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རྒྱལ་གཞུང་གི་གཞི་གཞུག་ལྷན་ཚོགས།



**ROYAL GOVERNMENT OF BHUTAN  
ROYAL CIVIL SERVICE COMMISSION**

**BHUTAN CIVIL SERVICE EXAMINATION 2012  
MAIN EXAMINATION  
(OCTOBER 13, 2012)**

**EXAMINATION CATEGORY : TECHNICAL  
PAPER II : GENERAL SUBJECT KNOWLEDGE  
for MEDICAL & HEALTH GROUP**



**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2012  
EXAMINATION CATEGORY: TECHNICAL**

**PAPER II: GENERAL SUBJECT KNOWLEDGE for MEDICAL & HEALTH GROUP**

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<b>Date</b>	: 13 October 2012
<b>Total Marks</b>	: 100
<b>Examination Time</b>	: 90 minutes (1.5 hours)
<b>Reading Time</b>	: 15 minutes (prior to examination time)

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**READ THE FOLLOWING INSTRUCTIONS CAREFULLY:**

- You have 15 minutes (prior to writing time) to read the instructions, clarify doubts, make sure that you have all the pages, and check for any printing errors. DO NOT write during this time.
- This paper consists of **TWO Parts – Part I and Part II. All questions are compulsory.**
  - ✓ **Part I** consists of **70 Multiple Choice Questions** of 1 (one) mark each; and
  - ✓ **Part II** consists of **10 Short Answer Questions** of 3 (three) marks each.
- While answering the multiple choice questions, write only the letter of the correct answer chosen against the question number, clearly and legibly. E.g. 71(c). Any double writing or smudgy answers shall not be evaluated.
- All answers must be written in the answer booklet provided to you. You will not be given any marks for answers written other than in the answer booklet. Ask for additional answer booklets if required.
- Ensure that you write your roll number in the space provided in the answer booklet. In case you take additional answer booklet, make sure that you write your roll number in the additional answer booklet as well.
- This paper has 15 (fifteen) printed pages including this cover page.



**PART I : MULTIPLE CHOICE QUESTIONS**

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Sheet against the question number. E.g. 71(c). Each question carries ONE mark.

1. The myofilaments of muscles consist primarily of two proteins. These two proteins are called
  - a) Actin and Myosin
  - b) Progesterone and Testosterone
  - c) Progesterone and Estrogen
  - d) Actin and Pectin
  
2. Compared with the current in the white-hot filament of a common lamp, the current in the connecting wire is:
  - a) Less
  - b) The same
  - c) More
  - d) None of above
  
3. A step-up transformer in an electrical circuit can step up
  - a) Voltage
  - b) Energy
  - c) Both of these
  - d) None of these
  
4. Research indicates that cigarette smoking results in the following conditions..
  - a) Whooping cough
  - b) Cardiovascular stress
  - c) Hepatitis
  - d) Measles
  
5. The equation  $E = mc^2$  indicates that energy
  - a) Equals mass moving at the speed of light squared
  - b) Equals moving mass
  - c) Is fundamentally different from mass
  - d) and mass are closely related

6. A job is done slowly, while an identical job is done quickly. Both jobs require the same amount of work, but different amounts of
- a) Energy.
  - b) Power.
  - c) Both A and B.
  - d) None of above.
7. Plants receive their nutrient mainly from
- a) Chlorophyll
  - b) Atmosphere
  - c) Light
  - d) Soil
8. The work done by the tension in the string of the pendulum during one complete oscillation is equal to
- a) Total energy of the pendulum
  - b) Potential energy of the pendulum
  - c) Zero
  - d) Kinetic energy of the pendulum
9. The molar concentration of pure water is
- a) 0.55 Molar
  - b) 5.5 Molar
  - c) 55 Molar
  - d) 550 Molar
10. The chromosomes responsible for characteristics other than sex are known by the terms...
- a) Ribosomes
  - b) Lysosomes
  - c) Autosomes
  - d) Spermatocytes



11. When there are no external forces the shape of a liquid drop is determined by the

- a) Density of the liquid
- b) Viscosity of the liquid
- c) Surface tension of the liquid
- d) Temperature of the air

12. What is the approximate percentage of carbon dioxide that is present in the atmosphere:

- a) .03%
- b) 1%
- c) 5%
- d) 7%

13. The swing period of a simple pendulum is doubled when

- a) The length of the pendulum is doubled
- b) The length of the pendulum is halved
- c) The length of the pendulum is increased by four times
- d) The mass of the bob is doubled

14. Ribosomal RNA is actively synthesized in

- a) Nucleoplasm
- b) Ribosomes
- c) Lysosomes
- d) Nucleolus

15. When light bends as it enters a different medium, the light undergoes the process of

- a) Diffusion
- b) Contraction
- c) Refraction
- d) Retraction

16. As far as our present knowledge extends, hormones are NOT found in one of the following categories of substances:

- a) Proteins
- b) Peptides



- c) Nucleic acids
- d) Steroids

17. The loss of water of crystallization from a hydrate when exposed to air is termed as

- a) Efflorescence
- b) Deliquescence
- c) Quiescence
- d) Anhydrogenation

18. When a color blind man marries a woman with normal color vision, it is probable that one of the following situations may result

