

**ROYAL CIVIL SERVICE COMMISSION  
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2025  
EXAMINATION CATEGORY: TECHNICAL**

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<b>Date</b>	:	October 10, 2025
<b>Total Marks</b>	:	100
<b>Writing Time</b>	:	90 minutes (1.5 hours)
<b>Reading Time</b>	:	15 Minutes (prior to writing time)

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**GENERAL INSTRUCTIONS:**

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is to check the number of pages of the Question Paper, printing errors, clarify doubts and to read the instructions. You are NOT permitted to write during this time.
3. This paper consists of **TWO Parts: Part I & 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 should be written on the Answer Booklet provided to you. Candidates are not allowed to write anything on the question paper. If required, ask for additional Answer Booklet.
6. **All answers should be written with correct numbering of Section, Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating any or correct Section, Part and Question Number will NOT be evaluated and no marks would be awarded.**
7. Begin each Part on 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. Use of any other paper including paper for rough work is not permitted.
10. **You must hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
11. This paper has **12 printed pages**, including this instruction page.

**GOOD LUCK**

PART I

MULTIPLE CHOICE QUESTIONS

(70 MARKS)

Choose the correct answer and write down the letter corresponding to the correct answer chosen in the Answer Booklet against the question number. E.g. 71 (a). Each question carries ONE mark. Answering questions with more than one choice will not be evaluated.

1. In monocot roots, which type of vascular bundles are found?
  - a) Collateral, conjoint and closed
  - b) Radial with exarch xylem
  - c) Bicollateral, conjoint and closed
  - d) Radial with endarch xylem
2. The inner, darker and harder portions of secondary xylem that cannot conduct water in an older dicot stem is called:
  - a) Alburnam
  - b) Bast
  - c) Wood
  - d) Duramen
3. Which of the following is not a characteristic feature of bryophytes?
  - a) Vascular tissues
  - b) Amphibious habitat
  - c) Dominant gametophytic generation
  - d) Filamentous rhizoids
4. Which type of movement is present in *Mimosa pudica*?
  - a) Nyctinastic
  - b) Chemonastic
  - c) Seismonastic
  - d) Phototropic
5. Importance of day length in flowering of plants was first shown in:
  - a) Lemna
  - b) Tobacco
  - c) Cotton
  - d) Petunia
6. Which of the following induces flowering in long day plants?
  - a) Gibberellins
  - b) Ethylene
  - c) Auxin
  - d) Cytokinin

7. The deteriorative processes in plants that naturally terminate their functional life are collectively called:
  - a) Wilting
  - b) Plasmolysis
  - c) Senescence
  - d) Abscission
  
8. The type of placenta found in human beings is called:
  - a) Diffuse
  - b) Zonary
  - c) Cotyledonary
  - d) Discoidal
  
9. The embryo at 16-celled stage is known as:
  - a) Morula
  - b) Gastrula
  - c) Blastula
  - d) Blastomere
  
10. A common scent-producing gland among mammals is:
  - a) Anal gland
  - b) Prostate gland
  - c) Adrenal gland
  - d) Bartholin's gland
  
11. 4.0 g of NaOH is dissolved in 100 ml of distilled water. The normality of the solution is:
  - a) 0.1 N
  - b) 0.5 N
  - c) 0.2 N
  - d) 1.0 N
  
12. In a reversible reaction, rates of both sides of a reaction are:
  - a) Same
  - b) Different
  - c) Product side more
  - d) Reactant side more
  
13. The rate of chemical reaction does not depend upon:
  - a) Catalyst
  - b) Pressure
  - c) Concentration
  - d) Temperature

14. Which part of ovary in mammals acts as an endocrine gland after ovulation?
- Vitelline membrane
  - Graafian follicle
  - Stroma
  - Germinal epithelium
15. Bartholin's gland of female corresponds to which glands in male?
- Prostate glands
  - Rectal glands
  - Cowper's glands
  - Inguinal glands
16. Faraday's laws of electrolysis are related to the:
- Atomic number of the cation
  - Atomic number of the anion
  - Speed of the cation
  - Equivalent weight of the electrolyte
17. In the electrolytic cell, flow of electrons is from:
- Cathode to anode in solution
  - Cathode to anode through external supply
  - Cathode to anode through internal supply
  - Anode to cathode through internal supply
18. In human body, an organ capable of extensive regeneration is:
- Kidney
  - Liver
  - Thymus
  - Spleen
19. Growth at the end of childhood and during puberty is controlled by:
- Thyroxin
  - Thymosin
  - Somatotropic hormone
  - Thyroxin and somatotropic hormones
20. Which is common to kidney and skeleton in mammals?
- Cortex
  - Medulla
  - Pelvis
  - Radius

