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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
MEDICAL & HEALTH GROUP**

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

PAPER II: GENERAL SUBJECT KNOWLEDGE for *MEDICAL & HEALTH* 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 **10** 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. Action potential is due to the movements of the:

- | | |
|--------------------|--------------------|
| a. Na ⁺ | c. Cl ⁻ |
| b. K ⁺ | d. Ca ⁺ |

2. All bacteria fix Nitrogen Except

- | | |
|------------------|----------------|
| a. Cyanobacteria | c. Rhizobium |
| b. E-Coli | d. Azotobacter |

3. Bacterial cell wall is made up of

- | | |
|------------|------------------|
| a. Peptide | c. Protein |
| b. Chitin | d. Peptidoglycan |

4. A body of mass 4 kg is accelerated upon by a constant force, travels a distance of 5 m in the first second and a distance of 2 m in the third second. The force acting on the body is:

- | | |
|--------|-------|
| a. 2 N | c. 6N |
| b. 4 N | d. 8N |

5. A Car travels from Paro at 9am and reaches Punakha at 1 pm covering a distance of 120 km, the average speed at which the car travels is:

- | | |
|------------|-------------|
| a. 30km/hr | c. 70 km/hr |
| b. 50km/hr | d. 40km/hr |

6. If a dispersed phase is liquid and dispersion medium is solid the colloid is known as:

- | | |
|----------|----------------|
| a. A sol | c. An emulsion |
| b. A gel | d. A foam |

7. The unit of rate constant of first order reaction is:

- | | |
|---|---|
| a. Time ⁻¹ | c. Litre mole ⁻¹ sec ⁻¹ |
| b. Mole litre ⁻¹ sec ⁻¹ | d. Litre mole ⁻¹ sec |

8. The reaction of hot NaOH with Cl₂ gives

- | | |
|-----------------------------|-----------------------|
| a. NaCl | c. NaCl,NaOCl |
| b. NaCl, NaClO ₃ | d. NaClO ₃ |

9. If the rate of reaction is equal to the unit rate constant of reaction then the order of reaction is:

- a. 0 order
- b. First order
- c. Second order
- d. Pseudo unimolecular

10. Membranous infolding in the bacteria that initiates DNA replication is

- a. Carboxysome
- b. Mesosomes
- c. Magnetosome
- d. Nucleosome

11. The Molecular formula for a compound containing 32.3% sodium 45.1% Sulphur and 22.5% Oxygen; molecular weight is 142.2 is :

- a. NaSO_2
- b. Na_3SO_4
- c. $\text{Na}_2\text{S}_2\text{O}_2$
- d. $\text{Na}_2\text{S}_3\text{O}_2$

12. In The ideal gas equation the effect of varying the mass of gas on pressure volume and temperature relationship as per Boyle's law is

- a. $V \propto n$
- b. $V \propto 1/P$
- c. $V \propto 1/n$
- d. $V \propto P$

13. How many moles of oxygen will fill a 5 litre container at 20 atm pressure And 0°C

- a. 4.75 mol
- b. 4.65 mol
- c. 4.55mol
- d. 4.45 mol

14. The building block of matter is:

- a. electron
- b. atom
- c. element
- d. molecule

15. Urine and blood are studied under the disciplines of.

- a. Organic Chemistry
- b. Inorganic Chemistry
- c. Physical Chemistry
- d. Bio Chemistry

16. H^+ has:

- a. one electron
- b. one proton
- c. one electron and one proton
- d. one proton and one neutron

17. Water has high boiling point due to

- a. covalent bond
- b. ionic bond
- c. polar bond
- d. H-bond

18. 24g of carbon contain _____ atoms of carbon:

- a. $6 \times 6.02 \times 10^{23}$
- b. $2 \times 6.02 \times 10^{23}$
- c. $12 \times 6.02 \times 10^{23}$
- d. $24 \times 6.02 \times 10^{23}$

