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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 BIO SCIENCE GROUP**

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

PAPER II: GENERAL SUBJECT KNOWLEDGE for BIO SCIENCE GROUP

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

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 14 (fourteen) 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 basic unit of life is:

- a) Genes
- b) Cells
- c) Gametes
- d) Tissues

2. The main gases in “green house emissions” are:

- a) CO₂, N, O₂
- b) CO₂, CH₄, N₂O
- c) CH₄, N₂O, O₂
- d) N₂O, O₂, CO₂

3. Which one of the following is known as the “power house” of the cell?

- a) Golgi body
- b) Mitochondrion
- c) Ribosome
- d) None of these

4. Respiration consists of a series of reactions resulting in a step-wise degradation of:

- a) Glucose to Pyruvic Acid and Hydrogen
- b) Glucose to Carbon Dioxide and Water
- c) Glucose to Ethanol and Carbon Dioxide
- d) None of the above

5. Which one of the following acid is the strongest?

- a) pH 1.1
- b) pH 2.3
- c) pH 6.2
- d) pH 0.5

6. Molecules that have the same number of atoms and the same number of electron are called:

- a) Isotopes
- b) Isotones
- c) Iso-electronics
- d) Isosters

7. Photosynthesis takes place faster in

- a) Yellow light
- b) Red light
- c) White light
- d) Darkness

8. Blue pine, spruce, fir and hemlock are valuable timber species in Bhutan and to which of the following class do they belong?

- a) Angiosperms
- b) Docotyledons
- c) Monocptyledon
- d) Gymnosperms

9. The formula of Methane is:

- a) CH₅
- b) CH₄
- c) CH₃
- d) CH₂

10. Plant development is affected by:

- a) Quality of light only
- b) Quality and quantity of light
- c) Quality and duration of light
- d) Quality, quantity and duration of light

11. Movement of cells against concentration gradient is called:

- a) Active transport
- b) Osmosis
- c) Diffusion
- d) Passive transport

12. Process of cell division takes place through:

- a) Heterosis
- b) Fusion
- c) Mitosis
- d) None of these

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13. A force of gravity F in "Newton" acts on a body with mass of 15 Kg. Then, what is the weight of the body?

- a) 15 Newton
- b) 150 Kg
- c) 150 Newton
- d) 15 Kg

14. Two important trace elements needed for normal growth of plants are:

- a) Calcium and Sulphur
- b) Iron and Manganese
- c) Zinc and Boron
- d) Potassium and Calcium

15. The gas used for artificial ripening of green fruit is-

- a) Ethylene
- b) Carbon dioxide
- c) Acetylene
- d) Ethane

16. Metals are good conductor of heat because:

- a) They have high melting point
- b) The atoms are lightly packed
- c) They contain free electron
- d) None of the above

17. When a heavy stone is raised, it is easier to roll it up a sloping road than to lift it vertical upwards because:

- a) Work done in rolling is more than in lifting it
- b) Work done in rolling a stone is less than in lifting it
- c) Work done in lifting the stone is much more than rolling it
- d) Work done in both is same but the rate of doing work is less in rolling

18. The inherited traits of an organism are controlled by-

- a) DNA molecules
- b) RNA molecules
- c) Enzymes
- d) Nucleotides

19. Which one is an organic acid?

- a) Sulphuric acid
- b) Nitric Acid
- c) Phosphoric Acid
- d) Citric acid

20. Movement towards light is exhibited by:

- a) All land plants
- b) Flowering plants
- c) Lower plants
- d) All the plants

21. Curd making is a techno-biological process involving

- a) Bacteria
- b) Protozoa
- c) Fungus
- d) Virus

22. The National Park famous for Takin (the National Animal is):

- a) Sakten Wild life Sanctuary
- b) Manas National Park
- c) Jigme Singye Wangchuck National park
- d) Jigme Dorji Wangchuck National Park

23. If two bodies of different masses, initially at rest, are acted upon by the same force for the same time, then the both bodies acquire the same-

- a) Momentum
- b) Velocity
- c) Acceleration
- d) Kinetic Energy

24. What is the basis of a hydrogen bomb?

- a) Fission of Uranium
- b) Fusion of Hydrogen
- c) Breaking of Hydrogen ions
- d) None of the above

25. When a person shouts in inside a large cave, he can hear an echo of his shout on reflection. What is the least distance between the source of the sound and reflector for the formation of a distinct echo?

