 1.24V
- C. 1.23V
- D. 1.22V
- E. 0.76V

60. The ionization energy of an atom is:

- A. The number of electrons on the outermost shell of the atom
- B. The ease with which an atom can lose an electron
- C. The ease with which atoms can combine to form molecules
- D. The charge on the nucleus
- E. None

61. Which elementary particles are the main contributors to the mass of an atom?

- A. Protons and electrons
- B. Neutrons and electrons
- C. Protons and neutrons
- D. None of these
- E. All of these

Question 62-63. The following chemical reaction is exothermic in its gaseous phase: $N_2 + 3H_2 \rightarrow 2NH_3$. What will happen in the following circumstances?

62. When the temperature is raised:

- A. The equilibrium is displaced to the right
- B. The equilibrium is displaced to the left
- C. The equilibrium is displaced both to the right and to the left
- D. There is an explosion
- E. Nothing happens

63. When pressure is increased:

- A. The forward reaction is favoured
- B. The backward reaction is favoured
- C. The reaction goes forward and then backwards
- D. There is an explosion
- E. Nothing happens

64. The atomic number of Uranium is 92. How many electrons and protons respectively are present in the U^{2+} ion?

- A. 90 and 90
- B. 92 and 92
- C. 90 and 92
- D. 92 and 90

E. 94 and 92

65. The nucleus of lead atom is represented by the symbol $^{207,282}\text{Pb}$. Given that:

Particle	Mass	Charge
Proton	$M_p = 1.67 \times 10^{-27} \text{ Kg}$	$Q_p = +1.60 \times 10^{-19} \text{ C}$
Neutron	$M_n = 1.67 \times 10^{-27} \text{ Kg}$	$Q_n = 0 \text{ C}$
Electron	$M_e = 9.11 \times 10^{-31} \text{ Kg}$	$Q_e = -1.60 \times 10^{-19} \text{ C}$

The charge of the lead atom is:

- A. 82 C
- B. $1.31 \times 10^{-17} \text{ C}$
- C. $1.312 \times 10^{-17} \text{ C}$
- D. $3.315 \times 10^{-17} \text{ C}$
- E. 0 C

66. The energy level of the hydrogen atom is given by the relationship $E_n = -\frac{13.6}{n^2}$, where n is a whole number different from zero and E_n the energy in eV of level n . Given: Planck's constant ($h=6.63 \times 10^{-34} \text{ JS}$), speed of light in a vacuum ($C=3 \times 10^8 \text{ ms}^{-1}$) and $1 \text{ eV} = 1.6 \times 10^{-19} \text{ J}$. The shortest wavelength in the Balmer series is:

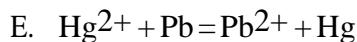
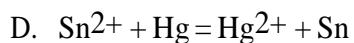
- A. 365.6 nm
- B. 91.4 nm
- C. 658.1 nm
- D. 121.9 nm
- E. 487.5 nm

67. The movement of a hydrogen atom from energy level n to a new energy level n' which is less than n corresponds to:

- A. An emission of a photon
- B. An absorption of a photon
- C. An absorption or emission of photon
- D. The ionization of the atom
- E. None

68. Given the following standard potentials of some redox couples: Hg^{2+}/Hg ($E^\circ = 0.86 \text{ V}$); Pb^{2+}/Pb ($E^\circ = -0.13 \text{ V}$); Sn^{2+}/Sn ($E^\circ = -0.14 \text{ V}$). The normal and complete reaction that would take place between these couples is:

- A. $\text{Pb}^{2+} + \text{Sn} = \text{Sn}^{2+} + \text{Pb}$
- B. $\text{Sn}^{2+} + \text{Pb} = \text{Pb}^{2+} + \text{Sn}$
- C. $\text{Pb}^{2+} + \text{Hg} = \text{Hg}^{2+} + \text{Pb}$



69. During a redox reaction:

A. the oxidizing agent is oxidized and the reducing agent is reduced

B. the reducing and the oxidizing agent are oxidised

C. the reducing and the oxidizing agent are reduced

D. the reducing agent is oxidized by accepting electrons

E. none

70. A 0.025M solution of lactic acid has a pH of 2.75. what is the ionization constant K_a of lactic acid?

A. 1.26×10^{-4}

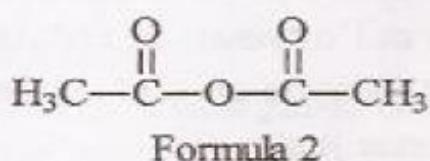
B. 1.36×10^{-4}

C. 1.78×10^{-3}

D. 7.11×10^{-2}

E. 7.66×10^{-2}

71. Paracetamol is produced by the action of paraaminophenol (formular 1) on ethanoic anhydride (formular 2).



MIA
PREPAS

Suppose the OH group in paraaminophenol behaves as an alcohol function and that the amino group reacts before the alcohol group. If ethanoic anhydride is in excess in the reaction medium, apart from the synthesis of paracetamol, the other reaction that will occur is:

A. An acid base reaction

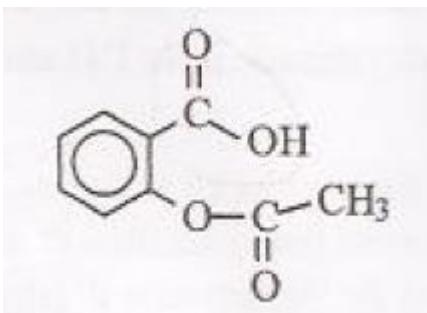
B. Hydrolysis reaction

C. Saponification reaction

D. Redox reaction

E. None

72. Aspirin is a drug widely used in Cameroon. Its scientific name is acetylsalicylic acid. its structure is:



The aspirin molecule contains the following functional groups:

- A. Carboxylic acid and alcohol
- B. Carboxylic acid and acid anhydride
- C. Carboxylic acid and ketone
- D. Carboxylic acid and ether
- E. Carboxylic acid and ester

73. At equilibrium, the esterification of any alcohol with ethanoic acid gives:

- A. 70% ester
- B. 67% ester
- C. 60% ester
- D. 33% ester
- E. None

74. What is the concentration of sodium ions in a solution of aqueous sodium sulphate obtained by dissolving 3.55g of sodium sulphate in 200ml of distilled water? Given: Na(23), S(32) and O(16)

- A. 0.125mol.L⁻¹
- B. 0.500mol.L⁻¹
- C. 0.250mol.L⁻¹
- D. 0.025mol.L⁻¹
- E. 0.013mol.L⁻¹

75. During an esterification reaction, ethanoic acid reacts with one mole of ethanol. The yield of this esterification reaction with ethanol:

- A. Is 67% since ethanol is a primary alcohol
- B. Is 67% since the reaction is slow, limited and thermally constant
- C. Is 67% since ethanoate is formed
- D. Can be equal, less or greater than 67% depending on the quantity of ethanoic acid used
- E. None

PHYSICS

FOR EACH QUESTION BELOW, CHOOSE THE CORRECT ANSWER FROM THE LIST OF OPTIONS PROPOSED.

