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རྒྱལ་གཞུང་གི་གཞི་གཞུག་ལྷན་ཚོགས།



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

**BHUTAN CIVIL SERVICE EXAMINATION 2013
MAIN EXAMINATION
(OCTOBER 13, 2013)**

EXAMINATION CATEGORY : TECHNICAL

**PAPER II:
GENERAL SUBJECT KNOWLEDGE for
BIO SCIENCE GROUP**

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2013
EXAMINATION CATEGORY: TECHNICAL**

PAPER II: GENERAL SUBJECT KNOWLEDGE for *BIO SCIENCE* GROUP

Date	: 13 October 2013
Total Marks	: 100
Examination Time	: 90 minutes (1.5 hours)
Reading Time	: 15 minutes (prior to examination time)

GENERAL INSTRUCTIONS

1. Write your Registration Number clearly and correctly in the Answer Booklet.
2. The first 15 minutes are to check the number of pages, printing errors, clarify doubts and to read the instructions in Question Paper. You are NOT permitted to write during this time.
3. This paper consists of **TWO Parts, namely Part I and Part II.**
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.
4. **All questions are compulsory.**
5. 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 Booklet if required.
6. All answers should be written with correct numbering of Part, Section and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating any or correct Part, Section and Question Number will NOT be evaluated and no marks would be awarded.
7. Begin each Part in a fresh page of the Answer Booklet.
8. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
9. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
10. This paper has **14** printed pages in all, including this Instruction Page.

GOOD LUCK!

PART I : MULTIPLE CHOICE QUESTIONS

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Booklet against the question number. E.g. 71 (c). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. TNT is a well-known explosive. TNT stands for
 - a. trinitrotoluene
 - b. tetranitrotoluene
 - c. trinitrotriglycerine
 - d. tertnitrotetramine

2. Paper is made from which natural polymer?
 - a. cellulose
 - b. chitin
 - c. keratin
 - d. elastin

3. Vitamin C is also known as
 - a. niacin
 - b. carbonic acid
 - c. ascorbic acid
 - d. citric acid

4. The last column in the Periodic Table contains the noble gases. Which of these elements is not a noble gas?
 - a. neon
 - b. bromine
 - c. krypton
 - d. argon

5. Protium, deuterium and tritium are all forms of which element?
 - a. hydrogen
 - b. helium
 - c. carbon
 - d. iron

6. Which planet has rings around them?
 - a. Jupiter
 - b. Saturn
 - c. Uranus
 - d. All of above

7. Atomic weight or atomic mass is based on the mass of an element's
 - a. protons
 - b. neutrons
 - c. protons and neutrons
 - d. protons and electrons

8. What is the rarest blood group?
 - a. A negative
 - b. B negative
 - c. AB negative
 - d. O negative

9. The pH value of human blood is
 - a. 4.5
 - b. 7.4
 - c. 8.0
 - d. 5.5

10. The metal present in the hemoglobin is
 - a. copper
 - b. iron
 - c. magnesium
 - d. calcium

11. The longest and the largest bone in the human body is
 - a. femur
 - b. fibula
 - c. spinal cord
 - d. humerus

12. Which part of the brain controls balance?
 - a. cerebrum
 - b. cerebellum
 - c. frontal lobes
 - d. corpus callosum

13. Lens used to correct myopia is
 - a. concave
 - b. convex
 - c. biconcave
 - d. biconvex

14. Influenza is caused by
- virus
 - fungi
 - bacterium
 - algae
15. Enzyme is a
- hormone
 - bio-catalyst
 - virus
 - vitamin
16. Leukemia is a form of cancer in which there is an abnormal increase in the number of
- red blood cells
 - white blood cells
 - bone cells
 - platelets
17. Pepsin a digestive enzyme is produced in the
- small intestine
 - liver
 - kidney
 - stomach
18. Which of the following is not a mammal?
- shark
 - dolphin
 - seal
 - whale
19. Which statement is false about the ability we have to change the soil?
- mineral make up is relatively unchangeable
 - soil texture is relatively changeable
 - soil structure is relatively changeable
 - soil organic matter content is relatively changeable
20. Increasing the organic matter content of soil is likely to
- Increase the soil's water holding capacity
 - Decrease the soil's water holding capacity
 - Have no effect on water holding capacity
 - None of the above