- a) 17 meters
- b) 10 metres
- c) 8 metres
- d) 26 metres

26. Len system used in microscope is a:

- a) Convex
- b) Concave
- c) Plain Mirror
- d) Covex and Concave

27. Ozone layer protects earth from:

- a) Harmful gases
- b) Black clouds
- c) Meteorites
- d) Cosmic and other radiation

28. Which colour of light shows maximum deviation when passed through a prism?

- a) White
- b) Violet
- c) Green
- d) Red

29. Which of the gas is not known as the Green House Gas (GHG) :

- a) Methane
- b) Hydrogen
- c) Carbon Dioxide
- d) Nitric oxide

30. Exposure to early morning sunlight helps a person improve his health because:

- a) The infrared light kills bacteria in the body
- b) The pigment cells in the skin get stimulated and produces a healthy scan
- c) Resistance power to disease increases
- d) The ultra-violet rays convert skin oil into vitamin D

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31. What is a manure which is mixture of crop debris and cow dung normally called as:

- a) Composed manure
- b) Farmyard Manure (FYM)
- c) Green Manure
- d) Biofertilizers

32. Liver is a vital organ in all vertebrates. Identify the correct combination of statements which is true about the liver:

- I) Secretes a hormone for controlling sugar level in the blood
- II) Secretes digestive enzymes
- III) Converts excess glucose into glycogen and vice-versa
- IV) Plays a major role in the breakdown of hemoglobin

- a) I and IV
- b) II and III
- c) III and IV
- d) II and IV

33. Which of the following is not a disease due to nutritional deficiency?

- a) Goiters
- b) Anemia
- c) Scurvy
- d) Diabetes

34. A boy gets a contaminated common salt (NaCl) with sand and Ammonium Chloride (NH_4Cl) from the market. The procedure he should adopt to get pure table salt is:

- a) Mix the sample in water and evaporate the solution
- b) Mix the sample in water and evaporate the decanted solution
- c) Mix the sample in acetone and evaporate the decanted solution
- d) Heat the sample, then mix it with water and evaporate the decanted solution

35. When there is a small population (especially plants in wild), there is a greater chance of:

- a) Natural selection
- b) Gene flow
- c) Genetic drift
- d) Mutation occurring

36. The most important macro-nutrients in the soil required for plant growth are:

- a) Potassium, Zinc and Phosphors
- b) Nitrogen, Phosphorus and Potassium

- c) Selenium, Calcium and Nitrogen
- d) Calcium, Phosphorus and Nitrogen

37. The area of cultivated agriculture in Bhutan is:

- a) 7.9 % of the total area of Bhutan
- b) 5.9 % of the total area of Bhutan
- c) 3.9 % of the total area of Bhutan
- d) 2.9 % of the total area of Bhutan

38. If a father has blood group AB and mother has O blood group, then the possibilities are that the children will have the following blood groups:

- a) A or O
- b) A or B or O
- c) A or B
- d) AB

39. An indigenous cattle is called by the following scientific name:

- a) *Bos taurus*
- b) *Bos indicus*
- c) *Bos bubalis*
- d) *Bos frontalis*

40. Avian flu is also called as:

- a) $H_1 N_2$
- b) $H_2 N_2$
- c) $H_5 N_1$
- d) $H_5 N_2$

41. The wonder drug Penicillin was discovered by:

- a) Robert Flemming
- b) Alexánder Flemming
- c) Louis Pasteur
- d) Edward Jenner

42. Bhutan is considered as one of the "hot spots" in the area of:

- a) Forestry
- b) Hydro-power
- c) Bio-diversity
- d) Tourism

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43. Traditional Medicinal Practice in Bhutan is called:

- a) So-Wa-Maen
- b) So-Wa-Rigpa
- c) So-Wa-Maenpa
- d) So-Wa-Lamlu

44. Most digestion occurs in:

- a) Mouth
- b) Stomach
- c) Small intestine
- d) Large intestines

45. When the results of your statistical analysis concluded that Variety A is significantly different from variety B at the 5% P level, it is written as:

- a) $P = 0.05$
- b) $P > 0.05$
- c) $P < 0.05$
- d) $P < \text{or} = 0.05$

46. In mathematics, if c is the hypotenuse of a right triangle, then the Pythagoras equation is written as:

- a) $a^2 - b^2 = c^2$
- b) $a^2 + b^2 = c^2$
- c) $a^2 + c^2 = b^2$
- d) $a^2 - c^2 = b^2$

47. In technical terms “morbidity” refers to:

- a) Deaths
- b) Diseases
- c) Infections
- d) Pathogens

48. Laughing gas is commonly known as:

- a) Sulphide
- b) Hydrogen oxide
- c) Nitrous oxide
- d) Nitric oxide

49. "Colostrum" is a type of:

- a) Juice
- b) Tea
- c) Milk
- d) Coffee

50. "White leghorn" is a type of:

- a) Horse
- b) Fish
- c) Poultry
- d) Pig

51. The process by which fish or aquatic animals release eggs or sperms into the water is called:

- a) Fallowing
- b) Whelping
- c) Spawning
- d) Delivering

52. *Cordyceps sinensis* is a type of:

- a) Insect
- b) Bacteria
- c) Fungi
- d) Virus

53. Mango (*Mangifera indica*) is fleshy, one-seeded fruit known as "drupe". Which part of the fruit is edible?

- a) Epicarp
- b) Mesocarp
- c) Endocarp
- d) Pericarp

54. In human, night blindness is caused by the deficiency of:

- a) Vitamin A
- b) Vitamin B
- c) Vitamin C
- d) Vitamin D

55. The telephone was invented by:

- a) Issac Bell
- b) Thomas Buckner.

