

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2024
EXAMINATION CATEGORY: TECHNICAL**

PAPER II: GENERAL SUBJECT KNOWLEDGE PAPER FOR MEDICAL SCIENCE

Date	: October 4, 2024
Total Marks	: 100
Writing Time	: 90 minutes (1.5 hours)
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 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 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 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 must hand over the Answer Booklet/s 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 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. All the statements are correct regarding bacteria EXCEPT
 - a) Respiration, cell division and sporulation are the functions of mitochondria in bacteria.
 - b) Capsule in bacteria enables adherence to surface and protection against phagocytosis.
 - c) Heterotrophs are the bacteria that are unable to Synthesize their own food materials
 - d) All the above
2. Which of the follow is the important Macronutrient for the growth of plant?
 - a) Iron
 - b) Copper
 - c) Potassium
 - d) None of the above.
3. Which of the following is bisexual flower?
 - a) Corn
 - b) Mustard
 - c) Papaya
 - d) None of the above
4. Which of the following organism breathes through skin?
 - a) Snake
 - b) Fish
 - c) Earth worm
 - d) Snail
5. Which of the following is most resistant to sterilization?
 - a) Tubercle bacilli.
 - b) Viruses
 - c) Spores
 - d) Prions
6. Which of the following plant is not a root?
 - a) Carrot
 - b) Radish
 - c) Turnip
 - d) Potato
7. Most effective mode of transmission of HIV:
 - a) Sexual
 - b) Blood product
 - c) Needle/syringe
 - d) Mother of fetus

8. Food poison is caused by:
 - a) Clostridium perfringens
 - b) Clostridium botulism
 - c) Corynebacterium diphtherae
 - d) Clostridium tetani
9. Hand rub should not be used in which condition?
 - a) Before touching patient
 - b) After touching patient
 - c) After touching patient's surrounding
 - d) Hands are visibly soiled
10. How many moments of hand hygiene have been laid down by WHO?
 - a) 5 moments
 - b) 6 moments
 - c) 7 moments
 - d) 8 moments
11. Which antibody crosses placenta?
 - a) IgG
 - b) IGA
 - c) IgE
 - d) IgM
12. Best way of sterilizing disposable plastic syringes is:
 - a) UV rays
 - b) Autoclave
 - c) Gamma rays
 - d) Hot air oven
13. Dengue is caused by
 - a) Alphavirus
 - b) Bunyavirus
 - c) Flavivirus
 - d) Hantavirus
14. Aorta arises from A:
 - a) Right atrium
 - b) Left atrium
 - c) Right ventricle
 - d) Left ventricle
15. Which of the following cells is not a WBC?
 - a) Neutrophil
 - b) Basophil
 - c) Manocyte
 - d) Thrombocyte

16. Which of the following is known as 'bad cholesterol'?
- a) LDL
 - b) HDL
 - c) VLDL
 - d) Chylomicrons
17. Infections induced by a 'physician' is known as
- a) Iatrogenic
 - b) Nosocomial
 - c) Congenital
 - d) Subclinical
18. What is the major metabolically available storage form of iron in the body?
- a) Hemosiderin
 - b) Ferritin
 - c) Transferrin
 - d) Hemoglobin
19. The shape of a cell is maintained by which of the following?
- a) Microtubules
 - b) Spindle Fibers
 - c) Ribosomes
 - d) Centrioles
20. Which single feature of normal RBC's is most responsible for limiting their life span?
- a) Loss of mitochondria
 - b) Increased flexibility of the cell membrane
 - c) Reduction of Hb iron
 - d) Loss of nucleus
21. The most important practice in preventing the spread of disease is:
- a) Wearing masks during patient contact
 - b) Proper hand washing
 - c) Wearing disposable lab coats
 - d) Identifying specimens from known or suspected HIV and HBV patients with a red label
22. The most common type of protein found in the cell membrane is:
- a) Lipoprotein
 - b) Mucoprotein
 - c) Glycoprotein
 - d) Nucleoprotein
23. Strand of RNA is made of:
- a) Ribose sugar
 - b) Phosphate unit
 - c) Nitrogen base
 - d) Deoxyribose sugar
24. Which of the following activates more than 100 different enzymes?

