

**ROYAL CIVIL SERVICE COMMISSION
BHUTAN CIVIL SERVICE EXAMINATION (BCSE) 2015
EXAMINATION CATEGORY: TECHNICAL**

PAPER III: SUBJECT SPECIALIZATION PAPER for *Medical lab. Technology*

Date	: 11 October 2015
Total Marks	: 100
Examination Time	: 150 minutes (2.5 hours)
Reading Time	: 15 Minutes (prior to examination time)

GENERAL INSTRUCTIONS:

1. Write your Roll 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 SECTIONS**, namely SECTION A and SECTION B:
 - **SECTION A** has two parts: Part I - 30 Multiple-Choice Questions
Part II - 4 Short Answer QuestionsAll questions under SECTION A are COMPULSORY.
- **SECTION B** consists of two Case Studies. Choose only **ONE** case study and answer the questions under your choice.
4. 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.
5. Begin each Section and Part in a fresh page of the Answer Booklet.
6. You are not permitted to tear off any sheet(s) of the Answer Booklet as well as the Question Paper.
7. Use of any other paper including paper for rough work is not permitted.
8. You are required to hand over the Answer Booklet to the Invigilator before leaving the examination hall.
9. This paper has 08 printed pages in all, including this instruction page.

GOOD LUCK!

SECTION A

PART I - Multiple Choice Questions (30 Marks)

Choose the correct answer and write down the letter of the correct answer chosen in the Answer Booklet against the question number. E.g. 31 (c). Each question carries ONE mark. Any double writing, smudgy answers or writing more than one choice shall not be evaluated.

1. Fungi are commonly identified on their basis of their
 - a) Serologic and biochemical characteristics
 - b) Staining properties with polychrome dyes
 - c) Solubility in 20% potassium hydroxide
 - d) Sporulation and arrangement of spores on the hyphae

2. Alkaline phosphate is GREATLY elevated in
 - a) Kidney disease
 - b) Liver disease
 - c) Myocardial infraction
 - d) Obstructive jaundice

3. Optochin is used to help identify
 - a) *Streptococcus pneumonia*
 - b) *Staphylococcus aureus*
 - c) *Streptococcus pyogenes* (group A)
 - d) *Streptococci* producing alpha hemolysis

4. An elevated leukocyte count with increased numbers of neutrophilic granulocytes USUALLY indicates
 - a) Bacterial infection
 - b) Viral infection
 - c) Infectious mononucleosis
 - d) Allergic reaction

5. The infective stage of hookworm is the
 - a) Rhabditiform larva with short buccal cavity
 - b) Rhaditiform larva with a long buccal cavity
 - c) Filariform larva with pointed tail
 - d) Filariform larva with notched tail

6. Cerebral spinal fluid patients with post –cerebral hemorrhage appears
 - a) Clear (colourless)
 - b) Bright red
 - c) Light yellow or straw coloured
 - d) Green

7. Which of the following enzymes are present in heart muscle? 1. Lactic dehydrogenase (LDH) 2. Creatinine phosphokinase (CPK) (CK) 3. Serum glutamic oxaloacetic transaminase (SGOT)
 - a) 2 only
 - b) 1 and 2 only
 - c) 2 and 3 only
 - d) 1, 2 and 3

8. A substance that produces a prolonged prothrombin time when given orally is
 - a) Heparin
 - b) Protamine sulphate
 - c) Salicate
 - d) Coumadin

9. Metabolic acidosis can be detected by testing urine for the presence of
 - a) Ketone bodies
 - b) Protein
 - c) Glucose
 - d) Uric Acid

10. A mother is Rh (D) negative, the father is homozygous Rh (D) positive. All of their offspring will be
 - a) Erythroblastic
 - b) Ho0mozygous Rh(D) positive
 - c) Heterozygous Rh (D) positive
 - d) 50% Rh (D) positive and 50% Rh (D) negative

11. Albumin, alpha 1, alpha 2, beta and gamma globulin are electrophoretic fractions of
 - a) Hemoglobin
 - b) Amino acid
 - c) Serum protein
 - d) Serum lipoprotein

12. The degree that a procedure deviates from a known value or from a calculated mean value is known as
- Coefficient variation
 - Quality control
 - Standard deviation
 - Percent deviation
13. Cell/ antibody mixtures used in tube testing to determine ABO Group should be centrifuged for
- 15-30 seconds @ 1000
 - 2min @ 2000
 - 3min @ 3000
 - 5min @ 5000
14. During a crossmatch procedure, a negative result on the addition of coombs control cells indicated that the
- Crossmatch is compatible and blood may be infused
 - Crossmatch is incompatible
 - Antiglobulin reagent is inactivated, neutralized or not added to the test
 - Antiglobulin reagent is detecting antibody globulin, indicating inadequate washing during the crossmatch procedure.
15. Microscopic examination of urinary sediment discloses small, motile cells having an oval "head" with a rather long, delicate, whip like tail. These cells are most likely identified as
- Proteus vulgaris*
 - Trichomonas vaginalis*
 - Spirochetes
 - Spermatozoa
16. The organism that can cause rheumatic fever and/or glomerular nephritis is
- Staphylococcus aureus*
 - Streptococcus pyogenes*
 - Streptococcus viridians*
 - Staphylococcus haemolyticus*
17. The accepted and usual time and temperature used for the inactivation of serum is
- 25°C for 1 hour
 - 37°C for 30 min
 - 56°C for 30 min
 - 56°C for 10 min