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- c) Peter Mart
- d) Graham Bell

56. Insectivorous plants are autotrophic in nature and grow in soils (e.g. water logged swampy areas) that are deficient in :

- a) Water
- b) Sodium
- c) Potassium
- d) Nitrogen

57. The full form of "AIDS" is:

- a) Acquired Infectious Deficiency Syndrome
- b) Acquired Infectious Deficiency Syndrome
- c) Acquired Immune Disease Syndrome
- d) Acquired Immune Deficiency Syndrome

58. Sulphonamides are:

- a) Natural antimicrobial agents
- b) Synthetic antimicrobial agents
- c) Antibiotics
- d) All the above

59. Bhutan became a member of the United Nations in:

- a) 1961
- b) 1971
- c) 1981
- d) 1991

60. The Latin word of Science is "Scientia which means":

- a) Knowledge
- b) Awareness
- c) Comprehension
- d) Understanding

61. Ethology is the study of:

- a) Human behavior
- b) Animal behavior
- c) Plant movement
- d) Ethics

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62. Entomology refers to the study of:

- a) Plants
- b) Insects
- c) Animals
- d) Fish

63. A male cat is called as:

- a) John cat
- b) Tom cat
- c) Gelder cat
- d) Male Cat

64. Radioactivity is a phenomenon of the spontaneous release of :

- a) Gamma rays (short wave electromagnetic waves)
- b) Electrons (β - particles)
- c) Protons (α - particles)
- d) All of the above

65. While transporting logs, friction can be reduced changing from:

- a) Rolling to sliding
- b) Sliding to rolling
- c) Dynamic to statics
- d) Potential energy to kinetic energy

66. Neutralization is a chemical reaction that can be used to counter the harmful effect of acid. Out of the following, which is an example of a neutralization process?

- a) $\text{CaCO}_3 + 2\text{HCl} \longrightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2$
- b) $\text{Mg} + 2\text{HCl} \longrightarrow \text{MgCl}_2 + \text{H}_2$
- c) $2\text{KOH} + \text{H}_2\text{SO}_4 \longrightarrow \text{K}_2\text{SO}_4 + 2\text{H}_2\text{O}$
- d) $\text{Na}_2\text{S} + 2\text{HCl} \longrightarrow 2\text{NaCl} + \text{H}_2\text{S}$

67. What is the chemical name for vinegar:

- a) Malic acid
- b) Acetic acid
- c) Citric acid
- d) Pyruvic acid

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68. A smuggler cannot carry gold by depositing iron on the gold surface because :

- a) Iron rusts
- b) Gold has higher reduction potential than iron
- c) Gold is denser
- d) Iron has lower reduction potential than iron

69. Pollination by bird is known as:

- a) Hydrophily
- b) Entomophily
- c) Ornithophily
- d) Anemophily

70. Extinction of plant and animal species in wild occurs when all members of a species and its component populations go to extinct. The ultimate cause of decline and extinction is:

- a) Outbreak of periodical disease epidemic
- b) Increase in predator population
- c) Change in environment
- d) Availability of less food

PART II : SHORT ANSWER QUESTIONS

Write short notes on the following statements/questions. Each question carries THREE marks.

- 1) Mention 2 Millennium Development Goals, and describe them briefly.
- 2) Please substantiate the statement: We cannot have Food security without Climate security?
- 3) The brunt of ill-impact of climate change ultimately will have to be borne by the communities and farmers in the Geogs and villages. What will be your strategies to reduce vulnerability of communities to ill-impacts of climate change?
- 4) Why is the Ministry of Agriculture and Forests commonly called as the Renewable Natural Resources (RNR) sector? Please justify.
- 5) What are your views of the government's policy on the ban of "Shifting Cultivation" practices?
- 6) What is meant by "Bio-technology"? Name at least 3 Bio-technologies in Bhutan.
- 7) What is meant by "Green Revolution"? Give 3 examples?
- 8) What are views on balancing "Biological Conservation" and "Rural Development" in Bhutan?
- 9) What is meant by Organic farming? Give 3 examples of organic farming practices in Bhutan.
- 10) Mention your professional background, and briefly explain how your professional knowledge can help to alleviate/address Climate Change issues.