

ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2012
EXAMINATION CATEGORY: TECHNICAL

PAPER III: SUBJECT SPECIALIZATION PAPER FOR: LAB TECHNOLOGY

Date : October 14, 2012
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.

7. **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. Meningococci is
 - a. *Haemophilus influenzae*
 - b. *Neisseria meningitidis*
 - c. *Streptococcus pneumoniae*
 - d. Staphylococci

2. Of those listed below, the **BEST** method for detecting motility is
 - a. coverslip.
 - b. Gram stain.
 - c. supravital.
 - d. hanging drop.

3. *Escherichia coli* usually grow on MacConkey agar exhibiting
 - a. swarming
 - b. pink colonies
 - c. pink periphery and a blue-black center
 - d. black colonies with a green metallic sheen

4. A well-controlled Gram stain would be useful in identifying
 - a. rabies
 - b. gonorrhea
 - c. tuberculosis
 - d. amoebic dysentery

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

6. Which of the following are non fermentative bacteria
 - a. *Escherichia coli*
 - b. *Klebsiella pneumoniae*
 - c. *Pseudomonas aeruginosa*
 - d. *Staphylococcus aureus*

7. The recent immunization of tetravalent HPV vaccine in our country is against
- Cervical cancer
 - All HPV types
 - HPV 6, 11, 16 and 18 subtypes
 - HPV 16 and 18 subtypes
8. The function of reverse transcriptase in retro-virus is to
- Convert DNA to RNA
 - Convert RNA to DNA
 - Convert mRNA to proteins
 - Convert tRNA to mRNA
9. The recent pandemic of influenza or swine origin flu is caused by the following
- Orthomyxo virus
 - Paramyxo virus
 - Parvo virus
 - Picarno virus
10. The scientific name of hook worm is
- Ancylostoma duodenale*
 - Ascaris lumbricoides*
 - Fasiolo hepatica*
 - None of the above
11. An asexual life cycle of malaria parasites occurs in
- Mosquitoes
 - Both man and mosquitoes
 - Stagnant waters
 - Man

Immunology

12. Toll Like Receptors (TLR) belongs to
- Innate immunity
 - Acquired immunity
 - Both
 - None of them
13. Immune cells like CD4 cells are
- Antigens
 - Lymphocytes
 - Neutrophils
 - All of the above

Biochemistry/Imuno-Haematology/Pathology

14. The specific gravity of urine and total solids are measured by a
- Photometer
 - coulometer.
 - polarimeter.
 - refractometer.

15. Which of the following are diagnostically significant urinary crystals?
- Urate
 - Oxalate
 - Cystine
 - Calcium carbonate
16. Abnormal fat catabolism produces
- ketone bodies
 - emotional glycosuria
 - alimentary glycosuria
 - orthostatic proteinuria
17. Which one of the following is **NOT** a serum enzyme test used for testing liver function?
- Alkaline phosphatase
 - Lactate dehydrogenase (LDH)
 - Creatinine phosphokinase (CPK)
 - Alanine aminotransferase (glutamic pyruvic transaminase (GPT))
18. 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
19. The basic diluting fluid used for automated hematology procedures is
- Osmotic
 - Isotonic
 - Hypotonic
 - Hypertonic
20. Eosinophils are associated with
- allergies.
 - infections.
 - toxic states.
 - mononucleosis.
21. Variation in the size of red blood cells is called
- Hypochromia
 - Anisocytosis
 - Poikilocytosis
 - Polychromatophilia
22. An individual whose genotype is AO is mated with an individual of genotype BO. Their offspring may be of blood groups
- A,O
 - A,B
 - O,B
 - A,B,AB,O

23. A "Bombay" individual normally possesses
- anti-Lu^a
 - anti-Kell
 - anti-H
 - anti-D
24. Sickle cell anemia is due to an abnormality in a patient's
- Serum
 - Plasma
 - Hemoglobin
 - Red cell maturation
25. Most chemical anticoagulants prevent blood from clotting by removing
- Vitamin K
 - Fibrinogen
 - Prothrombin
 - Ionized calcium
26. In gel electrophoresis, the separation of particles are achieved based on
- The size of the particle
 - The shape of the particle
 - The ionic charge of the particle
 - The weight of the particle
27. Dehydration in histopathological tissue processing is achieved by
- Increasing strengths of alcohol
 - Decreasing strengths of alcohol
 - Increasing Distilled water and paraffin wax
 - Xylene
28. In cytology, a cytocentrifuge is used to process
- Large amount of body fluids
 - A large amount of tissues
 - Small amount of body fluids
 - Cervical smears
29. The normal total count of human spermatozoa is
- Between 10-20 million spermatozoa per mL of sperm
 - Between 100-150 million spermatozoa per mL of sperm
 - Less than 1 million spermatozoa per mL of sperm
 - More than 200 million spermatozoa per mL of sperm
30. The renal thresh hold of glucose is
- Around 80 mg/dL
 - Around 180mg/dL
 - Around 100 mg/dL
 - Less than 50 mg/dl

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. Describe the biological importance of enzymes and coenzymes
2. Distinguish between colorimeter and spectrophotometer
3. Write about identification characters of *Entamoeba coli* from stool specimen with a neat labeled diagram
4. Write about the life cycle of the AIDS virus with a clear labeled diagram and describe its pathogenesis in humans.

SECTION B

(50 marks)

General Direction:

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

1. A 52-year-old obese woman is seen by her physician. She complains of perineal itching. A pelvic exam reveals that the woman has a white discharge that is collected and sent for culture and identification. Additionally, the woman is instructed to collect a midstream clean catch urine specimen. The urine is sent to the laboratory for a routine urinalysis and the following results are obtained:

Physical Testing: Yellow, cloudy with no odor

Chemical Testing

Glucose =500 mg/dl, Clinitest =500 mg/dl

Bilirubin= negative, Ketones= negative, Protein= negative, Urobilinogen =normal, Nitrite = negative, Specific Gravity = 1.015, pH 5.0, Leucocyte = positive

Microscopic Analysis

RBC= 0-2/hpf, WBC= 10-15/hpf; seen in clumps, Casts = 0-2 hyaline

Epithelial Cells = many, Squamous Epithelial cells seen

Bacteria = negative, Crystals= few urates, Yeast= moderate

- a. Identify the abnormal findings
 - b. What results suggest that the woman has a vaginitis?
 - c. What is the most likely cause of the vaginitis?
 - d. What results indicate that the urine was not a midstream clean catch?
 - e. What is the most likely diagnosis for this woman?
 - f. How does this diagnosis explain the presence of the glucose in the urine?
2. A group "A" man marries a group "AB" woman. The man's father is group "O."
 - a. What are the possible ABO groups of children produced from this mating?
 - b. The woman is Rh negative and the man is Rh positive. The man's mother was also Rh negative. What is the chance that their offspring will be Rh negative?
 - c. Because the pregnancy is high risk, the woman wants her husband to donate blood for her. Give 2 reasons why this is not a good idea?
 - d. During the pregnancy, the woman experienced a fetomaternal bleed and was given Rh immune globulin. Post delivery, she is re-evaluated and it is found that she has developed a weak Anti-D and an Anti-E.
 - e. Is she a candidate for Rh immune globulin now?
 - f. What could be done to aid in determining this?