POST UNIVERSITIES MATRICULATION EXAMINATION SCREENING TEST
OCTOBER 27th, 2005

Subject: GENERAL PAPER **Time allowed: 1 hour**

INSTRUCTIONS

Read the following instructions carefully

5. Use an **HB pencil** and shade in your answers. Ensure that any shading in error is thoroughly erased.
6. Candidates should write their full **Names** (Surname first), **JAMB Registration number. Paper code, Sex, JAMB score, Faculty of first choice** and **second choice** and the **Question Paper Option** given to them, in the appropriate spaces on the **Answer sheets.**
7. Attempt all questions. Each candidate must submit the answer sheet with the question paper.
8. The use of calculators and/or similar electronic devices is **NOT allowed.**

1. Sodium chloride may be obtained from brine by
A. Decantation B. Distillation
C. Evaporation D. Sublimation

2. Which of the following is a chemical compound?
A. Soap B. Milk C. Urine
D. Gold

3. Crystallization is a separation method used A. where purity of the product is important B. where beauty of the product is important
C. where one of the products is a solid
D. where the salt can not be destroyed by heat

4. Which of the following is not a mixture?
A. sea water B. Iron II sulphide
C. Petroleum D. Urine

5. Carbon forms two oxides. Ratio of oxygen in both oxides is 1:2, if one mole of carbon separately combines with oxygen, deduce the formula of the oxides
A. $CO:CO_2$ B. $CO_2:CO_3$ C. $CO_2:C_2O$
D. $CO_2:CO_3$

6. If $50cm^3$ of CO_2 gas and $50cm^3$ of SO_2 gas are measured, at S.T.P., calculate the amount of each gas in moles (Molar volume = $22.4dm^3$)
A. 0.023 mol B. 0.0222 mol
C. 0.0002 mol D. 0.0022 mol

7. How much volume of ethane would be required to produce 1.12 dm^3 of carbon (IV) oxide on combustion in sufficient oxygen?
$2C_2H_{6(g)} + 7O_2 \rightarrow 4CO_{2(g)} + 6H_2O$
A. 56 dm^3 of ethane B. 2.24 dm^3 of ethane C. 0.56 dm^3 of ethane D. 5.6 dm^3 of ethane

8. By how much would the volume have increased when 10 dm^3 of ozone were converted to oxygen
$2O_{3(g)} \rightarrow 3O_{2(g)}$
A. 15 dm^3 B. 40 dm^3
C. 0.5 dm^3 D. 5 dm^3

9. The pressure exerted by a gas is as a result of
A. The continuous random motion of its particles
B. Bombardment of the walls of the container by its molecules
C. The collision between the gas molecules D. The elastic nature of the gas molecules

10. Which of the following gas will diffuse at the slowest rate?
A. Ammonium B. Sulphur (IV) oxide C. Carbon (II) oxide D. Nitrogen

11. Element P has an electronic configuration of 2,8,6. Element R has an electronic configuration of 2,8,8,1. What is likely to form if P and R combine?
A. A covalent compound PR
B. An ionic compound PR_2
C. An ionic compound PR
D. An ionic compound P_2R

12. Which is the atomic structure of phosphorus with mass number 31?

	Protons	Neurons	Electrons
A.	15	16	15
B.	15	16	16
C.	16	15	15
D.	16	15	16

13. Which metal has the least tendency to form positive ions?
A. Iron B. Aluminium C. Sodium

D. Calcium

14. What is the number of pairs of shared electrons in a methane molecule?
A. 1 B. 2 C. 4 D. 8

15. The percentage by volume of nitrogen in air is high because
A. Nitrogen is relatively inactive
B. Nitrogen supports life
C. Nitrogen prevents corrosion of metals
D. Nitrogen increases the rate of combustion

16. Natural water includes the following except
A. rain water B. spring
C. pure water D. lake water

17. Which of the following methods cannot be used to remove permanent hardness in water?
A. addition of washing soda
B. addition of caustic soda
C. Permutit method
D. adding alum to water

18. If the solubility of sodium tetraoxosulphate (VI) at 30°C is 18g per 100g, how much is this in gramme per kilogram?
A. 18kg per 1000g B. 180kg per 100g
C. 180g per 1000kg D. 180g per kg

19. The following are example of colloid except A. milk B. starch in water C. aerosol D. ammonium chloride solution

20. Oil spillage in ponds and creeks can be cleaned by
A. Burning off the oil layer
B. Spraying with detergent
C. Spraying with common salt
D. Spraying with hot oil

21. The pH of the solutions M, N, O and P are 1. 6, 8 and 10 respectively, therefore
A. None of the solution is acidic
B. the pH of O is made neutral by adding water
C. P is the most acidic solution
D. M is the most acidic solution

