

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2010
EXAMINATION CATEGORY: TECHNICAL**

PAPER II: GENERAL SUBJECT KNOWLEDGE FOR BIO SCIENCE GROUP

Date	: 23rd November 2010
Total Marks	: 100
Examination Time	: 1.5 hours
Reading Time	: 15 Minutes (Prior to examination time)

1. GENERAL INSTRUCTIONS:

- 1.1 Under the provision of Technical Graduates Selection Examination procedures of the Royal Civil Service Commission, candidates shall write their **Roll No.** only on the answer book provided separately. All questions should be answered in this answer book.
- 1.2 No other particulars that would indicate the identity of the candidate shall be written on the answer book. Any candidate found guilty of writing their particulars or making any identification marks in the answer book shall be disqualified from consideration of future employment by the RCSC.
- 1.3 This question book is the property of the RCSC and shall not be torn or removed from the examination hall. It consists of 12 pages including this page. Any pages found missing should be reported to the invigilators within the first 15 minutes of the receipt of the question book.
- 1.4 Candidates shall not be allowed to carry any papers inside the examination hall.
- 1.5 Candidates shall be required to produce the Admission Card while entering the examination hall and when demanded by concerned authorities.

2. SPECIFIC INSTRUCTIONS

- 2.1 Do not write anything during the first 15 minutes, which does not include the 90 minutes for answering. This time is to be spent in reading the instructions, the questions and to make sure that no pages are missing.
- 2.2 Any misprint/clarification of questions must be raised during the first 15 minutes.
- 2.3 Once the examination begins, you will not be allowed to ask for clarifications or leave the examination hall.
- 2.4 PART A consists of 70 multiple choice questions of 1 (one) mark each and PART B consists of 10 short answer questions of 3 (three) marks each. **All questions are compulsory.**
- 2.5 Marks will be given based on the knowledge of the subject, clarity and preciseness of your response.

GOOD LUCK!

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Time Allotted: 90 minutes; Total Marks: 100

PART A (70 Marks)

Special Instruction: Copy the Question Number on your answer sheet and write the correct answer as a, b, c or d.

1. Studies in electromagnetic induction were pioneered by?
 - a. Isaac Newton
 - b. Michael Faraday
 - c. Albert Einstein
 - d. Alexander Bell

2. Which of the following scientist is a subject-matter-specialist regarding black holes in space?
 - a. Albert Einstein
 - b. Galileo
 - c. Benjamin Franklin
 - d. Stephen Hawking

3. The central limit theorem is a concept found in the subject of?
 - a. Economics
 - b. Biology
 - c. History
 - d. None of above

4. The equation $y = a + bx$ is the general form for?
 - a. Exponential model
 - b. Logarithmic model
 - c. Polynomial model
 - d. Linear model

5. Over-use of nitrogenous fertilizers on farms can lead to?
 - a. Sedimentation of lakes
 - b. Calcification of lakes
 - c. Eutrophication of lakes
 - d. Saponification of lakes

6. In scientific papers, p-value is often reported along with descriptive results of a study. The p-value shows the?
 - a. Probability of the null hypothesis being true
 - b. Probability of observing similar values in countless similar experiments
 - c. Probability of the observed value occurring due to chance if in fact the null hypothesis was false
 - d. Probability of the observed value occurring due to chance if in fact the null hypothesis was true

7. Organic farming means saying no to?
 - a. Organic fertilizers and plant-based pesticides
 - b. Inorganic fertilizers only
 - c. Chemical pesticides only
 - d. Inorganic fertilizers and chemical pesticides

8. Which of the following land category is no more in the Land Act 2007 of Bhutan?
 - a. Chuzhing
 - b. Tseri
 - c. Orchard
 - d. Kamzhing

9. Energy can neither be created, nor destroyed. This is the?
 - a. 1st Law of Thermodynamics
 - b. 2nd Law of Thermodynamics
 - c. 3rd Law of Thermodynamics
 - d. All of above

10. All thermal motion ceases at a temperature of?
 - a. 0⁰ Celcius
 - b. - 500⁰ Celcius
 - c. - 273.15⁰ Celcius
 - d. - 253.25⁰ Celcius

11. An earthquake that measures 7 on the Ritche scale is?
 - a. 3 times stronger than one that measures 6 on the Ritche scale
 - b. 1 times stronger than one that measures 6 on the Ritche scale
 - c. 10 times stronger than one that measures 6 on the Ritche scale
 - d. 27 times stronger than one that measures 6 on the Ritche scale

12. Analysis of Variance (ANOVA) is a kind of?
 - a. Parametric statistical test
 - b. Non- parametric statistical test
 - c. Geological term to categorize rocks
 - d. All of the above