- 19. The scientific study of embryo i.e. from zygote to the formation of complete organism is called as:**
- a. Morphology
 - b. Sexology
 - c. Gerontology
 - d. Embryology
- 20. The vector of malaria is studied in:**
- a. Microbiology
 - b. Parasitology
 - c. Entomology
 - d. anatomy
- 21. Which of the following is not the study of environmental effects on organisms**
- a. environmental biology
 - b. ecology
 - c. paleontology.
 - d. a & b
- 22. All the functions of liver all are true except:**
- a. urea formation
 - b. vitamin storage
 - c. cholesterol formation
 - d. hormone production
- 23. The automatic, involuntary activities are controlled by:**
- a. cerebrum
 - b. cerebellum
 - c. medulla oblongata
 - d. spinal cord
- 24. Which of the following is not related to DNA:**
- a. genes
 - b. Transcription
 - c. double helix
 - d. uracil
- 25. When a colour blind male marries a normal women then the chances of colour blindness in the sons are:**
- a. 0%
 - b. 50%
 - c. 75%
 - d. 100%
- 26. Genetic material in an organism especially in its germ cells is called**
- a. Cytoplasm
 - b. Gene pool
 - c. Germplasm
 - d. Protoplasm
- 27. Nitrogen freezes at 63.1 K. What is the corresponding temperature in the Fahrenheit scale?**
- a. 315⁰⁰F
 - b. 346⁰F
 - c. 321⁰F
 - d. 290⁰F
- 28. When a car is braked to a stop, its kinetic energy is transformed to**
- a. Potential energy.
 - b. Energy of motion.
 - c. Energy of rest.
 - d. Heat.

29. Two identical arrows, one with twice the kinetic energy of the other, are fired into a hay bale. The faster arrow will penetrate

- a. The same distance as the slower arrow.
- b. Twice as far as the slower arrow.
- c. Four times as far as the slower arrow.
- d. More than four times as far as the slower arrow.

30. An object at rest may have

- a. Speed.
- b. Velocity.
- c. Energy.
- d. Momentum.

31. A feather and a coin dropped in a vacuum fall with equal

- a. Forces.
- b. Momenta.
- c. Accelerations.
- d. Kinetic energies.

32. In the first step of glycolysis, glucose is converted to glucose-6-phosphate. Which of the following supplies the energy for the reaction?

- a. ATP
- b. RNA
- c. Oxygen
- d. Hydrogen

33. In 1940s and 1950s, scientists did experiments to determine the molecule responsible for heredity. Their experiments demonstrated that the molecule that encodes and transmits information in organisms is

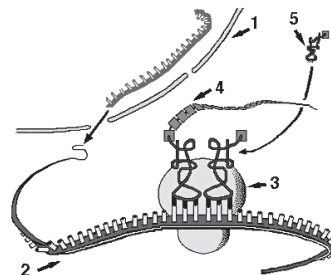
- a. DNA.
- b. Glucosamine.
- c. Insulin.
- d. Vitamin D.

34. Under normal conditions, which of the following causes a zygote to form?

- a. Mitosis takes place.
- b. Meiosis takes place.
- c. Two gametes combine.
- d. Asexual reproduction occurs.

35. The diagram below shows a process that occurs in cells. Which process is shown in the diagram?

- a. Diffusion
- b. Recombination
- c. Respiration
- d. Translation



- 36. Blue colour of the sky is due to**
- a. Diffraction of light
 - b. Dispersion of light
 - c. Reflection of light
 - d. Refraction of light
- 37. The pesticides DDT and parathion are inhibitors of key enzymes in the**
- a. Respiratory system
 - b. Cardiovascular system
 - c. Digestive system
 - d. Nervous system
- 38. Colour in a rainbow are produced due to**
- a. Interference of light waves reflected by water drops in the air
 - b. Diffraction of light waves
 - c. Dispersion and total internal reflection of sunlight by water drops in the air
 - d. All of the above
- 39. A Periscope is an instrument used for**
- a. Finding the focal length of the lens
 - b. Seeing very distant objects
 - c. Seeing very small objects
 - d. Viewing objects out of the line of vision
- 40. Movement of tongue muscle is controlled by**
- a. Facial nerve
 - b. Trigeminal nerve
 - c. hypoglossal nerve
 - d. Vagus nerve
- 41. Which one of the following is polysaccharide?**
- a. Glycogen
 - b. Sucrose
 - c. Lactose
 - d. Maltose
- 42. By the statement ‘survival of the fittest’, Darwin meant that _____.**
- a. The strongest of all species survives
 - b. The most intelligent of the species survives
 - c. The cleverest of the species survives
 - d. The most adaptable of the species to changes survives
- 43. Which one of the following is mainly responsible for green house effect?**
- a. SO₂
 - b. CO₂
 - c. CO
 - d. O₂
- 44. The metal that is used as a catalyst in the hydrogenation of oils is**
- a. Nickel
 - b. Lead
 - c. Copper
 - d. Platinum

45. An insect can run along the edge of a pond without wetting its feet because of

- a. Viscosity
- b. Pascal's law
- c. Surface tension
- d. Capillary action

46. Structural lipids of cell membrane

- a. Simple lipid
- b. Chromolipids
- c. Steroid
- d. Phospholipid

47. The rise of a liquid in a capillary tube does not depend upon

- a. Angle of contact
- b. Density of the liquid
- c. Radius of the capillary tube
- d. Atmospheric pressure