21. Which one is the weakest base?
- $\text{NH}_3$
  - $\text{CH}_3\text{NH}_2$
  - $(\text{C}_2\text{H}_5)_2\text{NH}$
  - $(\text{CH}_3)_3\text{N}$
22. Which of the following is obtained when an alkyl halide reacts with alcoholic silver cyanide?
- Alkyl cyanide
  - Alkanamine
  - Alkane
  - Carbylamine
23. The vascular cambial ring of dicot stem is:
- Primary in origin
  - Secondary in origin
  - Embryonic in origin
  - Partly primary and partly secondary in origin
24. Which is NOT a characteristic of plant cell walls?
- Found only in the sporophyte phase of life cycle
  - Among other compounds contain compounds built of simple sugars
  - May contain enzymes that are biologically active
  - Often contain strengthening polymers
25. Substitution reactions of benzene are mainly:
- Free radical
  - Electrophilic
  - Nucleophilic
  - None of the above
26. Which of the following monosaccharides is a pentose?
- Glucose
  - Fructose
  - Arabinose
  - Galactose
27. Stroma in the chloroplasts of higher plants contains:
- Light-independent reaction enzymes
  - Light -dependent reaction enzymes
  - Ribosomes
  - Chlorophyll
28. Which of the following is a branched chain structure?
- Amylose
  - Amylopectin
  - Cellulose
  - Nylon

29. The name of Norman Borloug is associated with:
- White revolution
  - Green revolution
  - Yellow revolution
  - Blue revolution
30. In CAM-plants, carbon dioxide acceptor is:
- RuBP
  - PGA
  - PEP
  - OAA
31. Hexose monophosphate pathway takes place in:
- Endoplasmic reticulum
  - Cristae
  - Mitochondrial matrix
  - Cytoplasm
32. A solution of ethanol in water forms:
- An ideal solution
  - Conjugate solution
  - Minimum boiling azeotrope
  - Maximum boiling azeotrope
33. "The ratio of the concentration of a solute between two liquid phases is constant at a given temperature." This statement is called:
- Henry's law
  - Raoult's law
  - Kirchoff's law
  - Distribution law
34. Wind pollination is common in:
- Legumes
  - Lilies
  - Grasses
  - Orchids
35. One of the most resistant known biological materials is:
- Lignin
  - Hemicellulose
  - Lignocellulose
  - Sporopollenin

36. Which of the following is not vestigial organ in human?
- Tail vertebrae
  - Nails
  - Nictitating membrane
  - Vermiform appendix
37. The  $\alpha$ -D-glucose and  $\beta$ -D-glucose differ from each other due to difference in carbon atom with respect to its:
- Conformation
  - Configuration
  - Number of OH groups
  - None of the above
38. Distribution law was given by:
- Van't Hoff
  - Raoult
  - Nernst
  - Zigmondy
39. In thin layer chromatography, stationary phase is:
- Liquid
  - Gas
  - Filter paper
  - Solid
40. In callus culture, roots can be induced by supply of:
- Auxin
  - Cytokinin
  - Gibberellin
  - Ethylene
41. Which term is used to describe the component isolated from a plant for *in vitro* culture?
- Callus
  - Embryoid
  - Synthetic seed
  - Explant
42. Which of the following is not a colligative property?
- Elevation in boiling point
  - Osmotic pressure
  - Optical activity
  - Relative lowering of vapour pressure

43. Carbon-14 dating method is based on the fact that:
- Carbon-14 fraction is same in all objects
  - Carbon-14 is highly insoluble
  - Ratio of carbon-14 and carbon-12 is constant
  - All the above
44. Amphivasal vascular bundle possesses:
- Xylem around phloem
  - Phloem around xylem
  - Phloem on both sides of xylem
  - Phloem towards centre and xylem towards periphery
45. Which tissues gives rise to secondary growth?
- Apical meristem
  - Adventitious roots
  - Germinating seed
  - Vascular cambium
46. Ontology recapitulates phylogeny. This theory is called:
- Biogenetic law
  - Law of embryology
  - Law of acquired characters
  - Law of bridges
47. Organisms called Methanogens are most abundant in a
- sulphur rock.
  - cattle yard.
  - polluted stream.
  - hot spring.
48. Reagent which reacts with both acetaldehyde and acetone is:
- Fehling
  - Grignard
  - Schiff's
  - Tollen's
49. The action of nitrous acid on an aliphatic primary amine gives:
- Alcohol
  - Alkyl nitrite
  - Secondary amine
  - Nitro alkane