22. Which hydroxide dissolves in water to form alkaline solution?
A. Aluminium hydroxide
B. Calcium hydroxide
C. Copper (II) hydroxide
D. Iron (III) hydroxide

23. Starch molecules can be broken down into smaller molecules by heating in a dilute acid. What is this type of reaction called?
A. Cracking B. Hydrolysis
C. Oxidation D. Reduction

24. Which of the following cannot be used as an oxidizing agent?
A. $K_2Cr_2O_2$ B. CO_2 C. H_2S D. HNO_3

25. What quantity of copper will be deposited by the same quantity of electricity that deposited 18g of aluminium [Al = 27, Cu = 64]
A. 64g B. 32g C. 16g D. 8g

26. Which of the following is not true about semi-conductors?
A. Moving holes are equivalent to moving positive charges
B. There are two kinds of charge carriers – a free electron and a hole
C. The escape of a valence electron from an atom produces electron-hole par of charge carriers
D. Increase in temperature increases its electrical resistance

27. A wire carrying a current of 10A and 2.5m in length is placed in a field of flux intensity 0.14T. what is the force in the wire if it is placed at 60° to the field?
A. 30.3N B.20.5N C. 15.3N
D. 10.5N

28. In the transformer, the magnetization of the core is repeatedly reversed by the alternating magnetic field resulting in energy dissipation as heat. This loss is called
A. Eddy currents loss B. Hysteresis loss C. Flux linkage loss D. Joule heat loss

29. A step-up transformer is designed to operate from a 25V supply. If the transformer is 80% efficient, determine the current in the primary coil when the output terminals are connected to 240V, 100W lamp
A. 5.0A B. 4.0A C. 2.5A D. 2.0A

30. Which of the following pairs consist of fundamental quantities only?
A. Velocity and gravitational potential
B. Acceleration and field strength
C. Momentum and work done
D. Moment and force

31. One of the limitations of Thompson's model of the atom is that it does not explain,
A. small angle scattering B. stability of the atom C. ionization progress
D. the variation of the effective atomic radius

32. An atom is said to be excited if an electron of the atom is
A. in the round state B. At infinity
C. promoted to an energy level higher than its original level D. having an energy level of 0.0eV

33. The minimum energy necessary to remove an electron from a given atom to infinity is called
A. Excitation energy B. Ground state energy
C. Ionization energy D. Binding energy

34. Find the de Broglie wavelength of a 0.01Kg pellets having a velocity of 10m/s [$h = 6.63 \times 10^{-34}$ Js]
A. 6.63×10^{-31}m B. 6.63×10^{-32}m
C. 6.63×10^{-33}m D. 6.63×10^{-30}m

35. What happens to the proton number Z and the nucleon number A of a nuclide which emits a γ-radiation?
A. Z increases by 1 while A does not change
B. Z increases by 1 and A increases by 1
C. Z and A neither increase or decrease
D. Z increases by 1 while A decreases by 1

36. A note that is an OCTAVE higher than a given note of frequency 256Hz would have a frequency of
A. 2048Hz B. 1024Hz C. 128Hz
D. 512H

37. The QUALITY and PITCH of a musical note depends respectively on
A. Frequency and harmonics
B. Overtones and intensity
C. Intensity and frequency
D. Overtones and frequency

38. A sound wave of frequency 130Hz and wavelength 2.0m was produced at a distance, d, from a target and echo was heard at the source 0.5 second later, calculate the value of d.
A. 65.0m B. 130m C. 260m
D. 520m

39. In an experiment, lead shot contained in a vertical cardboard cylinder, falls through 100cm when the cylinder is inverted. Calculate the rise in temperature caused by 100 such inversions. [specific heat capacity of lead = $130 Jkg^{-1}K^{-1}$; $g = 10ms^{-2}$]
A. 3.3K B. 4.4K C. 5.5K
D. 7.7K

40. A body is projected with a velocity Vms^{-1}, inclined at an angle β to the vertical. Which of the following gives the CORRECT expression for the horizontal component of velocity V_x after time t?
A. $V\cos\beta$ B. $V\sin\beta$ C. $Vg\cos\beta$
D. $Vt\sin\beta$

41. An object of mass 0.2Kg and density $600Kgm^{-3}$ is suspended with a string so that 1/10 of it is immersed in paraffin of density $900Kgm^{-3}$. Find the tension in the string.
A. 0.2N B. 2.0N C. 1.0N
D. 0.1N

42. A rocket burns fuel at the rate of $20Kgs^{-1}$ and ejects it with a velocity of $5.0 \times 10^{5}ms^{-1}$. Calculate the thrust exerted by the gas on the rocket
A. $1.0 \times 10^{5}ms^{-1}$ B. $2.0 \times 10^{5}ms^{-1}$
C. $3.0 \times 10^{5}ms^{-1}$ D. $5.0 \times 10^{5}ms^{-1}$