48. Sound wave is an example of

- a. Longitudinal wave
- b. Transverse wave
- c. Stationary wave
- d. All of these

49. Which one of the following animal phyla does not possess a coelom?

- a. Platyhelminthes
- b. Annelida
- c. Mollusca
- d. Echinodermata

50. The ozone layer forms naturally by the

- a. Interaction of CFC with oxygen
- b. Interaction of UV radiation with oxygen
- c. Interaction of IR radiation with oxygen
- d. Interaction of oxygen and water vapour

51. The yellow precipitate formed during the chromyl chloride test is chemically

- a. Lead chromate
- b. Chromic acid
- c. Sodium chromate
- d. Lead acetate

52. Argon is used in

- a. High temperature welding
- b. Radiotherapy for treatment of cancer
- c. Filling airships
- d. Obtain low temperature

53. Cooking is fast in a pressure cooker, because

- a. Food is cooked at constant volume.
- b. Loss of heat due to radiation is minimum.
- c. Food particles are effectively smashed.
- d. Water boils at higher temperature inside the pressure cooker.

54. Dalda is prepared from oils by

- a. Oxidation
- b. Reduction
- c. Hydrolysis
- d. Distillation

55. Helium is used in balloons in place of hydrogen because it is

- a. Incombustible
- b. Lighter than hydrogen
- c. Radioactive
- d. More abundant than hydrogen

56. Sugar constituent present in DNA is

- a. Deoxyribose
- b. Ribose
- c. Arabinose
- d. Glucose

57. Pollen grains of a plant whose $2n = 28$ are cultured to get callus by tissue culture method. What would be the number of chromosomes in the cells of the callus?

- a. 21
- b. 14
- c. 56
- d. 28

58. Pieces of plant tissue used in tissue culture is called

- a. Explant
- b. Somaclone
- c. Inoculant
- d. Clone

59. Ovule integument gets transformed into

- a. Seed
- b. Fruit wall
- c. Seed coat
- d. Cotyledons

60. Most of the endangered species are the victims of

- a. Habitat destruction
- b. Over-hunting
- c. Acid rain
- d. Competition with introduced species

61. A female Anopheles mosquito can be recognized by

- a. Proboscis and palpi are long and more or less of equal length
- b. Proboscis long and palpi short
- c. Proboscis short and palpi long
- d. Both proboscis and palpi are short

62. Leptocorisa is a major pest of

- a. Paddy
- b. Coconut
- c. Wheat
- d. Sugarcane

63. A 6% solution of urea is isotonic with

- a. 6% solution of Glucose
- b. 25% solution of Glucose
- c. 1 M solution of Glucose
- d. 0.05 M solution of Glucose

64. Which of the following is not a greenhouse gas?

- a. Carbon monoxide
- b. Methane
- c. Oxygen
- d. Water vapour

65. Fleshy fruits with stony endocarp are called

- a. Berries
- b. Pomes
- c. Drupes
- d. Capsules

66. When a fresh water protozoan is placed in marine water, its Contractile vacuoles ____

- a. Disappears
- b. Increases in size
- c. a number of contractile vacuoles appear
- d. Remains unchanged

67. Galvanization is the deposition of

- a. Copper on iron
- b. Tin on Iron
- c. Zinc on Iron
- d. Aluminium on Iron

68. The process of bleaching by chlorine is called

- a. Decomposition
- b. Oxidation
- c. Reduction
- d. Absorption

69. Which of the following is the hardest metal?

- a. Iron
- b. Platinum
- c. Tungsten
- d. Silver

70. Cassiterite is the ore of

- a. Lead
- b. Tin
- c. Zinc
- d. Copper

PART II : SHORT ANSWER QUESTIONS

Answer all questions. Each question carries THREE marks.

1. What are the various classes of Organic compound in terms of Carbon skeleton/ carbon chain in their molecule?
2. List down the most frequently encountered rate-controlling factors.
3. State Ohm's law.
4. Briefly answer the following questions (1x3= 3 marks)
 - a. What are catalysts?
 - b. What amount of catalyst is consumed in the reaction it catalyzes?
 - c. Is there a difference between the initial and the final energy levels in catalyzed and non-catalyzed reactions?
5. Name any five of the six noble gases.
6. Which is better mode of reproduction: Sexual or Asexual? Why?
7. How do you convert the following: (1½ x 2= 3 marks)
 - a. Galvanometer to Ammeter
 - b. Galvanometer to Voltmeter
8. Define the following: (1x3= 3 marks)
 - a. Normality
 - b. Molarity
 - c. Molality
9. Define the following: (1x3= 3 marks)
 - a. Law of Reflection
 - b. Electrical Resistance
 - c. Ultrasonic sound
10. Define Kepler's Laws of Planetary Motion?