

ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2018
EXAMINATION CATEGORY: TECHNICAL

PAPER II: GENERAL SUBJECT KNOWLEDGE PAPER FOR MEDICAL SCIENCE

Date	: 6 October 2018
Total Marks	: 100
Writing Time	: 90 minutes (1 hour 30 mins)
Reading Time	: 15 Minutes (prior to writing time)

GENERAL INSTRUCTIONS:

1. Write your Registration Number clearly and correctly on the Answer Booklet.
2. The first 15 minutes is being provided to check the number of pages of 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 Part and Question Number in the Answer Booklet provided to you. Note that any answer written without indicating correct Part and Question Number will NOT be evaluated and no marks will 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. Use of any other paper including paper for rough work is not permitted.
10. **You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.**
11. This paper has **13 printed pages**, including this instruction page.

GOOD LUCK

PART I

Multiple Choice Questions (70 marks)

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

1. Which is not a characteristic of plant cell walls?
 - a. Found only in the sporophyte phase of life cycle
 - b. Among other compounds, it also contains simple sugar
 - c. Contains biologically active enzymes
 - d. Contains strengthening polymers

2. Choose the incorrect cause of absorption of water by the plant roots:
 - a. Transpiration pull force
 - b. Osmotic pressure of the soil water
 - c. Non osmotic pressure of the root hairs
 - d. High Turgor Pressure of a plant cell

3. All the following are micronutrients required for the growth of plants EXCEPT:
 - a. Iron
 - b. Copper
 - c. Zinc
 - d. Magnesium

4. Nitrogen fixation in leguminous plants is example of:
 - a. Pathogenic plant infection with bacteria
 - b. Parasitic infection of plants
 - c. Synthesis of proteins required for plant growth
 - d. Symbiotic plant infection with bacteria

5. Choose the intestinal parasite that causes anemia in infected people:
 - a. *Ancylostoma duodenale*
 - b. *Enterobius vermicularis*
 - c. *Giardia lamblia*
 - d. *Trichuris trichiuria*

6. Choose the correct products of the photosynthesis:
 - a. $C_6H_{12}O_6 + 6H_2O + 6O_2$
 - b. $6C_6H_{12}O_6 + 6H_2O + 6O$
 - c. $2C_6H_{12}O_6 + 6H_2O + 6CO_3$
 - d. $C_6H_{12}O_6 + 6H_2O + 6CO_2$

7. Choose the correct function of chloroplast?
 - a. Rigidity and protection of plant cells
 - b. Takes part in plant cell division
 - c. Acts as food processing unit in the plant cells
 - d. Function as power house of the plant cells

8. Allergic reaction involves activation of:
 - a. Macrophages
 - b. T & B lymphocytes
 - c. Mast cells
 - d. Platelets

9. Choose the chemical which is most commonly used as food flavor enhancer as tasting powder:
 - a. Potassium bicarbonate
 - b. Sodium bicarbonate
 - c. Monosodium glutamate
 - d. calcium glutamate

10. Prokaryotic cells differ from eukaryotic cells due to:
 - a. Mode of cell division
 - b. Shape and size of the cells
 - c. Motility of the cells
 - d. Unicellular in nature

11. All the following are haemoparasites EXCEPT:
 - a. Plasmodium species
 - b. Leshmania species
 - c. Trichomonas species
 - d. Wuchereria bancrofti

12. The chemical composition of Bleaching powder is:
 - a. Magnesium bicarbonate
 - b. Sodium Carbonate
 - c. Calcium Bicarbonate
 - d. Calcium Hypochloride

13. Biogas Project initiated by Tarayana foundation has greatly benefited many rural families in Bhutan. Which of the following gases constitutes the highest quantity of gas produced by the biogas plant?
 - a. Carbon dioxide
 - b. Hydrogen
 - c. Nitrogen
 - d. Methane

14. Body pain following a strenuous exercise is due to:
 - a. Accumulation of uric acids
 - b. Break down of citric acid
 - c. Formation of lactic acid
 - d. All the above