21. The amount of different sizes of mineral particles in a soil defines the soil
- texture
 - structure
 - pore space
 - profile
22. Which of the following is considered to be a plant macronutrient?
- Ca
 - N
 - P
 - All of above
23. Which of the following rocks is classified as metamorphic?
- basalt
 - gypsum
 - obsidian
 - schist
24. Peanuts are
- legumes
 - nuts
 - roots
 - grains
25. Which agricultural crop is primarily used to make fuel for running cars?
- rice
 - potato
 - maize
 - barley
26. How can you tell the age of a horse?
- by the length of its tail
 - by the height of its shoulders
 - by the number of rings on its hooves
 - by the length of its teeth
27. What is a vegan?
- someone who does not eat anything animal-related
 - someone who does not eat vegetables
 - someone who does not eat dairy products
 - someone who does not eat mea

28. What is the only mammal that constantly sings to her young while nursing?
- horse
 - pig
 - llama
 - cat
29. During the 1960s, scientists developed new varieties of rice called HYVs. What is this development known as?
- Green Revolution
 - High Yielding Varieties
 - Project Flood
 - Rice for All Initiative
30. Subsistence farming is when
- growing food to sell to a market
 - using every bit of farmland available
 - when farmers produce only enough to feed themselves
 - farming using intensive inputs
31. If two balloons are each rubbed with wool, we find that the balloons
- attract each other
 - repel each other
 - do not affect each other
 - become conductive
32. Consider two charged objects. If the charge on one of them is changed in sign, the electric force between them
- doubles
 - is cut in half
 - stays the same
 - reverses direction
33. The Kyoto Protocol was adopted at the 3rd COP to the UNFCCC in Kyoto, Japan, on
- 11 December 1995
 - 11 December 1996
 - 11 December 1997
 - 11 December 2000
34. Under the Kyoto Protocol, within 2008-2012 the industrialized nations committed to reduce their emission on average of what percentage against the levels of year 1990?
- 5%
 - 10%

- c. 15%
 - d. 20%
35. During a census to find out average weight of Bhutan's 5 year old children
- a. every child in the population are weighed
 - b. a random sample of appropriate size from the population is chosen and weighed
 - c. a fixed 10% sample size is chosen and weighed
 - d. none of the above is appropriate
36. The rejection of plant organs is called:
- a. Senescence
 - b. Die-back
 - c. Plant disease
 - d. None of the above
37. Planting of trees on land where they did not grow formerly or the establishment of forest by natural succession is termed as:
- a. Reforestation
 - b. Reafforestation
 - c. Afforestation
 - d. All of the above
38. The beginning of a seed, spore or other structure usually following a period of dormancy is:
- a. Birth
 - b. Phenology
 - c. Germination
 - d. Dormancy
39. What does the term evolution mean?
- a. The characteristics of an individual change through the course of its life, in response to natural selection.
 - b. Modification with decent occurs
 - c. All species are related by common ancestry
 - d. None of the Above
40. Seeds contain the following:
- a. Mature sporophyte and nutritive tissues
 - b. Embryo and nutritive tissues
 - c. Female gametophyte and nutritive tissues
 - d. Male gametophyte and nutritive tissues

41. What do the pollen grains contain?
- Female gametophyte
 - Male gametophyte
 - Male sporophyte
 - Sperm
42. Plastids are special structures that occur only in plants. If they contains pigments such as chlorophyll, they are called
- Chromoplasts
 - Leucoplasts
 - Chloroplasts
 - Amyloplasts
43. An Osmometer is a device that measures:
- Water potential (Ψ)
 - Atmospheric pressure
 - Root pressure
 - None of the above
44. The part of the Earth's environment in which living organisms are found and with which they interact to produce a steady-state system:
- Biome
 - Biosphere reserve
 - Ecosystem
 - Biosphere or ecosphere
45. One of the following flowering plants is not a primitive flowering plants occurring in the Himalayas:
- Magnolia
 - Exbucklandia
 - Betula
 - Populus
46. The attraction of like molecules for each other (because of hydrogen bonding) is called:
- Adhesion
 - Surface tension
 - Fusion
 - Cohesion
47. A sample of holy spring water is collected and tested for its chemical properties. The holy water sample showed pH of 0.5.
- The water sample is alkaline
 - Neutral