76. Which of the following is a transducer for changing electrical energy into mechanical energy?

- A. Torch
- B. Gas oven

- C. Vacuum cleaner
- D. Table lamp
- E. Radio set

77. A resistance converts electrical energy into:

- A. Chemical energy

- B. Mechanical energy
 C. Heat d) light
 D. All forms of energy
- 78.** A motor of 5Ω resistance, supplied with a current of $2A$ has an efficiency of 80% . Its emf is:
- 50V
 - 40V
 - 5V
 - 4V
 - None
- 79.** A vehicle is running at a speed of 36Km/h on a straight road. The time taken to cover 400m is:
- 0.67mn
 - 40mn
 - 66.67mn
 - 4mn
 - None
- 80.** In a place where $g= 10\text{m/s}^2$, a steel ball in free fall covers 20m during the last second of its fall. The total time of the fall is:
- 20s
 - 2s
 - 25s
 - 2.5s
 - none
- 81.** Oscillations are said to be synchronized when:
- They have the same amplitude
 - Have the same phase
 - They have the same frequency
 - They have the same initial value
 - None
- 82.** During lunar eclipse,
- The sun is found between the earth and the moon
 - The moon is found between the sun and the earth
 - The earth is found between the sun and the moon
 - The moon expands
 - The moon shrinks
- 83.** A light beam passing through the optical centre of a lens:
- Is refracted
 - Is reflected
 - Is diffracted
 - Is dispersed
 - Is not deviated
- 84.** A hypermetropic eye has a vision which is:
- More distinct during the day than at night
 - More distinct at night than during the day
 - Distinct for near than for far objects
 - More distinct for far than for near objects
 - None
- 85.** Correction of vision in a myopic eye is done using:
- A glass whose faces are parallel
 - The interface between media
 - A prism
 - A converging lens
 - A diverging lens
- 86.** The photon is a particle:
- Without a charge
 - With zero mass
 - Moves in a vacuum with a speed of $300 \times 10^3 \text{km/s}$
 - Constitutes light
 - All
- 87.** The period of a simple pendulum with a small amplitude is:
- Proportional to the square of its length
 - Proportional to the square of its mass
 - Proportional to the square root of its length
 - Proportional to the square root of its mass
 - Independent of acceleration due to gravity
- 88.** An astronaut in a space explorer floats (weightless state) because:
- The astronaut is not subjected to any force
 - The space explorer is in equilibrium
 - The space explorer is in free fall
 - The space explorer is not subjected to any force
 - None
- Questions 89 and 90: a motor vehicle of mass $m= 1.3\text{t}$ circulates in a straight line on a horizontal road. The resistance to the progression due to different frictional rubs is

equivalent to a constant force $F = 500\text{N}$. the motor vehicle runs with a constant speed $V_o = 72\text{Km/h}$.

89. What is the value of the force F_1 where F_1 is the engine force?

- A. 100N
- B. 200N
- C. 300N
- D. 400N
- E. 500N

90. As the vehicle runs with speed V_o , the driver applies the brakes to stop the car, the force of braking, F_2 is supposedly constant. The value of the acceleration (a) is 2.0m/s^2 . What is value of the breaking force F_2 which is supposedly constant?

- A. $1.1 \times 10^3\text{N}$
- B. $2.1 \times 10^3\text{N}$
- C. $3.1 \times 10^3\text{N}$
- D. 4.1×10^3
- E. $5.1 \times 10^3\text{N}$

91. When a monochromatic beam of light travelling in air enters a glass block along an oblique path to the glass surface, there is no change in its:

- A. Frequency
- B. Direction
- C. Velocity
- D. Amplitude
- E. Amplification

92. X rays and gamma Y rays are radiations used in:

- A. Archaeology
- B. Medicine
- C. Isotopes
- D. Control thickness
- E. All

93. What name is given to the domain of electromagnetic waves on either side of the visible spectrum?

- A. Infrared, ultraviolet
- B. Ultraviolet, infrared
- C. Ultraviolet α , ultraviolet β
- D. Infrared α , infrared β
- E. Ultraviolet α , infrared α

94. Which of the following radiations gives us information about the deep electronic layers of an atom?

- A. Infrared
- B. Visible
- C. Ultraviolet
- D. γ

95. X rays produced in the dentist's office typically has a wavelength of 0.30nm . suppose the speed of laser light in air is $3.0 \times 10^8\text{m/s}$. the frequency of these rays will be:

- A. $1.2 \times 10^{18}\text{Hz}$
- B. $1.5 \times 10^{18}\text{Hz}$
- C. $1.0 \times 10^{18}\text{Hz}$
- D. $2.0 \times 10^{18}\text{Hz}$
- E. None

96. Amongst the effect of electric current, the joule effect represents:

- A. The heating effect
- B. The magnetic effect
- C. The chemical effect
- D. Electromagnetic induction
- E. None

97. The intensity of the current which crosses a circuit during 40mins and yields an output of 24100C is:

- A. 603A
- B. 10A
- C. 0.1A
- D. $5.8 \times 10^7\text{A}$
- E. None

98. The following indications are engraved on a microscope: objective; X25 ocular; X10. The intrinsic power of this microscope is:

- A. $P_i = 250$
- B. $P_i = 500$
- C. $P_i = 1000$
- D. $P_i = 2500$
- E. None

99. Radioactivity is a phenomenon:

- A. Linked to the electronic structure of an atom
- B. Linked to the structure of the nucleus of an atom
- C. Modified by chemical reactions
- D. Mainly artificial



E. None

100. The specific heat capacity of an ideal gas at constant pressure is greater than its specific heat capacity at constant volume. This is because:

- A. External work is done when a gas expands
- B. Internal work is done when a gas expands
- C. The kinetic energy of its molecules

decreases when a gas is heated at constant pressure

- D. The kinetic energy of its molecules increases when the gas volume is increased at constant temperature
- E. None

GENERAL KNOWLEDGE

A. MEDICAL ASPECTS

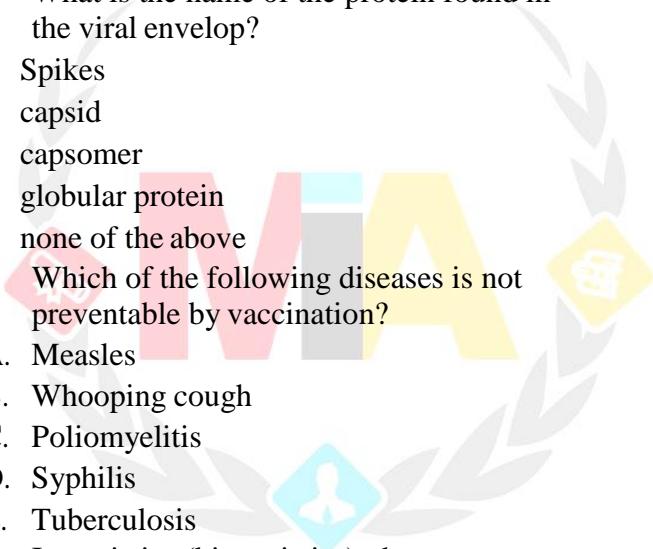
- 1. Which of the following diseases is not managed by a national control program in Cameroon?
 - A. Tuberculosis
 - B. Vaccine preventable diseases
 - C. HIV/AIDS
 - D. Malaria
 - E. Diabetes
- 2. Food borne illnesses have been a recurrent problem in your community over the years. What should the health department registered sanitarian pay particular attention to among the following during his inspection?
 - A. Unhygienic food handling methods
 - B. Improper storage of rodenticides
 - C. Inadequate cooking
 - D. The use of unlabelled products
 - E. Use of old utensils
- 3. Plasmodium spp is:
 - A. an accidental parasite
 - B. an erratic parasite
 - C. an obligate parasite
 - D. a facultative parasite
 - E. all
- 4. Which of the following causes cholera?
 - A. *Vibrio leprae*
 - B. *Vibrio cholerae*
 - C. *Shigella shigella*
 - D. *Salmonella typhi*
 - E. *Salmonella paratyphi*
- 5. Which of these vaccines protects against tuberculosis?
 - A. BCG

- B. Polio
- C. Diphtheria
- D. Small pox
- E. Immunoglobulins
- 6. Which human activity could reduce the spread of cholera?
 - A. Hand washing
 - B. Drinking well bottled water
 - C. Killing of
 - D. Vegetables with camel water
 - E. Dead cholera victims

7. **Which of the following represent a passive mechanism by which bacteria can penetrate a host?**