- a) Vitamin A
 - b) Vitamin B
 - c) Vitamin C
 - d) Vitamin D
25. Which of the following are obtained from fruits, vegetables, and cereals?
- a) Monosaccharides
 - b) Sucrose
 - c) Cellulose
 - d) Starch
26. Which of the following is used to make rectified spirit by fermentation process?
- a) Cellulose
 - b) Starch
 - c) Glucose
 - d) Fructose
27. Plants convert glucose ($C_6H_{12}O_6$) in to:
- a) Starch only
 - b) Cellulose only
 - c) Glucose
 - d) Starch and cellulose
28. How many amino acids are synthesized by our bodies?
- a) 10
 - b) 20
 - c) 30
 - d) 40
29. Which of the following is the key to the ability of DNA to store genetic information and to pass it on from generation to generation?
- a) Double stranded structure of DNA
 - b) Deoxyribose sugar
 - c) Phosphate unit
 - d) Nitrogen base
30. Vitamin E is necessary for
- a) Eyes and skin
 - b) Energy production in cells
 - c) Antioxidant
 - d) Blood clotting
31. The vitamin which helps in chemical transmission of images from the eye to the brain is
- a) Vitamin A
 - b) Vitamin B
 - c) Vitamin C
 - d) Vitamin D
32. Specific organic compounds which are required by our bodies to prevent specific diseases but

- cannot be produced by our bodies are called
- a) Hydrocarbons
 - b) Carbohydrates
 - c) Proteins
 - d) Vitamins
33. Nutrition is derived by cows, cattle, goats, deer, sheep, and termites from
- a) Cellulose
 - b) Starch
 - c) Monosaccharides
 - d) Oligosaccharides
34. Human beings process 46 chromosomes divided as-
- a) 44 autosomes and 2 sex chromosomes
 - b) 46 are autosomes
 - c) 40 are autosomes and 6 sex chromosome
 - d) None of the above
35. The distance which is travelled by an average red blood cell during its approximately four months life span is equal to
- a) 300 km
 - b) 500 km
 - c) 1000km
 - d) 2000km
36. Phenotype is the expression of
- a) Genetic makeup
 - b) Physical makeup
 - c) Chemical composition
 - d) Metabolism
37. Latex gloves protect the Hospital employee from:
- a) Accidental needle puncture
 - b) Equipment handling injury
 - c) Patient aerosols
 - d) Body fluid
38. The part of the hand that should not be used while checking someone else's pulse is
- a) Index finger
 - b) Pinky finger
 - c) Central finger
 - d) Thumb
39. Emerging and re-emerging infectious diseases are characterized by all, EXCEPT-
- a) They have appeared for the first time or existed previously and presently increasing in incidence or Geographical range
 - b) They have developed resistance to drug
 - c) They are the result of increasing change in ecosystem, deforestation
 - d) They are seldom of Zoonotic origin

40. All of the following are vaccine preventable diseases EXCEPT:
- a) Measles
 - b) Hepatitis B
 - c) Dengue
 - d) Pertussis
41. A location with luxuriant growth of lichens on the trees indicates that the:
- a) trees are very healthy
 - b) trees are heavily infested
 - c) location is highly polluted
 - d) location is clean without pollution
42. The zone of atmosphere in which the most of the aeroplane fly is called:
- a) Ionosphere
 - b) Mesosphere
 - c) Stratosphere
 - d) Troposphere
43. How many deciduous teeth are present in humans?
- a) 32
 - b) 20
 - c) 26
 - d) 28
44. Iodine deficiency in human being can lead to
- a) Myxedema
 - b) Cretinism
 - c) Exophthalmic goiter
 - d) Simple goiter
45. The noble gases used in the electrical light bulbs are:
- a) Helium and neon
 - b) Neon and argon
 - c) Helium, neon and argon
 - d) Helium, neon and krypton
46. The material commonly used for manufacturing water pipe is
- a) Polystyrene
 - b) Terylene
 - c) Teflon
 - d) Polyvinyl chloride (PVC)
47. Brass is an alloy of:
- a) Ag & Mg
 - b) Mn & Ni
 - c) Cr and Co
 - d) Cu & Zn
48. The most common metals used for Dental braces is consist is