18. Leukemia may be suspected when a manual hematocrit determination reveals
- Hemolysis
 - Icteric Plasma
 - A high hematocrit
 - A heavy buffy coat
19. A variety of media may be safely stored for months if care is taken to
- Maintain them at room temperature
 - Retain their moisture
 - Avoid exposing them to light
 - Maintain them in an incubator
20. When using a buffer with pH of 8.6 each of serum proteins in an electrical field migrates toward
- The positive pole
 - The negative pole
 - Either pole
 - Both poles
21. An RBC exhibiting hypochromia would be described as being
- Variable in shape
 - Packed with hemoglobin
 - Markedly bluish in colour
 - Markedly pale in central colour
22. A Donor who recently tested positive for HBsAg should be deferred
- For 6 months
 - For 1 year
 - For 5 years
 - Permanently
23. Blood glucose levels are directly regulated by the hormone
- ACTH
 - Insulin
 - Thyroxin
 - Hydrocortisone
24. In *Taenia saginata*, the larval stage develops in
- Cattle
 - Swine

- c) Fish
 - d) Man
25. Reticulocytes contain
- a) DNA remnants
 - b) RNA remnants
 - c) Basophilic granules
 - d) Howell-Jolly Bodies
26. Safranin in gram stain is used as a
- a) Mordant
 - b) Decolourizer
 - c) Secondary stain
 - d) Primary stain
27. The end product of purine metabolism is
- a) Urea
 - b) Creatinine
 - c) Creatine
 - d) Uric acid
28. Hematoxylin
- a) Stains the nucleus
 - b) Stains the cytoplasm
 - c) Is negatively charged
 - d) All of above
29. Injection of anti-venom to a patient for a snake bite is an example of
- a) Naturally acquired active immunity
 - b) Artificially acquired active immunity
 - c) Naturally acquired passive immunity
 - d) Artificially acquired passive immunity
30. Salmonella typhi causes disease by
- a) Forming a thick capsule
 - b) Releasing endotoxin
 - c) Resisting phagocytosis
 - d) Producing an exotoxin

PART II – Short Answer Type Questions (20 Marks)

Answer ALL the questions. Each question carries 5 marks. Mark for each sub-question is indicated in the brackets.

1. Write down all the different types of vacutainers used in our hospitals along with their functions. (5 marks)
2. Describe a detailed laboratory diagnosis for urinary tract infection in women.(5marks)
3. List five differences between DNA and RNA (5 marks)
4. Draw a labeled diagram of an electron microscope along with its uses and principle. (5 Marks)

SECTION B

Case Study

Choose either Case 1 or Case 2 from this Section. Each Case carries 50 marks. Mark for each sub-question is indicated in the brackets.

Case 1

Most liver diseases cause only mild symptoms initially, but these diseases must be detected early. Hepatic (liver) involvement in some diseases can be of crucial importance. This testing is performed on a patient's blood sample.

Liver Function Test can be used to detect the presence of liver disease, distinguish among different types of liver disorders, gauge the extent of known liver damage, and follow the response to treatment.

Several biochemical tests are useful in the evaluation and management of patients with hepatic dysfunction. Some or all of these measurements are also carried out (usually about twice a year for routine cases) on those individuals taking certain medications, such as anticonvulsants, to ensure the medications are not damaging the person's liver.

1. Some tests are associated with functionality, some with cellular integrity and some with conditions linked to the biliary tract. Briefly describe the routine test parameters for the Liver function test and its reference ranges? (20 marks)
2. What are the methods used in the laboratory to test for the parameters of the LFT? (20)
3. What are the diseases associated with abnormal Liver function test results? (10marks)

OR

Case 2

Antibiotic sensitivity is the susceptibility of bacteria to antibiotics. Antibiotic susceptibility testing (AST) is usually carried out to determine which antibiotic will be most successful in treating a bacterial infection *in vivo*.

1. Describe the commonly used method for testing antibiotic sensitivity for any one organism (requirements, procedure and interpretation) (20 marks)
2. When carrying out the disk diffusion, your Quality Control (QC) is out of range and you observe one of the following;
 - a. Many zones too large,
 - b. Many zones too small
 - c. One or more zones too small or too large
 - d. Two QC strains are out of range with the same antimicrobial agent

Describe the probable cause for each of the above observation and what action has to be taken? (15 marks)

3. Briefly describe Methicillin Resistant *S. aureus* (MRSA) and Extended spectrum Beta – lactamases and its detection? (15 marks)

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