15. Buffer solution is a mixture of:
 - a. weak base and weak acid
 - b. weak base and strong acid
 - c. weak acid and conjugate acid
 - d. weak acid and conjugate base

16. The building blocks of protein is:
 - a. Amino acids
 - b. Atom
 - c. Elements
 - d. Molecule

17. The vitamin which helps in synthesis of retinal rhodopsin is:
 - a. Vitamin A
 - b. Vitamin K
 - c. Vitamin B Complex
 - d. Vitamin D

18. Common bacteria that cause food poisoning in Bhutan is:
 - a. E. coli
 - b. Salmonella
 - c. Shigella
 - d. Staphylococcus species

19. All the following are functions of adipose tissue EXCEPT:
 - a. Insulation for the body
 - b. Food reserve for the body
 - c. Shock absorber of various organs
 - d. Packing tissues for the organs

20. Choose wrongly matched pair from the following:
 - a. Squamous epithelium – Buccal cavity
 - b. Cuboidal epithelium - Glands
 - c. Ciliated columnar epithelium-Bronchus
 - d. Stratified Squamous epithelium – esophagus

21. The largest bone in the human body is:
- Skull
 - Tibia
 - Fibula
 - Femur
22. Which part of the human brain is concerned with the intelligence?
- Medulla oblongata
 - Cerebellum
 - Cerebrum
 - Hypothalamus
23. Which of the following hormones is responsible for fight-or-flight response?
- Adrenaline
 - serotonin
 - Oxytocin
 - Rennin
24. The most accurate normal pH range of the human blood is:
- 7.00-7.50
 - 7.50-8.00
 - 7.35-7.45
 - 7.10-7.90
25. Which of the following is responsible for connecting muscles to bone?
- Tendon
 - Fibrous cartilage
 - Hyaline cartilage
 - Ligament
26. Choose the universal blood donor:
- Healthy person with O positive blood group.
 - Healthy person with O negative blood group.
 - Health person with AB positive blood group.
 - Health person with AB Negative blood group.
27. Function of Molar teeth is:
- Grinding
 - Cutting
 - Tearing
 - All the above

28. Which one of the following descriptions is INCORRECT about the tympanic membrane?
- It is a thin flap of skin acts as sound receiver
 - vibrates when sound hits it
 - send vibrations to the inner ear
 - Act as protection for the inner ear
29. The recent estimated number of neurons in human brain is:
- 100 billion
 - 101 billion
 - 120 billion
 - 150 billion
30. The world's TB Day is observed on:
- 24th March
 - 1st April
 - 1st December
 - 28th September
31. Drought, flood and famine are the consequences of:
- Global warming
 - Landslides and soil erosion
 - Cyclones
 - Earthquake
32. Saponification is the example of:
- Oxidation
 - Reduction
 - Hydrolysis
 - distillation
33. Epiphysis is seen at the end of:
- Flat bones
 - Long bones
 - Short bones
 - Sesamoid bones
34. Illness accompanied by rice water stool is one of the symptoms of:
- Typhoid
 - Dysentery
 - Cholera
 - Malaria

35. The primary ions involved in acid-base balance of the body is:
- H^+ only
 - HCO_3^- only
 - H^+ & HCO_3^-
 - PO_4 only
36. A catalyst is:
- Consumed in reaction
 - Produced in reaction
 - Not affected in reaction
 - Undergoes chemical change
37. Lead pencils contain:
- Lead
 - Lead sulphate
 - Graphite
 - Carbon
38. Two isotonic solutions have the same:
- Vapor pressure
 - Osmotic pressure
 - Freezing point
 - Boiling point
39. Non-volatile solid is added to the water. The boiling point of water is:
- Decreased
 - Increased
 - Remained same
 - Can't be predicted
40. The net electric charge of an isolated system will always remain constant. It is called
- Coulomb's law
 - Faraday's law
 - Law of conservation of charge
 - Ohms Law
41. Choose the incorrect effect of resistance of a conductor:
- Directly proportional to the length of conductor
 - Inversely proportional to the cross section of the conductor
 - Directly proportional to the temperature
 - Directly proportional to the density of electrons in the conductor