- A. attacking the hosts intestinal linings
- B. degrading carbohydrate protein complexes
- C. disrupting the cell surface
- D. tissue damage caused by other organisms
- E. all of the above
- 8. Which of the following is used to preserve food by slowing down the metabolic processes of food borne microbes?
 - A. Freezing
 - B. Lyophilisation
 - C. Ionizing radiation
 - D. Pasteurization
 - E. Sterilization
- 9. The best method for sterilizing milk is by:
 - A. Deep freezing
 - B. Pasteurization
 - C. Autoclaving

- D. Refrigeration
E. None
10. Most antibiotics are isolated from:
A. Viruses
B. Microorganisms
C. Organs and tissues of some animals
D. Plants
E. Soil
11. The use of immunoglobulins remains the best means of:
A. passive prophylaxis
B. active prophylaxis
C. treatment of diseases
D. all of the above
E. none of the above
12. What is the name of the protein found in the viral envelop?
A. Spikes
B. capsid
C. capsomer
D. globular protein
E. none of the above
13. Which of the following diseases is not preventable by vaccination?
A. Measles
B. Whooping cough
C. Poliomyelitis
D. Syphilis
E. Tuberculosis
14. In statistics (biostatistics), the measure of dispersion of data obtained for a variable is:
A. Mode
B. Mean
C. Median
D. Range
E. Standard deviation
15. The best indicator of the central value when one or more of the lowest or highest observation are wide apart or not evenly distributed is called:
A. Mode
B. Mean
C. Median
D. Range
- E. Standard deviation
16. The most frequently occurring observation in a series is the:
A. Mode
B. Mean
C. Median
D. Range



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B. GENERAL CULTURE

- C.
17. When was the last time the Cameroon national football team participated in the world cup?
- 2014
 - 2010
 - 2006
 - 2002
 - 1998
18. Which of these regions of Cameroon is frequently being attacked by Boko Haram?
- North west region
 - Adamawa region
 - East region
 - Far north region
 - North region
19. The celebration of the 50th anniversary of the reunification of Cameroon took place in which town?
- Yaoundé
 - Douala
 - Bamenda
 - Bafoussam
 - Buea
20. Which is the main cash crop grown in the northern regions of Cameroon?
- Cocoa
 - Coffee
 - Cotton
 - Rubber
 - Beans
21. The seat of the African union (former OAU) is found in which country?
- Kenya
 - Cameroon
 - Ethiopia
 - South Africa
 - Gabon
22. The human immunodeficiency virus (HIV) was discovered in which year?
- 1983
 - 1984
- C. 1985
D. 1986
E. 1987
23. The man who discovered the causative agent of tuberculosis is called:
- Alexander Fleming
 - Robert Koch
 - Louis Pasteur
 - John Snow
 - None
24. Ebola fever is currently an epidemic in the following west African countries except in:
- Guinea Conakry
 - Sierra Leone
 - Liberia
 - Nigeria
 - Ghana
25. A deep-sea port is currently under construction in Cameroon. In which town is it being constructed?
- Limbe
 - Douala
 - Kribi
 - Garoua
 - Tiko
26. Which computer software is commonly used for presentations?
- Microsoft office word
 - Microsoft office power point
 - Microsoft office outlook
 - Microsoft office publisher
 - Microsoft office excel
27. Which of the following countries does not belong to the central African economic commission (CEMAC)?
- Cameroon
 - Rwanda
 - Chad
 - Central African Republic
 - Equatorial Guinea
28. Climate change with global warming is attributed mostly to which of the

- following?
- Z. Oxygen depletion
 AA.Nitrogen depletion
 BB.Ozone layer depletion
 CC.Deforestation
 DD.Carbon dioxide depletion
29. Which region in Cameroon is currently suffering from a cholera epidemic?
 EE. far north region
 FF. littoral region
 C. west region
 D. south west region
 E. east region
30. What is the number of senators in the Cameroon senate?
 A. 80
 B. 90
 C. 100
- D. 110
 E. 120
31. What is the number of members of parliament in the cameroon national assembly?
 A. 180
 B. 170
 C. 160
 D. 150
 E. 200
32. Recently, an aeroplane carrying 116 people crashed in a west African country. Which country is it?
 A. Burkina Faso
 B. Niger
 C. Ivory coast
 D. Mali
 E. Mauritania

LANGUAGE

Instructions : Les chiffres dans le passage suivant correspondent aux mots qui manquent.
Complétez le passage en choisissant les mots justes dans les listes proposées.

Le scanner est un appareil récent 33 on doit l'invention au professeur Hounsfield. Il permet de réaliser un examen 34 le médecin a prescrit et 35 on ne doit pas avoir peur car il n'est douloureux. C'est un examen 36 utilise les rayons X émise par un arceau rotatif 37 glisse le lit d'examen 38 est allongé le patient. Il donne des images en coupe du corps humaine 39 on peut diagnostiquer des pathologies abdominales, neurologiques, thoraciques, orthopédique.

33.

- A. Dont
 B. Que
 C. Qui
 D. Où
 E. Donc

B. A laquelle
 C. Que

- D. Dont
 E. Qui

34.

- A. Dont
 B. Que
 C. Auquel
 D. Qui
 E. Lequel

- F. Où
 G. Que
 H. Qui
 I. Dont
 J. Auquel

35.

- A. Auquel

37.
 A. Dans lequel
 B. Auquel
 C. A laquelle
 D. Duquel
 E. Qui

- 38.
- A. Que
 - B. Auquel
 - C. Qui
 - D. Sur lequel
 - E. Dont
- 39.
- A. Grâce auxquelles
 - B. Grâce auquel
 - C. Grâce a la quelle
 - D. Grâce auxquels
 - E. Qui
40. Cet homme est originaireMozambique
- A. Du
 - B. De la
 - C. De
 - D. Le
 - E. En
41. Ils regardent.....bon film a l'écran
- F. De
 - G. Une
 - H. Un
 - I. Des
 - J. De
42. Le martin, ma mère va acheter_choses au marché
- A. Une
- B. Un
- C. La
- D. Des
- E. De
43. La directrice parle ____filles de cette classe
- A. Au
 - B. Des
 - C. Une
 - D. Les
 - E. En
44. L'amie de ma sœur étudie dans____ville européenne
- A. Un
 - B. Une
 - C. Des
 - D. Les
 - E. De
45. _____Mauritanie est un pays d'Afrique du Nord
- A. La
 - B. Le
 - C. Du
 - D. Les
 - A. De

Instructions : pour chaque phrase ci-dessous, choisissez le mot manquant parmi les options proposées.

46. _____Cambodge est un beau pays ?

- A. La
 B. Le
 C. Du
 D. Les
 E. De
- 47.** Vous ____ la vaisselle avant de sortir
 A. Finis
 B. Finissons
 C. Finissez
 D. Finissent
 E. Finirez
- 48.** Ton frère et toi ____ trop lentement
 A. Marchons
 B. Marchent
 C. Marches
- Marchez
 Marcherez
49. Je ____ à la fac tous les jours
 .
 A. Vas
 B. Va
 C. Vais
 D. Allons
 E. Allez
- 50.** C'est moi qui ____ étudiant en faculté des sciences de la santé
 .
 A. Suis
 B. Es
 C. Est
 D. Sommes
 E. Êtes