43. A converging lens has radius of curvature 16.0cm, calculate the power of the lens
A. 0.0625 B. 0.125 C. 0.250
D. 0.500

44. If the velocity of light in air is $3.0 \times 10^{8}ms^{-1}$, find the velocity of light in a medium whose refractive index is 1.5
A. $5.0 \times 10^{8}\ ms^{-1}$ B. $5.0 \times 10^{7}\ ms^{-1}$
C. $2.5 \times 10^{8}\ ms^{-1}$ D. $2.5 \times 10^{7}\ ms^{-1}$

45. When an object is at infinity to the pole of a concave mirror the image formed is at
A. Principal focus, real and diminished
B. Centre of curvature, real and inverted
C. Centre of curvature, virtual and erect
D. Principal focus, real and erect

46. A total eclipse of the sun is seen when the observer is in the
A. Umbra region of the sun's shadow
B. Penumbra region of the sun's shadow
C. Umbra region of the moon's shadow
D. Penumbra region of the moon's shadow

47. A long drawn sound arising from overlapping reflections together with the original sound which gives rise to the reflections is called

A. Beat B. Echo C. Diffraction
D. Reverberation

48. Which of the following radiations is used for examining the freshness or staleness of eggs in the poultry?
A. Ultraviolet rays B. X-rays
C. γ-rays D. Radio waves

49. Which of the following statements is not correct about electromagnetic waves?
A. They are quantized energies.
B. They are transverse waves.
C. They are polarizable.
D. They may be deflected in an electric or magnetic field

50. A simple cell with mercury-amalgamated zinc plate minimizes
A. Sparking B. Local action
C. Back e.m.f. D. Polarization

51. When two genes for the same character (alleles) are contained in the same individual, the character that shows is known as
A. Important character B. Dominant character C. Superior character
D. Controlling character

52. In Nigeria, a tropical rain-forest can be found in
A. Sokoto B. Kaduna C. Abuja
D. Abia

53. The sum total of the biotic and abiotic factors that affect living things is referred to as:
A. Environment B. Lithosphere
C. Hydrosphere D. Atmosphere

54. Hygrometer is an ecological instrument that measures
A. Rainfall B. Humidity C. Temperature
D. Light

55. Which of the following air pollutant causes acid rain?
A. Sulphur dioxide B. Lead oxide
C. carbon dioxide D. Hydrogen sulphide

56. Which of the following does not have a well developed tissue?
A. Moss B. Fern C. Whispering tree
D. Maize

57. Which of the following is air borne?
A. Malaria B. Yellow fever
C. Cholera D. Tuberculosis

58. *Candida albicans* is a
A. Bacterium B. Fungus
C. Virus D. Protozoan

59. All of these are vertebrates except
A. Lizard B. Rat C. Star fish
D. Tilapia

60. Which of the following deaminates
A. Duodenum B. Ileum
C. Liver D. Kidney

61. A stable self-sustaining environment produced by an interaction between the biotic and abiotic components is best described as
A. niche B. community C. an ecosystem
D. a habitat

62. Which of the following is not present in the nucleus of cell?
A. Chromosome B. Nucleolus
C. Genes D. Mitochondria

63. The cervical vertebrae invariably number
A. 4 B. 7. C. 12 D. 5

64. What force is responsible for the movement of water to the top of tall trees?
A. Transpiration pull B. Root pressure
C. Diffusion D. Capillary pressure

65. Antibodies are mammalian blood are formed by
A. Platelets B. White blood cells
C. Red blood cells D. Liver

66. Which of the following liquids supplies cells in the tissues of a mammal with oxygen and nutrients
A. Blood B. Plasma C. Serum
D. Lymph

67. The fly and grasshoppers have mouth parts adapted for
A. sucking B. piercing and sucking
C. lapping and chewing D. biting and lapping

68. The sponging and lapping mouth parts occurs in
A. Butterfly B. Cockroach
C. Housefly D. Mosquito

69. The following is not an example of character
A. baldness B. colour blindness
C. haemophilia D. height

70. Which of the following is a vestigial organ
A. appendix B. liver
C. pancreas D. proventriculus

71. In which of the following flower parts does meiosis occur?
A. Anther B. Petal
C. Receptacle D. Style

72. When an organism moves its whole body towards a stimulus, the organism is said to exhibit
A. tropic movement B. trophic movement
C. tactic movement D. Nastic movement

73. The release of useful substances from cells of an organism is called
A. excretion B. evacuation C. metabolism
D. secretion

74. A box was left in the lawn for two days. When the box was removed the grass under it turned yellow due to lack of
A. Carbon dioxide B. Light
C. Oxygen D. Water