42. The Wave length of X-ray is:
- 0.01 to 10 nm
 - 10^{-13} - 10^{-12} nm
 - 0.01 – 0.05 nm
 - 10^{-5} - 10^{-10} nm
43. The unit of an electric charge is:
- Coulomb
 - Watt
 - Electron volt
 - ampere
44. The current passing through a conductor is proportional to the voltage over the resistance. It is called:
- Joule' Law
 - Coulomb's Law
 - Ohm's Law
 - None of the above
45. All the following are properties of convex lens EXCEPT:
- Converges parallel rays to a focal point.
 - Have positive focal lengths.
 - Forms a small virtual image.
 - Used in the correction of hypermetropia.
46. Every particle attracts every other particle in the universe with a force which is directly proportional to the product of their masses and inversely proportional to the square of the distance between their centers. It is the statement of:
- Newton's First Law
 - Newton's Second Law
 - Newton's Third Law
 - Newton's law of universal gravitation
47. A 8 kg mass and 4 kg are moving with equal kinetic energies. The ratio of the magnitudes of their linear momentum is:
- 1 : 2
 - 1 : 1
 - 2 : 1
 - 4 : 1
48. Lead is used for protection from X-Ray due to its:
- Hardness in nature
 - Ability of electrons absorption & scattering of energy
 - Poisonous in nature
 - Ductility and malleability.

49. Generation of hydroelectricity is the most suitable example for the conversion of:
- Natural energy into electrical energy
 - Mechanical energy into electrical energy
 - Potential energy into kinetic energy
 - Potential energy into electrical energy
50. The type of pulleys used for hoisting the national flag is:
- Fixed pulley
 - Movable pulley
 - Compound pulley
 - Combination of all.
51. Choose the most insignificant functions of a rotary wing used in Helicopter:
- Generates the aerodynamic lift force
 - Supports the weight of the helicopter
 - Counteracts aerodynamic drag in forward flight
 - Helps in landing
52. Normality of the solution is defined as:
- The number of moles of a substance per liter of solution.
 - The number of moles of solute per kg of solvent.
 - The number of equivalent weights of solute per liter of solution.
 - Number of grams of solute per kilogram of solvent.
53. Which of the following electromagnetic radiation has the shortest wave length?
- Ultraviolet rays
 - X-Rays
 - Radio waves
 - Infrared
54. Two cells of 1.25V and 0.75V are connected in series. The effective voltage is:
- 0.75V
 - 1.25V
 - 2.0V
 - 0.5V
55. The ratio of resistance of 120W and 60W electric bulb is:
- 1/2
 - 2/3
 - 1/3
 - 4/9
56. Albumin is an example of:
- A simple protein
 - Conjugated protein
 - Derived protein
 - Water insoluble protein

57. The most common cooking gas used in Bhutan is:
- Liquid petroleum gas (LPG)
 - Octane Gas
 - Ethane Gas
 - Compressed Natural Gas (CNG)
58. The metal used to cast the statue of the Lord Buddha at Kuensel Phodrang in Thimphu is:
- bronze
 - Copper
 - Zinc
 - Brass
59. The bitter taste of a bittergourd is due to presence of chemical called :
- Oxalic acid
 - Tartaric acid
 - Formic acid
 - Cucurbitacin
60. All the following are correct for Chromosomes EXCEPT :
- Contains DNA genetic material
 - Present in the nucleus of only human cells
 - DNA wraps around the histone
 - Chromosomes exist in pairs
61. Choose the correct concentration of ethyl alcohol used as disinfectant in the hospitals.
- 90% ethyl alcohol
 - 100% ethyl alcohol
 - 70% ethyl alcohol
 - 50% ethyl alcohol
62. All the following are characteristics of a conductor EXCEPT:
- Cheap and widely available
 - High melting and boiling points
 - High tensile strength
 - Low density
63. The bactericidal agent present in tooth paste is:
- Bromine
 - Chlorine
 - Fluorine
 - Iodine
64. Which of the following vitamins is the least important for body immune system?
- Vitamin A
 - Vitamin C
 - Vitamin B complex
 - Vitamin E