**2013 NATIONAL QUALIFYING EXAMINATION FOR MEDICAL TRAINING
IN CAMEROON
PAPER I: BIOLOGY, CHEMISTRY & PHYSICS**

BIOLOGY

**INSTRUCTIONS: FOR QUESTIONS 1-37, CHOOSE THE LETTER
CORRESPONDING TO THE BEST CORRECT ANSWER**

1. The normal pH value for the body fluid is:
 - A. 7.15 - 7.25
 - B. 7.35 – 7.45
 - C. 7.55 – 7.65
 - D. 7.00 – 7.35
 - E. 6.5 – 7.52
2. The junction between one neuron and the next, or between a neuron and an effector is called:
 - A. A synapse
 - B. A dendrite
 - C. A neurotransmitter
 - D. A ventricle
 - E. Gap junction
3. The retina does the following:
 - A. Allows vision in light and dark, using cones and rods
 - B. Gives depth perception using binocular vision
 - C. Contains the ciliary muscles that control the shape of the lens
 - D. Protects and supports the shape of the eye
 - E. Allows vision in light and in dark, using only cones
4. Which blood component plays the largest role in maintaining the osmotic pressure of blood?
 - A. Albumin
 - B. Carbon dioxide
 - C. White blood cells
 - D. Fibrinogen
 - E. Plasma
5. Blood pressure is the measure of:
 - A. Pressure exerted by the blood on the walls of the blood vessels
 - B. Pressure exerted by the blood on the arteries
 - C. Pressure exerted by the blood on the veins
 - D. Pressure exerted by the blood on the aorta
 - E. Pressure exerted by the blood on the capillaries
6. This is the pacemaker of the heart
 - A. AV node
 - B. Purkinje fibres
 - C. AV Bundle
 - D. SA node
 - E. None of these, a pacemaker is surgically inserted
7. An antigen is:
 - A. A chemical messenger that is released by virus infected cells
 - B. A lymphocyte responsible for cell-mediated immunity
 - C. Something that coats the inside of lungs, causing infection
 - D. Organic or chemical substance that causes in the body the formation of antibodies
 - E. A thick yellow-white fluid
8. Direct control of water excreted in the kidneys is controlled by
 - A. Anti-diuretic hormone
 - B. The medulla oblongata
 - C. Blood plasma
 - D. Sodium amounts in the blood
 - E. Calcium amounts in the blood
9. Carbon monoxide is dangerous because
 - A. It binds strongly to haemoglobin, making it unavailable to oxygen
 - B. It binds strongly to plasma, making it unavailable to carbon dioxide
 - C. It raises the blood's pH level, causing a person to hyperventilate
 - D. Carbon monoxide is not harmful, we have it in our bodies normally
 - E. It binds strongly to plasma, making a good production of red blood cells
10. The liver does this
 - A. Glycogen storage



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- B. Plasma protein synthesis
C. Bile production, drug detoxification
D. Drug detoxification
E. All of the above
11. This digestive enzyme is produced in the salivary glands and the pancreas
A. Maltase
B. Amylase
C. Nuclease
D. Lipase
E. Pepsin
12. The function of the ileum is to
A. Absorb nutrients
B. Absorb vitamin B12 and bile salts
C. Introduce bile and pancreatic juices
D. Absorb alcohol and aspirin
E. Absorb lipids
13. Non-essential amino acids:
A. Are stored in the body
B. Are only needed occasionally
C. Can be taken in supplements
D. Are not important
14. The reason iodine is in salt is:
A. To prevent diabetes
B. To prevent simple goitres
C. To prevent Addison's disease
D. To prevent Cushing's disease
E. To prevent hypertension
15. The sugar in RNA is _____, the sugar in DNA is _____
A. Deoxyribose, ribose
B. Ribose, deoxyribose
C. Ribose, phosphate
D. Ribose, uracil
E. None of the above
16. In mammalian cell cycle, synthesis of DNA occurs during
A. S phase
B. G1 phase
C. Mitotic phase
D. G2 phase
E. None of the above
17. The following statements are comparisons of male and female reproduction; choose the statement that is incorrect.
A. The reproductive organs of both sexes are homologous
B. Both sexes have reproductive capabilities throughout adulthood
C. Both systems experience latent development
D. Both systems have gonads that produce gametes and sex hormones
E. None of these
18. What substance are nails made of?
A. Elastin
B. Cuticle
C. Keratin
D. Plastin
E. None of the above
19. How many lungs does the human body have?
A. One
B. One pair
C. Two pairs
D. Four
E. None of the above
20. There are some amino acids which cannot be synthesized by human body and so must be included in the diet. These are called:
A. Basic amino acids
B. Essential amino acids
C. Non-essential amino acids
D. Fatty acids
E. None of the above
21. The only cell organelles visible with the electron microscope are:
A. The nucleus
B. Ribosomes
C. Golgi bodies
D. The chloroplast
E. None of the above
22. During mitosis, the maximal condensation of chromosomes is at:
A. Early prophase
B. Telophase
C. Metaphase
D. Interphase
E. G2 Phase



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- 23.** The Biuret test makes it possible to identify:
- A. Carbohydrates
 - B. Amino-acids
 - C. Dipeptides
 - D. Proteins
 - E. Starch
- 24.** In human, enzymes are:
- A. Provided by food
 - B. Synthesized within his body
 - C. Very active at 0°C
 - D. Destroyed in a reversible manner at 1000°C
 - E. The same at any age
- 25.** The Kreb's cycle takes place in:
- A. The intermembranal space of the mitochondrion
 - B. The stroma of the mitochondrion
 - C. The cytoplasm
 - D. The stroma of the chloroplast
 - E. The nucleus
- 26.** Mutation:
- A. Can only affect germinal cells
 - B. Modifies the sequence of a gene
 - C. Is always transmitted to offspring
 - D. Always has a selective advantage
 - E. None of the above
- 27.** The genome of an individual:
- A. Corresponds to all his cytoplasmic genes
 - B. Corresponds to all his DNA
 - C. Characterizes a genetic abnormality
 - D. Is totally transmitted to his offspring
 - E. None of the above
- 28.** Which of the physiologic variations is sex linked?
- A. Albinism
 - B. Blood groups
 - C. Sickle cell anaemia
 - D. Haemophilic condition
 - E. None of the above
- 29.** The cell mediated immune response affects:
- A. B lymphocytes
 - B. Circulating antibodies
 - C. Macrophages
- 30.** Which of the following structure occupies the neural canal of the vertebral column?
- A. Cerebellum
 - B. Hypothalamus
 - C. Medulla oblongata
 - D. Spinal cord
 - E. None of the above
- 31.** The hormone that accentuates uterine contractions during menstrual cycle is
- A. Progesterone
 - B. Oestrogen
 - C. Oxytocin
 - D. Chorionic gonadotrophin
 - E. None of the above
- 32.** The hormone glucagon is:
- A. Hypoglycaemic
 - B. Hyperglycaemic
 - C. A hormone which favours the synthesis of lipids
 - D. A hormone which favours glycogenesis
 - E. Secreted by β cells of the islets of Langerhans
- 33.** Glucosuria:
- A. Is an excess of glucose in the blood
 - B. Is deficiency of glucose in the blood
 - C. Is the presence of blood in the urine
 - D. Is the presence of glucose in urine
 - E. Is the presence of uric acid in blood
- 34.** In a man, spermatogenesis:
- A. Takes place in interstitial cells
 - B. Starts during puberty and ends absolutely at the age of 60
 - C. Is continues from puberty
 - D. Has a duration of 30 days
 - E. Is centrifugal in the seminiferous tubules
- 35.** In a woman, oogenesis:
- A. Starts at puberty and ends at menopause
 - B. Is discontinuous
 - C. Takes place on the uterus
 - D. Is centripetal in the ovary
- 36.** The components of DNA molecule:
- A. Phosphate
 - B. Glucose
 - C. Adenine

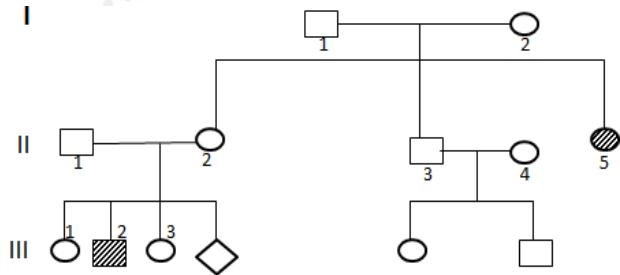


- D. Guanine
E. Cytosine
37. The.....is involved in specific humoral immune response
- A. Macrophage
B. Cytotoxic T-lymphocyte (Killer cell)
C. T lymphocyte (helper cell)
D. Plasma cell
E. B lymphocyte

INSTRUCTION: THE DIAGRAM BELOW HOLDS FOR QUESTIONS 38 TO 40
CHOOSE THE CORRECT ANSWER FOR EACH QUESTIONS

STATEMENT: Consider the following pedigree relative to the transmission of a hereditary disease.