- a) All the children will be color blind
- b) All the grandchildren will be color blind
- c) Only the sons will be colorblind
- d) Half the grandsons will be color blind

19. The unit of electric resistance is

- a) Hertz
- b) Watts
- c) Joules
- d) Ohms

20. A machine performs 8 Joules of work in 2 seconds. How much power is delivered by this machine?

- a) 8 Watts
- b) 6 watts
- c) 4 watts
- d) 10 Watts

21. Which of the following is an antiseptic?

- a) Aspirin
- b) Iodine
- c) Vitamin A
- d) Dilute Carbol fuschin

22. The first element in the periodic table is

- a) Halogen
- b) Hydrogen
- c) Nitrogen
- d) Cadmium

23. Which of the following is not an arachnid?

- a) Lobster
- b) Scorpion
- c) Black widow spider
- d) Tick

24. In terms of mass the fourth most abundant element in the universe is

- a) Oxygen
- b) Carbon
- c) Hydrogen
- d) Nitrogen

25. Which of the following is not found in blood?

- a) Fibrinogen
- b) Glucose
- c) Urea
- d) Glycogen

26. Consider a block of wood floating on water. If you push down on the top of the block until it is completely submerged, the buoyant force on it

- a) Increases
- b) Decreases
- c) Remains the same
- d) Depends on how far beneath the water surface it is pushed

27. During the first stage of carbohydrate metabolism, glucose is broken down to.....

- a) Pyruvic acid
- b) Lactic acid



- c) Hydrochloric acid
- d) Citric acid

28. A nuclear reaction where the nucleus of an atom splits into smaller parts is known as

- a) Nuclear fusion
- b) Nuclear combustion
- c) Nuclear fission
- d) Nuclear blasts

29. Ozone hole refers to

- a) Hole in ozone layer
- b) Decrease in the ozone layer in troposphere
- c) Decrease in thickness of ozone layer in stratosphere
- d) Increase in the thickness of ozone layer in troposphere

30. The only metal that is in liquid form at room temperature is

- a) Mercury
- b) Chromium
- c) Cadmium
- d) Lead

31. Animals having built in thermostat to maintain constant body temperatures are called

- a) Biothermic
- b) Poikilothermic
- c) Oligothermic
- d) Homeothermic

32. The ordinary sugar is a

- a) Monosaccharide
- b) Disaccharide
- c) Polysaccharide
- d) Oligosaccharide



33. Water vascular system is found in

- a) Sea Anemone
- b) Sea Horse
- c) Sea Cucumber
- d) Sea Pen

34. A substance that reacts with both strong acids and strong bases is known as

- a) Dimorphic
- b) Dual reactive
- c) Diphasic
- d) Amphoteric

35. Mosses and ferns are found in moist and shady places because both..

- a) Depend for their nutrition on microorganism which can survive only at low temperatures
- b) Do not need sunlight for photosynthesis
- c) Require presence of water for fertilization
- d) Cannot compete with sun loving plants

36. The removal of two hydrogen atoms from an alcohol yields

- a) An acetide
- b) An aldehyde
- c) A polyene
- d) A ketoacetone

37. In the first stage of photosynthesis, light energy is used to:

- a) Move water molecules
- b) Denature chlorophyll
- c) Split water
- d) Produce carbohydrates

38. When vinegar and baking soda are mixed together, the following gas is formed

- a) Oxygen
- b) Nitrogen



- c) Hydrogen
- d) Carbon dioxide

39. Algae have cell walls made up of...

- a) Hemicellulose, pectin and proteins
- b) Cellulose, gallactans and mannans
- c) Cellulose, Hemicellulose and Pectins
- d) Pectins, cellulose and proteins

40. One end of a towel dips into a bucket full of water and the other ends hangs over the bucket without dipping. It is found that after sometime the whole towel becomes soaked in water. This is due to

- a) The high viscosity of water
- b) Capillary action of cotton threads
- c) High gravitational force
- d) Evaporation of water upwards

41. The skin receptors in humans that are sensitive to heat are

- a) End organs of Krause
- b) Meissner's corpuscles
- c) End organs of Ruffini
- d) Pacinian corpuscles

42. The atoms in sugar are bound by the following bonds

- a) Covalent bond
- b) Van der waals bond
- c) Ionic bond
- d) Hydrogen bond

43. The process by which an amino acid loses its amino group is called

- a) Hydration
- b) Deamination
- c) Oxidoamination
- d) Dehydration



44. Which one of the following statements regarding a catalyst is **not correct**?
- a) An enzyme is a catalyst that only binds certain substrates.
  - b) An enzyme is a protein that is a highly efficient catalyst for one or more chemical reactions in a living system.
  - c) Catalysts increase the rate of a reaction by altering the mechanism, thereby increasing the activation energy.
  - d) Catalysts do not alter the equilibrium constant for a chemical reaction.
45. A compound that is quickly absorbed through the walls of the stomach is...
- a) Sugar
  - b) Protein
  - c) Fat
  - d) Alcohol
46. A process in which substances are separated through differences in the rates at which the components migrate is called....
- a) Filtration
  - b) Chromatography
  - c) Elution
  - d) Titration
47. Which of the following lacks a backbone?
- a) Alligator
  - b) Baby Panda
  - c) Eagle
  - d) Jellyfish
48. A Pascal is a unit of
- a) Pressure
  - b) Energy
  - c) Force
  - d) Work