50. Energy is produced in a nuclear reactor by:
- Controlled fusion
  - Uncontrolled fusion
  - Controlled fission
  - Uncontrolled fission
51. The process of decay of dead organic matter is known as:
- Denitrification
  - Nitrification
  - Nitrogen fixation
  - Ammonification
52. Which of the following metals causes harmful effects:
- Lead
  - Arsenic
  - Uranium
  - All of these metals
53. Somatic hybridisation can be done by:
- Protoplast fusion
  - Haploid anther
  - Cell culture
  - Pollen culture
54. The following is used to get desired breed of plants:
- Tissue culture
  - Genetic engineering
  - Inbreeding
  - None of the above
55. The undifferentiated cells in the adult which retain the power to divide are called:
- Meristematic cells
  - Postmitotic cells
  - Stem cells
  - All the above
56. An  $\alpha$ -particle is identical with:
- Proton
  - Neutron
  - Electron
  - Helium nucleus
57. Which of the following does not contain volume?
- Molarity
  - Molality
  - Normality
  - Formality

58. The mechanism of regeneration in which body parts are regenerated through the proliferation of cells is:
- Reparative regeneration
  - Restorative regeneration
  - Epimorphosis
  - Morphallaxis
59. Transfer of pollen grains from one flower to another flower of same plant is:
- Geitonogamy
  - Autogamy
  - Allogamy
  - Cleistogamy
60. Oxygenic photosynthesis occurs in:
- Chromatium*
  - Oscillatoria*
  - Rhodospirillum*
  - Chlorobium*
61. The pH of  $1.0 \times 10^{-4}$  M solution of HCl is:
- 6
  - 5
  - 4
  - 3
62.  $\text{NH}_3$  dissolves in  $\text{H}_2\text{O}$  to give  $\text{NH}_4\text{OH}$ . In this reaction water acts as:
- An acid
  - A base
  - A salt
  - A conjugate base
63. Which pair is essential for the growth of fish in water?
- Nitrates and sulphates
  - Sulphonates and carbonates
  - Calcium and phosphorus
  - Carbonates and phosphates
64. Which of the following cell organelles is associated with photorespiration?
- Mitochondria
  - Peroxisome
  - Chloroplast
  - All the above

65. Process of vernalisation can be induced by:
- Cytokinin I
  - Auxin
  - Ethylene
  - Gibberellic acid
66. An apparatus used for the measurement of quantity of electricity is known as:
- Calorimeter
  - Cathetometer
  - Coulometer
  - Colorimeter
67. The high density of water compared to ice is due to:
- Hydrogen bonding interaction
  - Dipole-dipole interaction
  - Dipole induced dipole interaction
  - Induced-dipole induced dipole interaction
68. Which of the following is bacterium involved in denitrification?
- Nitrosomonas*
  - Pseudomonas*
  - Azotobacter*
  - Nitrobacter*
69. Haemophilia is more commonly seen in human males than in human females because:
- This disease is due to an X-linked dominant mutation
  - This disease is due to Y-linked recessive mutation
  - This disease is due to an X-linked recessive mutation
  - This disease is due to Y-linked dominant mutation
70. Which of the following is the formula of chlorophyll *a*?
- $C_{55}H_{77}O_2N_4Mg$
  - $C_{55}H_{72}O_5N_4Mg$
  - $C_{45}H_{70}O_5N_4Mg$
  - $C_{55}H_{72}O_2N_4Mg$

**PART II**

**SHORT ANSWER QUESTIONS**

**(30 MARKS)**

**ANSWER ALL THE FOLLOWING 10 SHORT ANSWER QUESTIONS (3 MARKS EACH)**

1. Animal cells get ruptured when placed in distilled water or hypotonic solution but not the plant cells. Why? **(3 marks)**
2. Why is bile juice important in digestion of food when it has no digestive enzymes? **(3 marks)**
3. Calculate the pH value of a solution whose hydrogen ion concentration is 0.005 mole/litre. **(3 marks)**
4. What is the utility of carotenoids to plants? **(3 marks)**
5. Name the endocrine gland that secretes calcitonin. What roles are played by this hormone? **(3 marks)**
6. State phase rule and explain the terms: phase, component and degree of freedom. **(3 marks)**
7. Explain the role played by phytochrome in seed germination. **(3 marks)**
8. Name the hormones which increase and decrease the rate of photosynthesis. **(3 marks)**
9. Carbohydrates can be broadly divided into three classes. Name the classes and briefly describe them. **(3 marks)**
10. Root hairs are not trichomes, while epidermal hairs on stem are called trichomes. Why? **(3 marks)**

**TASHI DELEK**