

ROYAL CIVIL SERVICE COMMISSION

BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2011
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALIZATION PAPER FOR: LAB TECHNOLOGY

Date	: October 30, 2011
Total Marks	: 100
Examination Time	: 2.5 Hours
Reading Time	: 15 Minutes

INSTRUCTIONS

1. Write your Roll Number clearly on the answer booklet in the space provided.
2. The first 15 minutes is being provided to check the number of pages, printing errors, clarify doubts and to read the instructions. You are **NOT PERMITTED TO WRITE** during this time.
3. Use either **Blue** or **Black** ink pen or ball point pen for the written part and **Pencils** for the sketches and drawings.
4. All answers should be written on the Answer Booklet provided. Candidates are not allowed to write anything on the question paper.
5. This Question Booklet consists of **6 pages**. It is divided into two sections – namely SECTION A and SECTION B.
6. **SECTION A** consists of two parts. **Part I and Part II.**

Part I consists of 30 multiple choice questions carrying one (1) mark each and is **compulsory**. The answer of your choice should be clearly written **in whole** along with the question and option number on your answer booklet.

Part II consists of four (4) short answer questions of five (5) marks each and all questions are compulsory.

SECTION B consists of two **Case Studies**. Choose only **ONE** case study and answer the questions under your choice. Each case study carries fifty (50) marks in total.

SECTION A

PART A. MULTIPLE CHOICE QUESTIONS (30 Marks)

Directions:

In this part there are thirty multiple choice questions, each carrying 1 mark.

Each question is followed by four suggested answers. Write the correct answer as **a, b, c** or **d** against the respective question number in your answer sheet.

Bacteriology, Virology and Parasitology

1. Which of the following bacterial infection causes scarlet fever
 - a. *Staphylococcus aureus*
 - b. *Pseudomonas aeruginosa*
 - c. *Streptococcus pyogenes*
 - d. All of the above

2. The basic difference between Gram positive and Gram negative bacteria by Gram's reaction is
 - a. Their cell wall
 - b. Lipopolysaccharides
 - c. Metabolism
 - d. Biochemical reaction

3. Which of the following bacteria are most efficient in neutralizing the gastric acidity
 - a. *Escherichia coli*
 - b. *Salmonella typhi*
 - c. *Helicobacter pylori*
 - d. *Acinetobacter baumannii*

4. Following are serious complications related to post *Streptococcal* infections
 - a. Diabetes and blood pressure
 - b. RHD and Glomerulus nephritis
 - c. Cushing's syndrome
 - d. None of the above

5. Which of the following are capsule forming bacteria
 - a. *Escherichia coli*
 - b. *Klebsiella pneumoniae*
 - c. *Bacillus anthracis*
 - d. All of the above

6. The recent immunization of HiB vaccine in child in our country is against
 - a. *Streptococcus penumoniae*
 - b. *Mycobacterium tuberculosis*
 - c. *Neisseria meningitidis*
 - d. *Haemophilus influenzae*

7. Which of the following virus are called rhabdo virus
- Polio virus
 - Measles virus
 - Rota virus
 - Rabies virus**
8. The recent pandemic of influenza or swine origin flu is caused by the following
- Orthomyxo virus
 - Paramyxo virus**
 - Parvo virus
 - Picarno virus
9. Which of the following virus causes the so called avain flu
- H1N1-2008
 - Influenza virus type B
 - H5N1**
 - All of the above
10. HIV virus has the following genome
- RNA virus**
 - DNA virus
 - tRNA virus
 - None of the above
11. The scientific name of round worm is
- Ancylostoma duodenale*
 - Ascaris lumbricoides***
 - Fasiolo hepatica*
 - None of the above
12. Sexual life cycle of malaria parasites occurs in
- Man
 - Mosquitoes**
 - Stagnant waters
 - Both man and mosquitoes
13. The following stage of malaria parasite are the infective stage for humans
- Merozoites
 - Sporozoites**
 - Schizonts
 - Gametocytes
14. Elephantiasis is severe lymphatic disease caused by the following parasite
- LD bodies
 - African sleeping sickness worms
 - Filarial worms**
 - Guinea worms

Immunology

15. Which of the following immunity is non-specific
- a. Innate immunity
 - b. Acquired immunity
 - c. Both
 - d. None of them
16. Immune cells like T-cells recognize foreign antigens through
- a. Recognition of auto-antigens
 - b. Differentiation of self and non-self antigens
 - c. Recognition of antibodies
 - d. None of the above
17. The following immune cells are essential for monitoring treatment in HIV/AIDS patients
- a. Lymphocytes
 - b. CD4 cells
 - c. Plasma cells
 - d. Leucocytes

Bacterial/General Genetics

18. The process of synthesis of proteins from amino acid is called
- a. Transcription
 - b. Replication
 - c. Translation
 - d. None of above
19. In the process of DNA replication, genetic information of the cell is carried by
- a. tRNA
 - b. sRNA
 - c. mRNA
 - d. all of the above
20. Thalassaemia is the disorder of
- a. Haemoglobin A
 - b. Alpha-Haemoglobin
 - c. Beta Haemoglobin
 - d. Haemoglobin F
21. Which of the following are universal blood recipients
- a. Blood group A+ individuals
 - b. Blood group B+ individuals
 - c. Blood group O+ individuals
 - d. Blood group AB+ individuals