- a) Gold
 - b) Titanium
 - c) Stainless steel
 - d) Chrome
49. Which of these functions is the least important for proteins?
- a) Become blood osmotic proteins
 - b) Convert to enzymes
 - c) Utilization for energy
 - d) Component of structures
50. The World Health Day is celebrated on:
- a) 1st March
 - b) 7th April
 - c) 6th October
 - d) 10th December
51. Cleanliness, physical exercise, rest and sleep are a part of:
- a) Hygiene
 - b) Social hygiene
 - c) Personal hygiene
 - d) None of the above
52. Which of the following factors is necessary for a healthy person?
- a) Vaccination
 - b) Balanced diet
 - c) Personal hygiene
 - d) All of the above
53. The moles of solute divided by the mass of solvent in kilograms is termed as:
- a) Molality
 - b) Molarity
 - c) Moles
 - d) Equivalent weight
54. Why is it difficult to recycle plastics?
- a) It is very hard
 - b) It comes in different sizes
 - c) It is adhesive
 - d) It contains different types of polymer resins
55. Which of the following plans is used as a waste management plan?
- a) Plan for reuse
 - b) The integrated plan
 - c) Plan for recycling
 - d) Plan for reducing
56. Which of the following wastes is called the Municipal Solid Waste (MSW)?

- a) Food wastes
 - b) Wood pieces
 - c) Plastic cans
 - d) All of the above
57. The process of burning municipal solid wastes under suitable temperature and conditions in a specific furnace is called:
- a) Landfill
 - b) Incineration
 - c) Recycling
 - d) Vermicomposting
58. The burning of solid waste is not recommended because
- a) It is very costly
 - b) It requires a lot of space
 - c) It requires modern technologies
 - d) It causes several environmental issues
59. Whenever a conductor is placed in a varying magnetic field, an electromotive force is induced. It is called
- a) Coulomb's law
 - b) Faraday's law
 - c) Law of conservation of charge
 - d) Ohms Law
60. All the following statements are "TRUE" for the factors effecting resistance of a conductor EXCEPT:
- a) Directly proportional to the length of conductor
 - b) Inversely proportional to the cross section of the conductor
 - c) Directly proportional to the temperature
 - d) Inversely proportional to the density of electrons in the conductor
61. The unit of electrical current is:
- a) Coulomb
 - b) Watt
 - c) Electron volt
 - d) Ampere
62. Choose the correct definition of Osmosis:
- a) Movement of water molecules from a solution with a high concentration of water molecules to a solution with a lower concentration of water molecules through a partially permeable membrane of the cells.
 - b) Movement of water molecules from a less solute concentration to a high solute concentration through a semipermeable membrane.
 - c) Movement of molecules from a region of higher concentration to a region of lower concentration down the concentration gradient.
 - d) Random movement displayed by small particles that are suspended in fluids as a result of the collisions of the particles with other fast-moving particles in the fluid.