In black: sick individual



38. The allele responsible for this disease is:
- A. Dominant
B. Recessive
C. Codominant
D. Lethal
E. None of the above
39. The gene concerned in the transmission of this disease is situated on:
- A. A specific portion of X chromosome
B. A specific portion of Y chromosome
C. An autosome
D. The 23rd chromosome
E. None of the above
40. The probability of III3 individual being a carrier of the allele responsible for the disease is:

- A. 1/3
B. 2/3
C. 1/4
D. 3/4
E. 1

INSTRUCTIONS: FOR QUESTIONS 41-45;

- A. If 1, 2 and 3 are correct
B. If 1 and 3 are correct
C. If 2 and 4 are correct
D. If 4 only is correct
E. If 1, 2, 3, and 4 are correct

41. The following sequence shows the steps in protein synthesis: triplets, anti-codons, amino acids, Proteins, chemical reactions of the cell. Which among the following statements are correct?
1. Triplets should come first.
 2. Amino acids do not take part
 3. Enzymes should be present during chemical reactions in the cell
 4. All are correct
42. Which of the following functions can be associated with glycoprotein of plasma membrane?
1. Determination of the blood group.
 2. Binding sites of toxins or bacteria.
 3. Contribution to the union of spermatozoid and ovum.
 4. Increase in the efficiency of absorption.
43. Glucose is to starch what:
1. An amino acid is to a protein
 2. A steroid is to a lipid
 3. A nucleotide is to a nucleic acid.
 4. A polypeptide is to an amino acid.
44. Choose the correct statement(s).
1. ATP can release energy when it is transformed into ADP.
 2. ATP contains energy rich phosphate bonds.
 3. ATP contains adenine.
 4. ATP contains the deoxyribose sugar
45. For osmosis to take place there must be:
1. A selective permeable membrane.

2. Equal quantities of solutes on either side.
3. A concentration gradient
4. Any transporter
- .

FROM QUESTIONS 46 TO 50 CHOOSE THE RIGHT ANSWERS

46. The genotype:

- A. Corresponds to all genes carried by the chromosomes
- B. Is the same in identical twins
- C. Is transmitted unchanged to daughter cells during mitosis
- D. Corresponds to all the DNA molecule

47. Metabolism:

- A. Represents all the enzymatic reactions taking place in the cell
- B. Is composed of reactions of breakdown and synthesis
- C. Uses metabolites and energy
- D. Corresponds to all activities of cells

48. Mitosis:

- A. Is a process of sexual reproduction
- B. Leads to the formation of two identical

- daughter cells from a parent cell
- C. Does not exist in prokaryotes
- D. Distributes chromosomes into two identical groups between the daughter cells

49. A clone:

- A. Consist of all cells having the same functions
- B. Consist of all organisms or cells issued from the same strain and having the same genetic information
- C. Is only obtains from vertebrates
- D. Can only be obtained by grafting to a nucleus in an enucleated somatic cell

50. Immunodeficiency caused by HIV infection:

- A. Enables the appearance of opportunistic infections
- B. Is a consequence of opportunistic infections
- C. Is due to the decrease of T4 lymphocytes
- D. Is due to the decrease of T8 lymphocytes
- A. Can have different effects on different neurons
- B. Always acts by stimulating an action potential in a specific neuron

CHEMISTRY

TICK THE RIGHT ANSWER(S)

51. In the copper atom, $^{63}_{29}\text{Cu}$, there are:

- A. 27 neutrons, 36 protons, 31 electrons
- B. 63 neutrons, 27 protons, 27 electrons
- C. 27 neutrons, 63 nucleons, 36 electrons
- D. 36 neutrons, 63 nucleons, 27 protons
- E. 27 neutrons, 36 protons, 36 electrons

52. The isotopes of carbon, ^{12}C and ^{13}C , have:

The same molecular weight

- A. The same number of protons
- B. The same number of electrons
- C. The same number of neutrons
- D. Different numbers of electrons, protons and neutrons

53. The Bromide anion, $^{80}_{35}\text{Br}^-$

- A. Has 35 protons and 45 electrons
- B. Has a molecular weight of 80g mol⁻¹

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- C. Has 81 nucleons and 36 electrons
- D. Has 36 electrons and 45 neutrons
- E. Has a molecular weight of 81g mol⁻¹

54. How many electrons has the last atom of the second period?

- A. 6 B. 10 C. 12 D. 18 E. 8

55. How can we classify family element with atomic number Z = 35?

- A. In the transition metal
- B. In actinides
- C. In the halogen
- D. In the alkali
- E. In the rare gases

56. In the molecule of PCl₅:

- A. Phosphorus is surrounded by 10 electrons
- B. Atoms of chlorine respect the octet rule
- C. Phosphorus respects the octet rule
- D. At least one of the atoms of chlorine does not follow the octet rule
- E. None of the atoms follow the octet rule

57. How many maximum connections can be formed in a molecule containing four carbon atoms and 10 hydrogen atoms?

- A. 4 B. 6 C. 9 D. 13 E. 15

58. Among the following expression, which one determines the pH of a strong acid solution of concentration C?

- A. $pH = \frac{1}{2}(pK_e + pK_a + \log C)$
- B. $pH = 14 + \log C$
- C. $pH = -\log C$
- D. $pH = pK_a + \log[A^-][AH]$
- E. $pH = \frac{1}{2}(pK_a - \log C)$

59. In the following equilibrium, $HCOOH + NH_3 \rightleftharpoons HCOO^- + NH_4^+$, there are two acids and two bases. Both acids and bases are:

- A. HCOOH, NH₃ et HCOO⁻, NH₄⁺
- B. HCOOH, NH₄⁺, et HCOO⁻ NH₃
- C. HCOO⁻, NH₃ et HCOOH, et NH₄⁺
- D. HCOOH, HCOO⁻ et NH₃, NH₄⁺

60. Among the proposed acid-base pairs, which is the best suited to prepare a buffer solution with pH 5.5?

- A. NH⁺/NH₃ pKa= 9.25
- B. H₂PO₄⁻/ HPO₄²⁻, pKa = 4.30
- C. HCO₃⁻/ CO₃²⁻, pKa = 10.30
- D. H₂CO₃/HCO₃⁻, pKa = 6.35
- E. HCN/CN⁻, pKa = 9.20

61. Valine is one of the twenty natural amino acids and has an acid – COOH(pKa1 = 2.6) and an amine-NH₂(pKa2 = 9.6). if we consider a valine solution with pH = 10.6, which is the proportion (%) of the zwitterion form of the solution