Biochemistry/Haematology/Pathology

22. The use of daily internal quality control (IQC) range without the use of Levy-Jening's chart is satisfactory for laboratory quality control system
- Yes
 - No
 - Partially
 - Not at all
23. The following enzyme is an indicator of liver damage during toxic viral hepatitis
- Alanine transaminase (ALT)
 - Lactate dehydrogenase (LDH)
 - Creatine kinase (CK)
 - Glucokinase
24. Enzymes with different physical properties but catalyzing the same characteristic reactions are known as
- Catalysts
 - Isoenzymes
 - Proteins
 - Co-factors
25. The process of synthesis of Glucose from Glycogen is called
- Gluconeogenesis
 - Glycogenesis
 - Glycogenolysis
 - None of the above
26. The primary structure of proteins are composed of an arrangement of
- Nucleic acids
 - Amino acids
 - Monosaccharides
 - Lipoproteins
27. Which of the following is conjugated protein
- Albumin
 - Globulin
 - Haemoglobin
 - All of the above
28. Which of the following features best describes Microcytic anaemia
- Small RBCs, MCV < 50 fL, raised haemoglobin level
 - Large RBCs, MCV > 100 fL, normal haemoglobin level
 - Small RBCs, MCV < 50 fL, low haemoglobin level
 - Raised TLC, with normal haemoglobin levels

29. The Prothrombin time (PT) and activated partial thromboplastin time (aPTT) are prolonged in following conditions
- Vitamin B deficiency
 - Vitamin K deficiency
 - Cancers of skin
 - All of above conditions
30. Which of the following statement is true for Beer-Lambert's Law
- Percentage transmittance is inversely proportional to the concentration of the solute in the solution
 - Percentage transmittance is directly proportional to the concentration of the solute in the solution
 - Absorbance is inversely proportional to concentration of solutes in a solution
 - All of above

PART B. WRITE SHORT ANSWERS

(20 marks)

General Instructions:

In this part there are four short answer questions carrying 5 marks each. All the questions must be answered.

1. What are the compositions of blood? Describe some of its essential functions?
2. Write about RPR and TPHA tests carried out in your laboratory
3. Write about Coombs Test and discuss its importance. Why voluntary blood donors are safer than replacement or remunerated blood donors? Discuss some ways how you will encourage voluntary blood donations in your health center
4. Describe the steps and principle involved in the processing of tissue for histopathological examinations.

SECTION B

(50 marks)

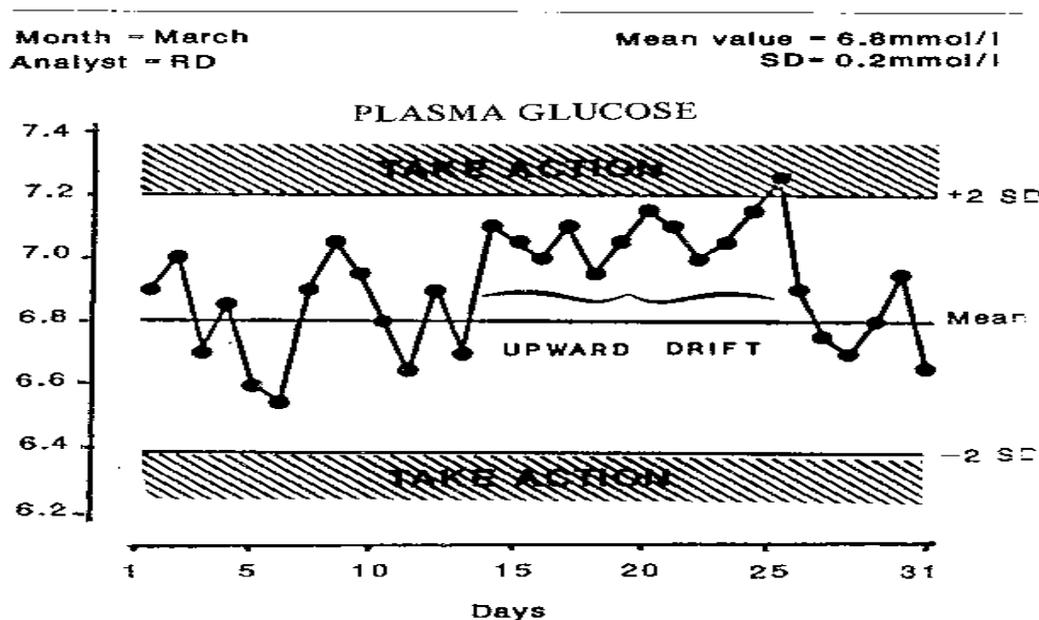
General Direction:

In this section there are two questions related to a case study. Answer **ANY** one question.

1. A 35 year old male resident of Thimphu reports to the Emergency Department, JDWNRH with fever, rigor, headache, cold and shivers, back and joint pain, followed by rise in temperature and sweating. Blood investigations shows normal results with insignificant raise in total leucocytes and eosinophil. There is low plate count combined with low haemoglobin level. Prescription of antibiotics and antipyretics did not improve the patient's condition even after 48 hours. There is no history of patient attending a public gathering but patient reported dining and consuming water from a common restaurant. The patient had travelled to Gelephu a week ago.

Discuss what could have possibly caused the fever in this patient. Discuss what are the other possible tests you would perform and why? Describe briefly on the life cycle of the possible pathogen in the above infection.

2. You visited a general district laboratory and found the following control chart when you inspected the quality control system for testing of Glucose in March 2011. The control chart shows an upward drift of the daily control materials.



- a. Explain what the above chart is called.
- b. Describe the methods how the above chart plotted
- c. How do you interpret the chart to the district lab Technician
- d. Explain what are the possible cause of the upward drift in the control chart and what are the suggested remedies you would suggest to the Lab technician to bring the graph to normal points