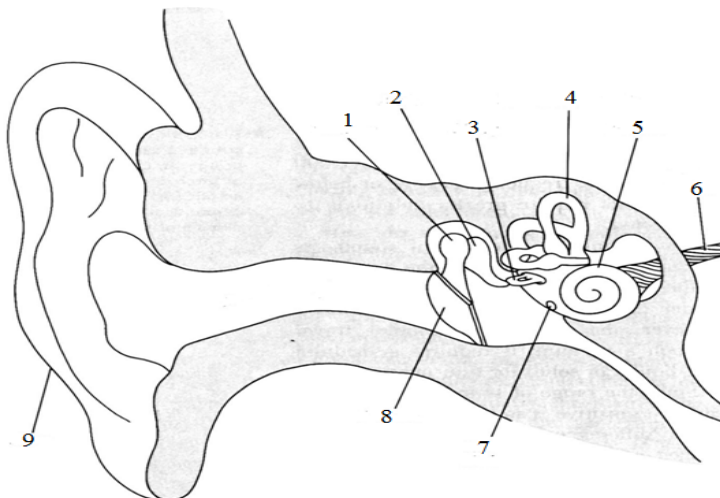
63. Choose the correct wavelength of X-ray which is commonly used electromagnetic radiation:
- a) 100-400 nm
 - b) 0.1-10 nm
 - c) 780 nm -1 mm
 - d) 0.000001-0.1 nm
64. For every action (force) in nature there is an equal and opposite reaction. It is called:
- a) Newton's First Law
 - b) Newton's Second Law
 - c) Newton's Third Law
 - d) Newton's law of universal gravitation
65. A 120 kg mass and 60 kg mass are moving with equal kinetic energies. The ratio of the magnitudes of their linear momentum is:
- a) 2 : 1
 - b) 1 : 2
 - c) 1 : 1
 - d) 4 : 1
66. The moving Turbine in hydroelectric power plant is an example of energy conversion from:
- a) Mechanical to electrical energy
 - b) Potential to mechanical energy
 - c) Potential to electrical energy
 - d) Electrical to mechanical energy
67. A simple device that is used either to break the electrical circuit or complete it is called
- a) Transistor
 - b) Switch
 - c) Capacitor
 - d) Transformer
68. Magnetism of the earth is due to:
- a) Doppler effect
 - b) Dynamo effect
 - c) Solar effect
 - d) Gravitational effect
69. If a current of 1.5 ampere is maintained a resistor of 10 ohms, then the energy dissipated in the resistor in 1 minute is:
- a) 1350 W
 - b) 22.5 W
 - c) 135 W
 - d) 125 W
70. A stone is dropped from the roof of house to the ground. The kinetic energy of the stone will be maximum:
- a) Just after it is dropped
 - b) When it is just on the half way
 - c) Just before it touches the ground
 - d) After touching the ground

PART II

SHORT ANSWER QUESTIONS [30 MARKS]

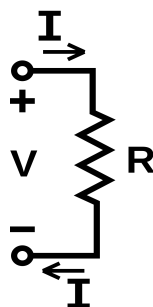
Answer ALL 10 short answer questions. Each question carries 3 marks.

- 1) What is avian flu? Explain the causes, symptoms, mode of transmission and preventive measures of avian Flu?
- 2) Name 5 different types of human teeth and explain their functions. List down some measures to prevent tooth decay which is commonly seen in Bhutan especially in school going children.
- 3) Among many public health issues in Bhutan, Alcohol Liver Disease (ALD) tops in the list. Jigme Dorji Wangchuk National Referral Hospital in Thimphu reports the highest death every year due to ALD.
 - a) Explain briefly how the consumption of alcohol causes ALD.
 - b) Write down at least 5 most important measures you would suggest to discourage the consumption of alcohol in Bhutan.
- 4) Name the structural parts of the human ear numbered 1-9 in the following diagram. Need not draw the diagram but list down the name of the structural parts with number on the answer sheet.



- 5) To improve the Bhutan's healthcare services and patient safety at the international level, the Bhutan Healthcare Standard for Quality Assurance (BHSQA) and 5S-CQI were introduced and implemented by the Ministry of Health since 2012. Answer the following questions.
 - a) Write down how many standards, objective elements and KIPs are there in the BHSQA.
 - b) Write down some important responsibilities you will have to take up in the hospitals in regard to the implementation of the BHSQA.
 - c) Elaborate 5S-CQI and describe the benefits of 5S in the healthcare centres of Bhutan.
- 6) Describe the functions of lipids in the body.

- 7) Using the following diagrams, state the Ohm's Law with formula.



- 8) State the laws of reflection from the plane mirror draw the diagram to label the following:
- (a) Incident ray
 - (b) Normal
 - (c) Reflected ray
 - (d) Incident ray
 - (e) Angle of incidence
- 9) Define molarity, molality and normality and show the formula for calculation.
- 10) According to the Annual Health Bulletin of 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?

TASHI DELEK