13. One of the following is a measure of the spread of data?
- Mean
 - Mode
 - Standard deviation
 - Correlation coefficient
14. In an experiment to study effect of fertilizer levels on yield of rice, one would consider running a regression to predict yield of rice from fertilizer level. In such a situation, the variable yield of rice is?
- Independent variable
 - Multiplier variable
 - Dependant variable
 - Constant variable
15. Gibberic acid is a hormone that promotes one of the following in plants?
- Ripeness of fruit
 - Sweetness of fruit
 - Sourness of fruit
 - Growth of root and stem
16. Calcium in the body is associated with formation of?
- Bone
 - Blood
 - Saliva
 - Urine
17. The form in which nitrogen is absorbed from soil by plants is mostly as?
- Nitrates
 - Nitrogen
 - Nitrites
 - Nitrous oxide
18. Soils that are rich in iron usually exhibit?
- Yellowish colour
 - Reddish colour
 - Blackish colour
 - Grey colour
19. Foot and Mouth Disease (FMD) is a viral disease that affects?
- Only cattle
 - Cattle and other cloven-hoofed animals
 - Only horses
 - Horses and other species of equines

20. C4 plants are more efficient than C3 plants under?
- Cool and moist conditions with normal light intensity
 - Hot and dry conditions with high light intensity
 - Very cold frigid conditions such as Siberian Tundra-type ecology
 - All of above
21. Which one of the following is not a greenhouse gas?
- CO₂
 - CH₄
 - SO₂
 - N₂O
22. Laughing gas is synonymous with which of the following gases?
- Sulphurdioxide
 - Ammonium sulphide
 - Hydrogen per oxide
 - Nitrous oxide
23. Zero degree Celsius is equal to?
- 12 degrees Fahrenheit
 - 22 degrees Fahrenheit
 - 32 degrees Fahrenheit
 - 42 degrees Fahrenheit
24. A spectrometer is an instrument to measure?
- Atmospheric pressure
 - Sound waves
 - Slope of a gradient
 - None of above
25. Which of the following is a part of the female organ in plant?
- Sepal
 - Stigma
 - Anther
 - Filament
26. Radish is a vegetable that comes from the family of?
- Cruciferae
 - Brassicaceae
 - Umbelliferae
 - Alliaceas

27. Coprophagy is a term used for animals that?
- Eat their own faeces
 - Eat their young ones
 - Give birth to multiple offsprings
 - Can hear sounds which humans cannot
28. Ohm is a unit to measure?
- Magnetic field strength
 - Electrical resistance
 - Electrical conductivity
 - Tensile strength
29. Albert Einstein postulated the theory of?
- Big Bang
 - Relativity
 - Central limit theorem
 - Survival of the fittest
30. Which of the following hormones is released by a pig, when it is under stress?
- Cortisone
 - Insulin
 - Cortisol
 - Oestrogen
31. Which of the following cell organelle may be referred to as “power house” of the cell?
- Mitochondria
 - Golgi apparatus
 - Vacuole
 - Nucleus
32. Pasteurization of milk is a process in which milk is?
- Heated to at least 72°C for about 16 seconds and then cooled to 4°C
 - Heated to at least 82°C for about 16 seconds and then cooled to 4°C
 - Heated to at least 92°C for about 16 seconds and then cooled to 4°C
 - Heated to at least 100°C for about 16 seconds and then cooled to 4°C
33. A representative sample is taken from a population to draw inference about the population. Sampling error is a statistical term that denotes the?
- Error due to staff entering the wrong data in the dataset
 - Error made by the researcher in taking the wrong sample
 - Difference between the sample statistic and the population parameter
 - All of above

34. *Oryza sativa* is the scientific name for?
- Wheat
 - Rice
 - Maize
 - Oat
35. Pig iron is an alloy composed of?
- Iron and carbon
 - Iron and nickel
 - Iron and tin
 - Iron and mercury
36. A metabolic pathway in which complex molecules break down into simpler ones is called?
- Catabolism
 - Anabolism
 - Hydrolysis
 - A combination of (a) and (b)
37. The concept of t-distribution in statistics is credited to?
- Fisher
 - Gosset
 - Gregor Mendel
 - Michael Faraday
38. The phenomenon of a single major gene affecting more than one character is known as?
- Entropy
 - Penetrance
 - Pleiotropy
 - Heritability
39. The statistics which measures the relationship between two or more variables is known as?
- Mode
 - Fisher's critical value
 - Standard deviation
 - Correlation coefficient
40. Which of the following is the chemical formula of pentose sugar?
- $C_3H_6O_3$
 - $C_4H_8O_4$
 - $C_5H_{10}O_5$
 - HCN