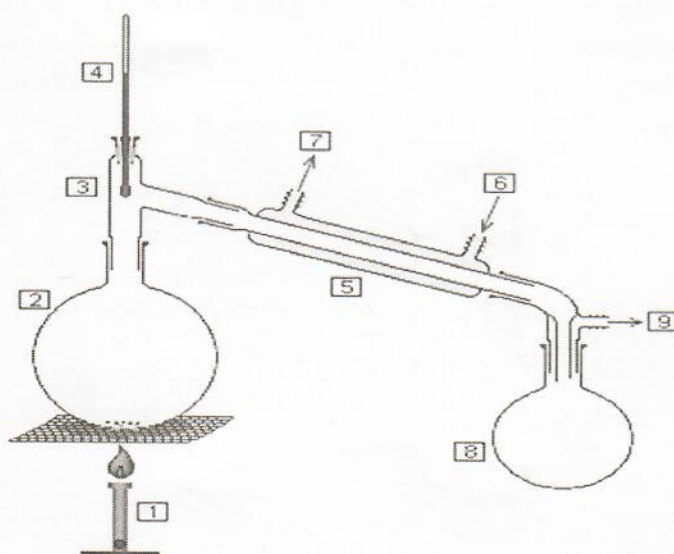
65. Chemical Formula for Baking Soda is:
- NaHCO_3
 - Na_2CO_3
 - KHCO_3
 - K_2CO_3
66. The addictive chemicals present in the tobacco is:
- Nicotine
 - Hydrogen cyanide
 - Formaldehyde
 - Benzene
67. Brass is a metallic alloy that is made of?
- copper and zinc
 - Copper lead
 - Lead and zinc
 - Copper and aluminum.
68. Which of the following sugar is present in sugar cane?
- Glucose
 - fructose
 - Sucrose
 - Galactose
69. Calcium is important for all the following synthesis?
- Bone formation
 - Tooth formation
 - Coagulation
 - Protein synthesis
70. All the following are correct about Sulphuric acid EXCEPT:
- Its chemical formula is H_2SO_4
 - It is highly corrosive
 - Acts as oxidizing agent
 - Its pH is slightly greater than 6