- A. 2.4 B. 3.6 C. 5.7 D. 9.1 E. 10.2



62. What is (are) the exact(s) proposal(s) amongst the following?
- Ka and Kb are two independent variables
 - $pK_a + pK_b = 0$
 - $pK_a + pK_b = 14$
 - One can characterize an acid/ base pair either by the Ka of its base or the Kb of its acid
 - As values of Ka and Kb are generally very large, we go to logarithmic scale to use them
63. What is (are) the exact(s) proposal(s) amongst the following?
- The quotient of autoproteolysis reaction of water is noted Ke and called the ionic product of water
 - At 25°C , $\text{Ke} = 10^{14}$
 - $p\text{Ke} = p\text{K}_a - p\text{K}_b$
 - In a neutral solution, H_3O^+ and HO^- are equimolar to 10^{-7} mol L⁻¹
 - Autoproteolysis reaction water is always ignored in the calculation of the pH
64. Phenol ($\text{C}_6\text{H}_5\text{OH}$) and hexanoic acid ($\text{C}_6\text{H}_5\text{COOH}$) have respective Ka equal to 1.3×10^{-10} and 1.26×10^{-5} . So, we can say that:
- the dissociation of phenol is less important than that of hexanoic acid
 - phenol is a stronger acid than hexanoic acid
 - the dissociation of phenol is greater than that of hexanoic acid
 - hexanoic acid is a stronger acid than phenol
 - you cannot compare these acids without calculating their pKa
65. Among the following aqueous solution whose content is described, which of them has (have) a buffering capacity?
- HCOONa and HCOONH_4
 - HCl and NaOH
 - H_2SO_4 and H_2SO_3
 - KB(OH)_3
 - HCN and CaCN_2
66. The pH of the blood of a patient shows before drug treatment was 6.7, and after is 7.3. H_3O^+ concentration in the blood, because of the treatment was therefore:
Given: Log2 = 0,3, Log5 = 0,7.
- Divided by 2
 - Multiplied by 4
 - Divided by 4
 - Multiplied by 2
 - Divided by 3
67. The titration of $V_1 = 100\text{mL}$ of a weak monoacid ($\text{pK}_a = 5$; $C_1 = 4.10^{-3}\text{mol}\cdot\text{L}^{-1}$) by a strong monobase ($\text{pK}_b = 8$; $C_2 = 4.10^{-2}\text{mol}\cdot\text{L}^{-1}$) gives:
- At half-equivalence, $\text{pH} = \text{pK}_b$
 - At equivalence, $\text{pH} = 7 + \frac{1}{2}\text{pK}_a + \frac{1}{2}\log C_2$
 - The base is predominant, therefore $\text{pH} = \text{pK}_a + \log(\frac{[\text{acid}]}{[\text{base}]}) - \frac{[\text{base}]}{[\text{acid}]}$
 - At half-equivalence $\text{pH} = 8$

E. Just after equivalence, the pH is still slightly acidic

68. What is the oxidation number of sulphur in $S_2O_3^{2-}$?

- A. 6 B. 4 C. 2 D. 0 E. -2

69. The bromine in BrO_3 is reduced to Br_2 with an exchange of:

- A. 2 electrons and 1 proton
B. 5 electrons and 6 protons
C. 10 electrons and 12 protons
D. 15 electrons
E. BrO_3^- cannot be reduced to Br_2

70. Here is a simplified diagram of the energy levels of mercury (without concern for scale):

Data:

- Planck Constant $h = 6,62 \cdot 10^{-34} J \cdot s$
- Light celerity in a vacuum is $c = 3,0 \cdot 10^8 m \cdot s^{-1}$
- $1,6 \cdot 10^{-19} J = 1 eV$



Tick off the right(s) answer(s)

- A. Transitions shown correspond to radiations absorbed.
B. The three frequency radiations given are: $8 \cdot 10^4 Hz$, $1,2 \cdot 10^{15} Hz$ & $6 \cdot 10^{15} Hz$
C. The wavelengths of those transitions are: 405 nm; 410 nm; 434 nm.
D. The smallest wavelength is 390 nm.

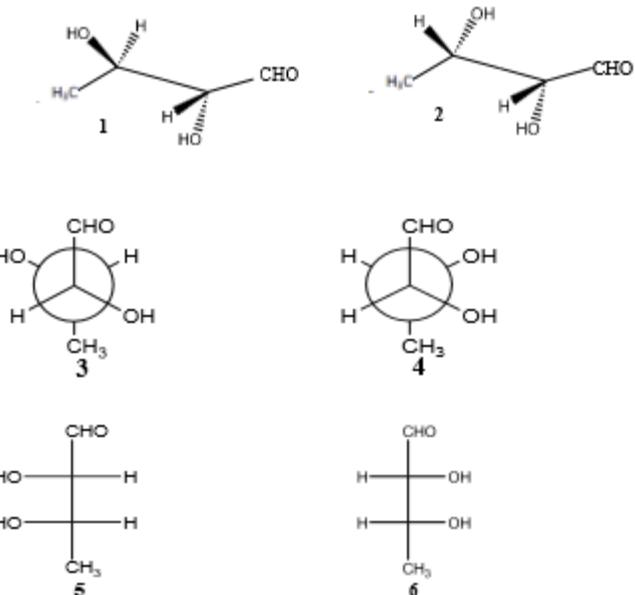
71. The reaction $CH_3-CH_2-OH \xrightarrow{Al_2O_3} CH_2 = CH_2 + H_2O$ in the presence of Al_2O_3 at $400^\circ C$ is:

- A. A substitution reaction
B. An addition reaction
C. A polymerization reaction
D. A combustion reaction
E. An elimination reaction

72. Let's consider the molecules shown below:



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Consider the following statements:

- a) 1 and 2 are stereoisomers.
- b) 5 and 6 are identical.
- c) 3 is the exact representation of 1 in Newman projection.
- d) 4 is the exact representation of 2 in Newman projection.
- e) 5 is the exact representation of 2 in Fischer projection.
- f) 6 is the exact representation of 1 in Fischer projection.
- g) 6 belongs to the L-series.

Choose from the following combinations that grouping all correct statements.

- A. a + b + d + f + g
- B. c + d + e + f
- C. a + c + d + f
- D. a + b + c + e

73. What volume of 10L H₂SO₄ is required to prepare 600ml of 0.5M H₂SO₄?

- A. 3ml
- B. 30ml
- C. 6ml
- D. 600ml

74. If the K_s of AgCl is A and the concentration of Cl⁻ in a container is B molar, what is the concentration of Ag⁺ in moles per litre?

- A. A mol/l
- B. B mol/l
- C. A/B mol/l
- D. B or C

75. If 8 A pass for 2 min at the cathode (where the following reaction takes place, Ag⁺ + e⁻ → Ag(s), how many grams of Ag(s) are pressed onto the cathode? (Ag = 108 g/mol).

- A. 0,96 g
- B. 1,02 g
- C. 1,07 g
- D. 1,12 g

PHYSICS

TICK THE RIGHT ANSWER(S)

76. An electric circuit has 4 identical ohmic conductor of resistance $R = 47\text{ ohms}$, and an identical ideal voltage generator of emf $E = 8.0\text{ V}$. The current produced by the generator is $I = 0.17\text{ A}$. The voltage across each resistor is equal to:
- 1 V
 - 4 V
 - 8 V
 - 12 V
 - 16 V
77. A radioactive caesium 137 source is analysed each year. The activity of the source at the instant t is $A(t)$. We note that $A(t)/A(t+1) = 1,023$ with t in years. The half-life of caesium-137 is:
- 10
 - 20
 - 30
 - 40
 - 50
78. A converging lens of focal length $f = 25\text{ cm}$ gives a real object A, located on the optical axis 105 cm in front of the main focus am image A'. The distance (in cm) between A' and main focus image is:
- 6,0
 - 8,0
 - 12
 - 16
 - 18
79. A twitch is applied to a steal pipe in which the oil flows. A sensor located at a distance $d = 480\text{ m}$ from the point of application of the shot records two very short beeps separated by a time $\Delta t = 224\text{ ms}$. Speed of sound in steel $v_a = 5.00\text{ Km/s}$. the speed (Km/s) of sound in oil is:
- 0.85
 - 1.20
 - 1.50
 - 1.70
 - 2.10
80. Second, meter, kilogram, and ampere are basic units of the international system. Find the equivalent unit of joule:
- Kgm-1. S-2
 - KgmS-1
 - KgmS-2
 - Kgm2S-1
 - Kgm2S-2
81. When the speed of an object doubles, its kinetic energy
- Is reduced to the quarter
 - Doubles
 - Triples
 - Quadruples
 - None of the above
82. A person wants to see 5 times bigger characters in a book. The refractive power is 7δ . Determine how far (in cm) the person must place his magnifying glass.
- A. 2.8
 - B. 11.4
 - C. 14.2
 - D. 17.8
 - E. 21.2
83. A sound wave of frequency 400Hz propagates in a metal rod with a speed of 300m/s . two points separated by the distance 26.25 m are:
- In phase
 - In phase opposition
 - Quadrature advance
 - Delay quadrature
 - No correct answer
84. Legal unit of Power P:
- WS-1
 - W
 - WS
 - VAh
 - NKg-1
85. Two balls of mass M and m ($M > m$), equivalent to material points, are released without initial speed at a height h from the ground, in a region where the gravitational field is constant. The air resistance is neglected:
- The ball M hits the ground first
 - The ball m hits the ground first
 - The two balls hit reach the floor simultaneously