49. Which of the following is not a cell organelle

- a) Mitochondria
- b) Lysosome
- c) Cytoplasm
- d) Endoplasmic reticulum

50. A family has 7 boys and 1 girl. What is the chance that the next child will be a girl?

- a) 12.5 Percent
- b) 50 Percent
- c) 25 Percent
- d) 100 Percent

51. The wire inside an electric bulb is known as

- a) Tungsten
- b) Filament
- c) Electrowire
- d) Electric transmitter

52. A knee jerk response to a sharp blow is an example of

- a) Reflex
- b) Habit
- c) Learned Response
- d) Instinct

53. Of the following liquids which is most dense

- a) Water
- b) Gasolene
- c) Chloroform
- d) Acetone

54. The blood of Cockroach has no respiratory value. This shows that

- a) Cockroach does not respire
- b) Respiration is anaerobic
- c) Oxygen directly goes into tissues
- d) Oxygen is not utilized in cell respiration



55. A feather and a coin dropped in a vacuum fall with the equal

- a) Momentum
- b) Acceleration
- c) Kinetic energy
- d) Forces

56. DNA Finger printing requires only a minute quantity of DNA sample such as WBC of blood stain because

- a) Large quantity of DNA is available in WBC
- b) DNA contains nitrogen bases
- c) DNA can be amplified through PCR
- d) DNA determines the heredity.

57. Infrared light is not visible to human eye because

- a) Its wavelength is too long
- b) Its wavelength is too short
- c) It is not made of visible colors that the human eye can see
- d) It travels in high speed that cannot be seen by the eye

58. If a cell has twice as much DNA as in a normal functional cell, it means that the cell

- a) has completed its division
- b) is preparing to divide
- c) has ceased to function
- d) has reached the end of its life span

59. Crude oil is separated into its components by the process of

- a) Chemical reaction
- b) Simple distillation
- c) Fractional distillation
- d) Settling



60. Common point of similarity between RNA and DNA is
- a) Both are double stranded
  - b) Both have identical sugar molecules
  - c) Both have identical Pyrimidine bases
  - d) Both are polymers of nucleotides
61. If the earth's radius shrink by 1 percent but its mass remains the same, the acceleration due to gravity on the earth's surface would
- a) increase
  - b) remain the same
  - c) decrease
  - d) none of these
62. Which of the following are devoid of respiratory, excretory and circulatory system
- a) Sponges
  - b) Thread worms
  - c) Liver flukes
  - d) Tape worms
63. 2.5 liters of a sodium chloride (NaCl) solution contain 5 moles of the solute. What is its molarity?
- a) 5 Molar
  - b) 2 Molar
  - c) 2.5 Molar
  - d) 12.5 Molar
64. Tachyglossus is a connecting link between
- a) Reptiles and Birds
  - b) Amphibians and Reptiles
  - c) Birds and Mammals
  - d) Reptiles and Mammals



65. When water is heated from  $10^{\circ}\text{C}$  to  $20^{\circ}\text{C}$ , its internal energy

- a) increases by 10
- b) is doubled
- c) is less than doubled
- d) is more than doubled

66. In the human body, the organ that carries out most of the digestions is the

- a) Small intestine
- b) Liver
- c) Stomach
- d) Large intestine

67. Baking soda is chemically

- a) Potassium chloride
- b) Potassium carbonate
- c) Potassium hydroxide
- d) Sodium bicarbonate

68. Osmoregulation is concerned with

- a) Excretion
- b) Ionic regulation
- c) Control of body's water content
- d) Carbon dioxide regulation

69. The pH of a solution that is 1000 times more acidic than pure water is

- a) 10
- b) 7
- c) 6
- d) 4

70. The fact that the Moon always shows its same face to Earth is evidence that the Moon rotates about its axis about once per

- a) Day
- b) Month
- c) Year
- d) None, because moon does not rotate on its axis



**PART II : SHORT ANSWER QUESTIONS**

**Answer all questions. Each question carries THREE marks.**

1. What is axon reflex?
2. What is an electric fuse? Explain its functions in brief.
3. Write two differences between vitamins and hormones. Give one examples of each.
4. What is a balanced diet?
5. What is the meaning of amalgamation with reference to the subject of chemistry?
6. Briefly describe about blood groups in human beings.
7. What is the chemical name of vitamin B1? Name the disease due to the deficiency of this vitamin in human beings.
8. Name the bacteria that cause Tetanus? Name the vaccine that prevents Tetanus?
9. What are the five functions that the skeletal system provides in the body?
10. A wire of length  $L$  and resistance  $R$  is stretched so that its length is doubled. Explain how will it's (i) Resistance change (ii) Resistivity change?