PART II

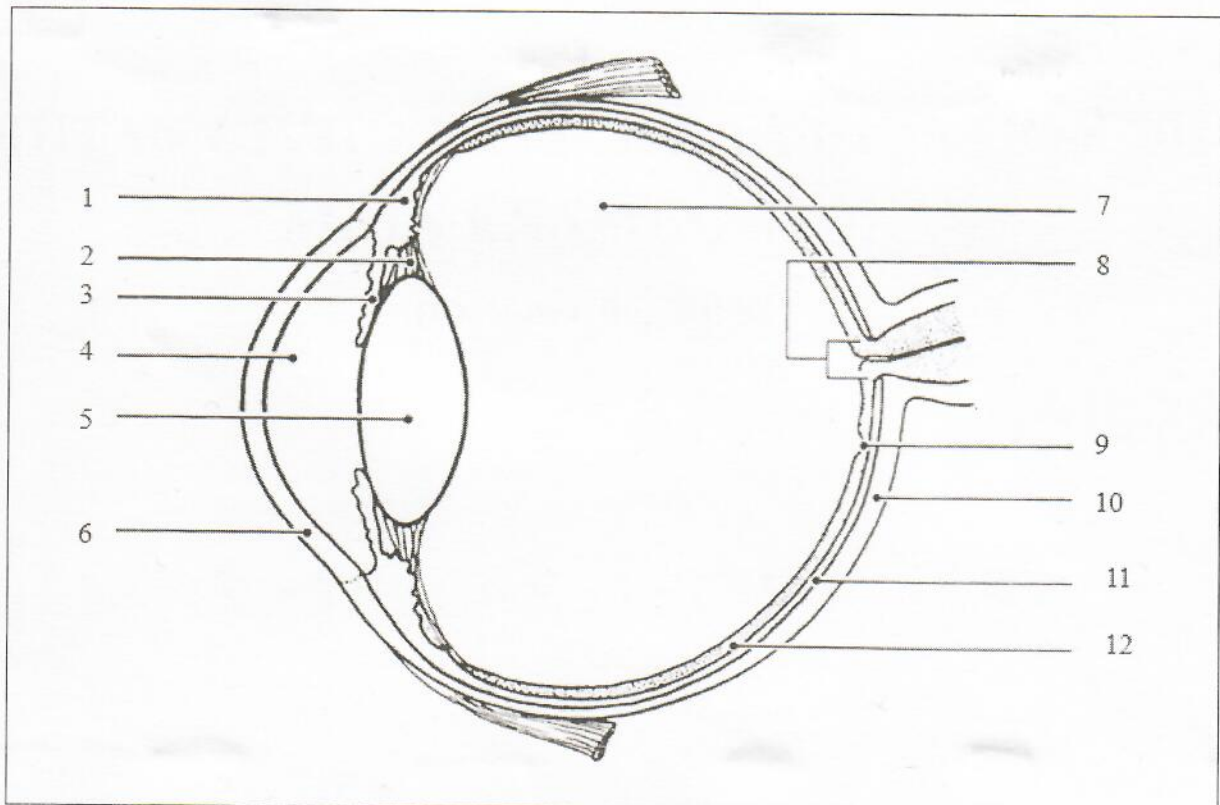
Short Answer Questions (30 marks)

Answer ALL 10 short answer questions. Each question carries 3 marks (M).

1. State the reasons for weighing the medical wastes generated at the hospitals in Bhutan before they are discarded. (3M)
2. According to the latest epidemiological report from the Ministry of Health, the Multi-Drug Resistant Tuberculosis (MDR-TB) cases have been increased in Bhutan. What could be the cause of increasing MDR-TB cases in the country? What are some preventive measures you would suggest the ministry of health to reduce the MDR-TB? (3M)
3. Bhutan's constitution mandates the need to keep a minimum of 60% forest cover which has been increased from 71% in 2015 to 80% in 2018. Explain its positive and negative indication in terms of socioeconomic development of the country. (3M)
4. Health Bulletin 2017 published by Ministry of Health reported highest adult death due to Alcoholic Liver Diseases (ALD). Explain the functions of liver. How does alcohol affect the liver? Explain some preventive measures to reduce the ALD in Bhutan. (3M)
5. Classify Carbohydrates based on structure and compositions and give at least three examples. (3M)
6. State the Laws of reflection and refraction and write down at least one application for each. (3M)
7. The diagram bellows shows a simple distillation plant. Write down the name of the parts labeled 1-9 (diagram need not be drawn). (3M)



8. State the specific function of each of the following: (3M)
- a) Pulmonary artery
 - b) Glomerulus
 - c) Islets of Langerhans
 - d) Patella
 - e) Gall bladder
 - f) Duodenum
9. From the diagram given bellow, write down the name of the parts of the human eye with correct sequence of the number 1-12 (diagram need not be drawn). (3M)



10. Oral health is one of the major problems in Bhutan due to which hundreds patients flood into the Department of Dentistry at JDWNRH. List down some common oral health problems prevailing in Bhutan. What are the preventive measures you suggest to improve the oral health of Bhutanese and name at least 5 tooth pastes considered the best to be suggested for use. (3M)

TASHI DELEK