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- D. The order of arrival at the ground depends on the latitude of the experiment
- E. No correct answer
86. The electrical energy WE received by a receiver whose terminal voltage is 3.0 V when it is traversed by a current of intensity 1.0 A during 20ms is:
- 3 W
 - 6×10^1 J
 - 6×10^{-2} J
 - 6 J
- E. No correct answer
87. The kinetic energy of a brick of mass $m = 25.0$ kg with a speed $v = 36.0$ km/h is:
- 1.62×10^4 J
 - 1.25×10^4 J
 - 1.25×10^3 J
 - 1.62×10^3 J
- E. No correct answer
88. The resistor R in a circuit is used to
- Increase the sensitivity of the ammeter
 - Increase the capacitance of the capacitor
 - Decrease the capacitance of the capacitor
 - Reduce the EMF in the circuit
 - protect the ammeter from overheating and consequent damage
89. In an alternator, there is transformation of:
- Electrical energy into mechanical energy
 - Mechanical energy into electrical energy.
 - Mechanical energy into chemical energy
 - Chemical energy into mechanical energy
- E. No answer is correct
90. A domestic iron (220V, 1000 W) function without interruption from 4pm to 6: 30 pm consumes electrical energy of:
- 15×10^4 J
 - 9×10^6 J
 - 22×10^4 J
 - 9×10^4 J
- E. None of the above
91. An electric motor of electromotive force 12 V and internal resistance 2Ω is supplied by a voltage of 15 V. its efficiency is equal to:
- 25%
 - 12,5%
 - 80%
 - 0,8%
 - None of the above
92. The corpuscular character of the light is highlighted experimentally by:
- Dispersion
 - Diffraction
 - Luminous interferences
 - Refraction.
 - None of the above
93. Two electric charges having values 10^{-5} C and 2×10^{-5} C respectively exert between them a force of intensity $0,2 \times 10^4$ N. Given $K = 9 \times 10^9$ USI. The distance separating the two charges is:
- 3.1 cm
 - 17.2 cm
 - 3.0 cm
 - 8.9 cm
 - 0.09 cm
94. The spectrum of "visible light" consist of wavelength whose range is between:
- 0.4 nm and 0.75 nm.
 - 0.4 pm and 0.75 pm.
 - $4 \mu\text{m}$ and $7.5 \mu\text{m}$.
 - 4 nm and 5 nm.
 - None of the above
95. The corpuscular character of the light is highlighted by:
- Diffraction.
 - Luminous interferences.
 - Refraction.
 - Dispersion.
 - Photoelectric effect
96. X-rays and Y-rays are radiations used in
- Archaeology
 - Medicine
 - Tracing isotopic
 - Control thickness
 - All the answers are right
97. A radioactive element has a half-life of



150 days. If initially there are 100 g of this product, how much will remain after 600 days?

- A. 0 g
- B. 12.5 g
- C. 33.3 g
- D. 6.25 g
- E. 3.12 g

98. The origin of Laplace's force is:

- A. Thermodynamics
- B. Atomic
- C. Electromagnetic
- D. Mechanics
- E. Nuclear power

99. The direction of Laplace's force is :

- A. Parallel to the conductor
- B. Oblique to the conductor
- C. Perpendicular to the magnetic field
- D. Parallel to the magnetic field
- E. None of the above

100. In a vacuum and in the same region:

- A. Heavy bodies fall less than light bodies
- B. Light bodies fall less quickly than heavy bodies
- C. Light bodies fall faster than heavy bodies
- D. Heavy bodies fall faster than light bodies
- E. All the bodies fall in the same manner

PAPER II:

GENERAL KNOWLEDGE & LANGUAGE

A. MEDICAL BASICS

Instruction: Choose the correct answer

- 1. Who of these scientists discovered Penicillin?
 - A. John Bunyn
 - B. Alexander Flemming
 - C. Darwin
 - D. Louis Pasteur
 - E. Isaac Newton
- 2. The first heart transplant was performed in which of following African countries?
 - A. Nigeria
 - B. Egypt
 - C. South Africa
 - D. Kenya
 - E. Cameroon
- 3. Which of the following causes cholera?
 - A. Vibrio leprae
 - B. Vibrio cholera
 - C. Shigella shigella
 - D. Salmonella typhi
 - E. Salmonella paratyphi
- 4. In which of these years was Human Immuno-Deficiency virus discovered?
 - A. 1993
 - B. 1983
 - C. 2003

- D. 2001
- E. 1973
- 5. Which of these causative agents causes malaria?
 - A. Trypanosoma
 - B. Plasmodium
 - C. Schistosoma
 - D. Onchocerca
 - E. Ascaris
- 6. Which of these vaccines protects against tuberculosis?
 - A. Diphtheria
 - B. Polio
 - C. Tetanus
 - D. BCG
- 7. Which of the following insects transmits the agent responsible for sleeping sickness?
 - A. Sand fly
 - B. Dragon fly
 - C. Tsetse fly
 - D. House
 - E. Grasshopper
- 8. Which of the following is the main carrier of malaria?
 - A. Dragon fly



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- B. Sand fly
 C. Tsetse fly
 D. Anopheles mosquito
 E. Aedes mosquito
- 9.** Which of the following is the main carrier of the dengue and yellow fevers?
 A. Aedes mosquito
 B. Anopheles mosquito
 C. Tsetse fly
 D. House fly
 E. Dragon fly
- 10.** Among the following which one is the fundamental unit of heredity?
 A. Gene
 B. Atom
 C. Molecule
 D. Cell
 E. DNA
- 11.** Which of these is a functional unit of the health care delivery system (HCDS) in Cameroon?
 A. Schools
 B. Churches
 C. Departments
 D. Health centre
 E. College
- 12.** In which department of the hospital must the patient be welcomed?
 A. Out patient
- B. Medicine
 C. Surgery
 D. Maternity
 E. Mortuary
- 13.** who amongst the following is not a professional in the hospital?
 A. Surgeon
 B. Physician
 C. Physicist
 D. Nurse
 E. Midwife
- 14.** Which human activity could reduce the spread of cholera?
 A. Hand washing
 B. Drinking well bottled water
 C. Killing of flies
 D. Washing vegetables with javel water
 E. Burning dead cholera victims
- 15.** You are told a member of a house has tuberculosis (TB). Which if these can be done to children to find out if they are already infected by the TB germ?
 A. Get the young people out of the house
 B. Do a tuberculin skin test (Mantoux test)
 C. Do a sputum examination
 D. Do nothing because tuberculosis is not transmissible
 E. None of the above

B. TEST OF MOTIVATION

Instructions: Choose the correct answer

16.