- c. Slightly alkaline
 - d. Acidic
48. One of the components of plant cell is:
- a. Lignin
 - b. Proteins
 - c. Fats
 - d. Resins
49.is an aggregate of unit values, where “unit” is the thing upon which observation is made, and the “value” is the property or attribute observed on that thing.
- a. Standard deviation
 - b. Population dynamic
 - c. Population variance
 - d. Population
50. Planned enquiry set up in the field or in the laboratory to answer one or more questions concerning the effects of procedures, materials or conditions on certain traits of the subjects of the experiment is:
- a. Experiment
 - b. Treatments
 - c. Experimental Designs
 - d. Replication
51. Woody plants that seldom reaches 20 ft in height in a given locality and has several stems:
- a. Tree
 - b. Woody liana
 - c. Co-dominants
 - d. None of the above
52. Most of the rainfall in the Bhutan Himalayas occurred as a result of mountain plain systems and it is called:
- a. Frontal rain
 - b. Convective rain
 - c. Orographic precipitation
 - d. All of the above
53. The bamboo flowering experimental area is 3 hectares. It is equivalent to:
- a. 3000 m²
 - b. 300 m²
 - c. 30000 m²
 - d. 30 m²

54. The science which deals with the investigation of physical (& chemical) processes in the atmosphere, including observation, forecasting and modelling:
- Climatology
 - Meteorology
 - Ecological climatology
 - All of the above
55. One of the following instruments is not housed inside the Stevenson's Screen:
- Wet and Dry Bulb Hygrometer
 - Max-Min Thermometer
 - Measuring cylinder
 - Anemometer
56. The land area drained by a river and its tributaries and topographically determined by ridges, or high elevation points:
- Watershed
 - Catchment
 - Sub-watershed
 - All of the above
57. Rainwater that is stored in the soil and that is available for uptake by plants and it is the largest fresh water resource on Earth:
- Blue water
 - Water credit
 - Water budget
 - Green water
58. The water filled reservoir, with a length of 10 m, a width of 5 m and a depth of 2 m. All the water from the reservoir is spread over a field of 1 hectare. What is the water depth on the field:
- 10 m
 - 0.10 m
 - 100 mm
 - 10 mm
59. The point at which the gravitational or easily drained water has drained from the soil:
- Field capacity
 - Wilting point
 - Available water
 - Soil water

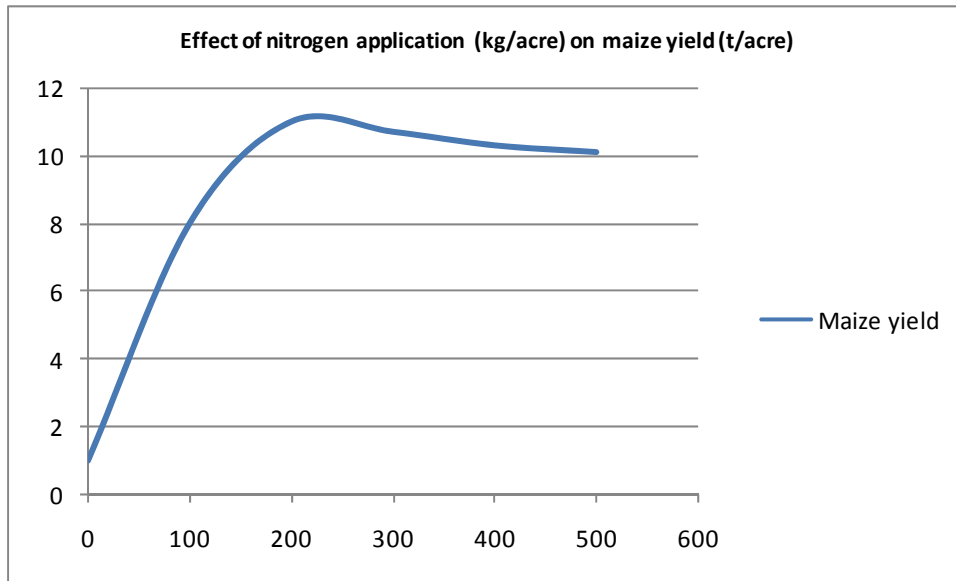
60. What percent of the earth's water is fresh water?
- 5 %
 - 10 %
 - 30 %
 - 3 %
61. One of the following diseases is not Water-borne disease:
- Diarrhoea
 - Trachoma
 - Hook worm
 - Hypertension
62. What is the chemical formula of Gypsum?
- $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
 - CaSO_4
 - $\text{CaSO}_4 \cdot \text{MgCO}_3$
 - None of the above
63. Bhutanese people love to drink Suja "butter salted tea" and one of the ingredients used is baking soda. What is the chemical formula for baking soda?
- NaHCO_3
 - NaCl
 - CH_3COOH
 - None of the above
64. A measure of human demand on the Earth's ecosystems or the land (area) needed to support human activities is called:
- Carbon footprint
 - Ecological footprint
 - Foot print
 - All of the above
65. An instrument use in measuring wind (Speed, direction etc):
- Hygrometer
 - Relative humidity
 - Max-Min thermometer
 - None of the above
66. All individuals of one species which live in a given area is called:
- Population structure
 - Population dynamics
 - Population estimate
 - None of the above