41. Some amino acids such as arginine are called essential amino acids because they
- Are highly essential for the animal to live?
 - Can be synthesized by the animal and is not necessary to be in the diet
 - Cannot be synthesized by the animal and therefore must be present in the diet
 - They are essential for formation of bones
42. A piece of wire of resistance R is stretched uniformly so that its length is doubled. The resistance of the stretched wire will be?
- $2R$
 - $R/2$
 - $4R$
 - $R/4$
43. The phenomenon of radioactivity is?
- Fusion of the nucleus
 - Fission of the nucleus
 - Disintegration of the nucleus
 - Nuclear reaction caused by cosmic radiation
44. The control rods in a nuclear reactor are made of?
- Graphite
 - Uranium
 - Cadmium
 - Plutonium
45. The forces present among the carbon atoms of diamond are?
- Ionic bond
 - Metallic bond
 - Covalent bond
 - Vanderwaal's force
46. Buffer solution is a mixture of?
- Weak base and weak acid
 - Weak base and strong acid
 - Weak acid and conjugate acid
 - Weak acid and its conjugate base
47. Myopia can be corrected by?
- Convex lens.
 - Concave lens.
 - Cylindrical lens.
 - Cornea replacement.

48. The branch of biology that deals with reptiles and amphibians is?
- Herpetology
 - Ornithology
 - Ichthyology
 - Ethology
49. The total number of bones in an adult human body is?
- 150
 - 206
 - 306
 - 366
50. The Constitution of Bhutan mandates a minimum forest cover of?
- 72.5 % of the total land area
 - 60% of the total land area
 - 60% of the total forest area
 - None of the above
51. Which of the following is not a totally protected species in Bhutan:
- Blue poppy
 - Takin
 - Himalayan Yew
 - None of the above
52. *Lycopersicon esculentum* is the scientific name for which common vegetable?
- Turnip
 - Cabbage
 - Tomato
 - Gourd
53. The branch of biology that studies the cellular aspects of heredity (especially the chromosomes) is known as?
- Microbiology
 - Cytomorphology
 - Micology
 - Cytogenetics
54. One of the following is not under the five-kingdom classification system?
- Monera
 - Fungi
 - Plantae
 - Bacteria

55. The flow of genetic information from nucleic acid to protein is called?
- Transportation
 - Transcription
 - Transpiration
 - None of the above
56. Western Blot test is used in the diagnosis of?
- SARS
 - Avain flu
 - Brain cancer
 - AIDS
57. Pedology refers to the study of?
- Soil
 - Air
 - Water
 - Children
58. The plant involved in sericulture is?
- Wild rose
 - Mulberry
 - Cotton
 - Bamboo
59. A plant cell is distinguished from an animal cell by the presence of?
- Cell wall
 - Cell body
 - Cell membrane
 - None of the above
60. Who introduced binomial nomenclature?
- Darwin
 - Whittaker
 - Linnaeus
 - Einstein
61. Distinction between a plant and animal cell lies in?
- Photosynthesis
 - Transpiration
 - Respiration
 - Translocation
62. In relation to climate change, REDD is an acronym for?
- Reducing emissions from deforestation and degradation
 - Reducing emissions from deforestation and devastation
 - Reducing emissions from death and decay
 - Reducing energy from deforestation and damages

63. The smallest unit of genetic material capable of undergoing mutation is?
- Cistron
 - Recon
 - Muton
 - Proton
64. The percentage of protected area network including biological corridors in Bhutan is?
- 33% of the total land area
 - 45% of the total land area
 - 51.24% of the total land area
 - 54.12% of the total land area
65. Which chemical is used for preserving biological specimens in laboratories?
- Acetaldehyde
 - Formaldehyde
 - Picric acid
 - Carbonmonoxide
66. The raw material for manufacture of paper is?
- Pectin
 - Cellulose
 - Cytosin
 - Melalin
67. The element used in valcanising rubber is?
- Nitrogen
 - Oxygen
 - Sulphur
 - Phosphorus
68. Rectified spirit is 95%?
- Methanol
 - Ethanol
 - Aldehyde
 - Ketone
69. Bhutan declared to remain “carbon neutral” under the framework of UNFCCC in?
- 1990
 - 2005
 - 2009
 - 2010
70. Sustainable forest management in Bhutan is governed by a code of best practices known as?
- Forestry master plan
 - Sustainable forestry code
 - Forest management code
 - Code of forest management practices

PART B (30 Marks)

Special Instruction: Answer all the 10 questions. Write your answers in the answer book provided.

1. Give the site of secretion, not synthesis, of the following hormones:
 - a. Antidiuretic hormone
 - b. Insulin
 - c. Relaxin

2. Name one function and one deficiency symptom of each of the following in plants:
 - a. Nitrogen
 - b. Iron
 - c. Molybdenum

3. Name the causative organisms and symptoms of the following diseases:
 - a. Diphtheria
 - b. Leprosy
 - c. Influenza H1N1

4. Name the endocrine glands that secrete the following hormones
 - a. Thyroxin
 - b. Cortisol
 - c. Insulin

Write short notes on the following with reference to Bhutan:

5. Conservation and protected area system
6. Organic farming policy and benefits
7. Potential impacts of climate change
8. The current policy on export of timber and its implications
9. Potential benefits of G2C initiatives
10. Renewable energy and associated advantages