- A. Humanism makes man and the human spirit the supreme values.
 B. Man is living being like any other on the planet Earth
 C. To live well, we must see nothing, say nothing and hear nothing
 D. Humanism is for weak minds

17.

- A. Without knowing one's HIV status, one can donate blood through blood transfusion
 B. Blood donation should not be free.

19.

You are witness of your brother's marriage. While going to the ceremony, you attend an accident with loss of life and several cases of serious injuries.

- A. You stop to assist
 B. You call someone to assist
 C. You hurry to leave to be on time for marriage

- C. Blood donation is useless
- D. To know one's blood type is important
- 18.**
- A. NGOs do not help people
- B. Work in remote areas do not help the practitioner in his career
- C. The 117 or 115 are emergency numbers to know
- D. The Hippocratic oath is the oath of hypocrites
- 20.**
- A. Medicine treats all diseases
- B. Committing to lost causes means that one is illuminated
- C. Raise funds for an organization is fraud
- D. Even well dressed, you can spontaneously dive into water to save a baby?

C. GENERAL CULTURE AND CIVICS

Instruction: Choose the correct answer

- 21. The law on gravity was put up by which of these scientists?**
- A. Darwin
- B. Isaac Newton
- C. Boyle
- D. Joule
- E. None of the above
- 22. What computer software is used to produce a word document?**
- A. Microsoft office word
- B. Power point, outlook
- C. Publisher
- D. Excel
- 23. Which of these countries does not belong to the Lake Chad Basin Commission?**
- A. Chad
- B. Niger
- C. Nigeria
- D. Cameroon
- E. Equatorial Guinea
- 24. Climate change with global warming can be attributed to which of the following?**
- A. Oxygen depletion
- B. Nitrogen depletion
- C. Carbon dioxide depletion
- D. Ozone layer depletion
- E. Deforestation
- 25. Weather elements can be measured by**

- instruments. Which one of the following pairs is incorrect?
- A. Atmospheric pressure and barometer
- B. Humidity and anemometer
- C. Rainfall and rain gauge
- D. Wind direction and wind vane
- E. Minimum and maximum temperature and the sex's thermometer
- 26. The rotation of the earth is not the cause of:**
- A. Day and night
- B. The seasons
- C. The deflection of ocean currents
- D. The deflection of winds
- E. The increase inclination of the sun between sunrise and sunset.
- 27. Among the following African countries which one has the largest surface area?**
- A. Nigeria
- B. Egypt
- C. Mali
- D. Democratic Republic of Congo
- E. Cameroon
- 28. Which is the most densely populated country in the African Continent?**
- A. South Africa
- B. Nigeria
- C. Kenya
- D. Democratic Republic of Congo

- E. Cameroon
29. In which of these dates did the lake Nyos natural disaster occurred?
- 21st of August 1982
 - 21st of August 1985
 - 21st of August 1987
 - 21st of August 1986
 - 21st of August 1984
30. The lake natural disaster was caused by which of these gases?
- Hydrogen sulphide
 - Sodium hypochlorite
 - Carbon dioxide
 - Carbon monoxide
 - Nitrogen
31. Which of these rivers has recently been responsible for the floods in the Northern part of Cameroon?
- Logone river
 - Benue river
 - Cross river
 - Katsina-ala river
 - Ntem river
32. Which airline was involved in the Mbanga Pongo Crash?
- Cameroun Airline
 - Camair-Co
 - Kenyan Airways
 - Swiss Airline
 - Gabon Airline
33. In which of these towns is the main hydroelectric dam that supplies light to most towns in Cameroon found?
- Douala
 - Yaoundé
 - Ndian
 - Edea
34. In which of these towns is the main deep-sea port that is currently being developed found?
- Edea
 - Ebolowa
 - Kribi
 - Douala
 - Limbe
35. Cameroon had how many provinces before transformation into 10 Provinces in 1983?
- 8
 - 9
 - 6
 - 7
 - 5
36. How many members are there in the Cameroonian upper house of parliament (senate)?
- 120
 - 180
 - 100
 - 80
 - 150
37. When was the last time Cameroon participated in the final phase of the world Cup?
- 2010
 - 2006
 - 2002
 - 1994
 - 1990
38. In 1972, Cameroonians voted for which of the following?
- Reunification
 - Independence
 - Liberation
 - Unity State
 - Federation
39. In which Region of Cameroon is the Bakassi Peninsula found?
- The South West Region
 - The South Region
 - The Littoral Region
 - The North West Region
 - The North Region
40. Which of the following crops cannot be grown successfully in the tropics?
- Tobacco
 - Tea
 - Coffee
 - Cocoa
 - Oats
41. In which of the following countries chemical weapons were suspected to be



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used on civilians on the 21st of August

2013

- A. Iraq
- B. Libya

C. Iran

D. Syria

E. Egypt

D. FRENCH (for the candidates who have chosen English as their first language)

INSTRUCTIONS : Cochez la lettre correspondant à la bonne réponse

42. Ma sœur et moi.....nos leçons tous les soirs avant d'aller au lit
- A. Apprennent
 - B. Apprenons
 - C. Apprenez
 - D. Apprends
 - E. Apprendons
43. Cette fille te rencontrer demain à 8 heures.
- A. Viendra
 - B. Venait
 - C. Viendras
 - D. Vienne
 - E. Vient
44. Il faut que vous terminé votre devoir avant la fin du cours
- A. Avez
 - B. Aviez
 - C. Soyez
 - D. Ayez
 - E. Aye
45. Mes enfants arrivent tout à l'heure. Il fautdemander de m'attendre.
- A. Les
 - B. Lui
 - C. Leurs
 - D. Leur
 - E. ils
46. Elle travaille dans cet hôpital comme _____
- A. Infirmerie
 - B. Infirmier
 - C. Infirmière
 - D. Infirmières
 - E. Infirmary
47. Les chambres de.....hôtel sont climatisées.
- A. Cet
48.oiseaux attrapent les poules et les poussins
- A. Quel
 - B. Quelles
 - C. Quels
 - D. Quelle
 - E. Qu'elle
49. Jean est toujours le premier de la classe. Il est.....intelligent de la classe.
- A. Le plus
 - B. Le mieux
 - C. Le moins
 - D. Le moindre
 - E. Le plut
50. J'ai du mal à croire que c'est ce homme qui a volé
- A. Bel
 - B. Beau
 - C. Beaux
 - D. Belle
 - E. Baux
51. C'est Paul et moi qui venus ce matin.
- A. Est
 - B. Es
 - C. Sommes
 - D. Sont
 - E. Son
52. Cette femme n'entend absolument rien; elle est_____
- A. Bête
 - B. Aveugle
 - C. Muette



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- D. Sourde
E. Sourd
53. Nana a échoué à son examen.....la paresse.
A. Grace à
B. A cause de
C. Parce que
D. Pour que
E. De part de
54. La jeune fille.....je te parlais ne viendra sûrement pas.
A. Que
B. Qui
C. Dont
D. Donc
E. Don't
55. « Avoir le Cœur sur la main » veut dire être _____
A. Courageux
B. Timide
C. Généreux
D. Peureux
E. Facile
56. Le Ministre de la justice est également le garde des.....de la République.
A. Sceaux
B. Seaux
C. Sots
- D. Sauts
E. Sautis
57. Les filles se sont.....les mains avant de manger.
A. Lavées
B. Lave
C. Laves
D. Lavée
E. Laver
58. C'estambulance qui a transporté le malade à l'hôpital.
A. Celle
B. Cet
C. Cette
D. Sept
E. Sette
59. Quand l'orateur.....le silence, il commença son discours.
A. A obtenu
B. Aura obtenu
C. Aurait obtenu
D. Eut obtenu
E. Avait
60. La mère de mon ami vient de casser sa pipe. L'expression soulignée signifie :
A. Voyager
B. Mourir
C. Rentre chez elle
D. Aller à l'Eglis