67. The junction zone between two or more diverse communities is termed as:
- Transition zone
 - Ecotone
 - Tension belt
 - All of the above
68. The study of the behavior of an organism in its natural habitat is:
- Ecology
 - Behavioral ecology
 - Habitat study
 - Behavioral study
69. The result of photosynthesis in presence of sun light is starch and oxygen. The chemical formula for starch is:
- CH_2O
 - $\text{C}_4\text{H}_5\text{O}_6$
 - $\text{C}_6\text{H}_{12}\text{O}_6$
 - None of the above
70. The percentage of total forested area of Bhutan under tree cover is:
- 70.5
 - 80.9
 - 72.5
 - 73.0

PART II : SHORT ANSWER QUESTIONS

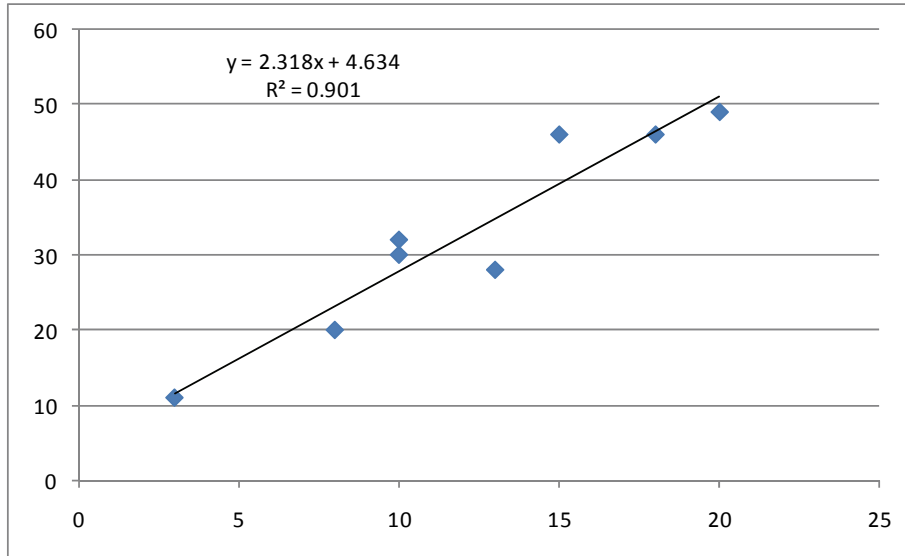
Write short answers corresponding to the questions in the Answer Booklet against the question number. Each question carries **THREE** marks.

1. Examine the graph below and describe briefly what information is presented.



2. The age of 7 pupils in a class were as follows: 5, 6, 10, 5, 6, 5 and 12 years old. Calculate the mean, median and mode for this small set of data.
3. Following are abbreviated forms for three of the important United Nations bodies. Write their full form along with one of their key functions: (1x3=3 marks)
- UNFCCC
 - WMO
 - UNESCO
4. Ozone layer protects life on earth from harmful ultraviolet rays of the sun. (1x3=3 marks)
- What is the chemical formula for an ozone molecule?
 - Name one of the elements in halogen gases that can destroy ozone layer.
 - Can ozone layer be restored – yes or no?

5. The graph shown below is a linear relationship between two variables x (on the horizontal axis) and y (vertical axis). The equation for this relationship and the R^2 value are displayed on the graph itself. (1x3=3 marks)



- a) What is the intercept?
 - b) What is the slope?
 - c) What percentage of variation in y is explained by x ?
6. Briefly describe Payment for Environmental Services (PES). Give one example of PES implementation in Bhutan and how this scheme helps the communities.
 7. Open cattle grazing in the forest is considered as one of the serious factors contributing to low regeneration of the desired tree species. If you are a farm manager or forest manager, how can you tackle such issue?
 8. Recent population explosion of army worms in many parts of the country resulting in crop damages was a serious talk of the town. What could be the reason of such outbreak of the worms? Did similar event occur in the past?
 9. Why Bhutan is considered as one of the ten hot spots of biodiversity?
 10. Give the scientific name of the following national symbols of Bhutan: (1x3=3 marks)
 - (a) Takin;
 - (b) Raven; and
 - (c) Tsenden