

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

PAPER III: SUBJECT SPECIALIZATION PAPER for
MEDICAL LAB. TECHNOLOGY

Date	: 14 October 2013
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 Questions
All 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 **07** 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. Methyl Red test (MR) is employed to detect the production of
 - a. Alkaline byproducts
 - b. Acid during the fermentation of glucose
 - c. Acetyl methylcarbinol
 - d. None of above

2. The class of immunoglobulin, whose level rises first in case of a bacterial or a viral infection is:
 - a. IgG
 - b. IgA
 - c. IgM
 - d. IgD

3. Pyrimidine nitrogenous bases attached to the deoxyribose of the double helix strands are:
 - a. Adenine and Thymine
 - b. Cytosine and Guanine
 - c. Thymine and Cytosine
 - d. Adenine and Guanine

4. Immunity induced in the host following an attack of measles is:
 - a. Artificial active immunity
 - b. Natural active immunity
 - c. Passive induced immunity
 - d. Natural passive immunity

5. For the determination of the efficacy of moist heat sterilization, the spores used are of
 - a. *Bacillus anthracis*
 - b. *Clostridium tetani*
 - c. *Bacillus stearothermophilus*
 - d. *Bacillus cereus*

6. Technique used to separate proteins is called:
 - a. Southern blotting
 - b. Northern blotting
 - c. Western blotting
 - d. Non of above

7. Which of the following statement is considered a major incompatibility:
- Transfuse PRBCs group B to group AB patients
 - Transfuse PRBCs group A to group B patients
 - Transfuse PRBCs group A to group AB patients
 - Transfuse PRBCs group O to group B patients
8. Which of the following is not used in grading the severity of aplastic anaemia:
- Hct
 - Reticulocyte count
 - Absolute Neutrophil Count (ANC)
 - Platelet count
9. Iron in the body is transported by:
- Transferrin
 - Ferritin
 - Hemosiderin
 - Albumin
10. Which of the following statement is NOT TRUE about the Direct Antiglobulin Test (DAT)?
- It may detect complement on the surface of red cells
 - It is positive in the hemolytic disease of the newborn due to Rh incompatibility
 - It detects agglutination of the antibody-coated red cells
 - It is used for cross matching of recipient and donor blood
11. Spherocytes in a blood film is a feature of ONE of the following:
- Thalassaemia major
 - Autoimmune hemolytic anaemia
 - Reticulocytosis
 - Glucose-6-phosphate dehydrogenase (G6PD) deficiency
12. Ribozymes are :
- Enzymes present in Ribosomes
 - Enzymes that combine the Ribosomal units
 - Enzymes which dissociate
 - Enzymes made up of RNA
13. Which one of the following transfusion is likely to cause intravascular haemolysis?
- Group O donor, Group A recipient
 - Group B donor, Group O recipient
 - Group O donor, Group AB recipient
 - Rh-Positive donor, Rh-negative recipient

14. The Fab fragment of immunoglobulin:
- as generated by pepsin treatment
 - is generated by the separation of heavy and light chains
 - binds antigen
 - has no interchain disulphide bond
15. Which of the following statements does not apply to IgG?
- Neutralizes bacterial toxins
 - Can fix complement
 - Crosses human placenta
 - Appears early in primary immune response
16. Plasmids are important to the genetics of many bacteria because:
- They are inherited from one generation to the next
 - They may carry genes that give their host a selective advantage
 - May render the bacteria drug resistant
 - All the above
17. An essential agent for converting glucose to glycogen in liver is
- Lactic acid
 - GTP
 - UTP
 - Pyruvic acid
18. All the following are Carbohydrates except:
- Starch
 - Chitin
 - Glycogen
 - Cholesterol
19. Which ONE of these is NOT seen in association with liver disease?
- Positive direct antiglobulin test (DAT)
 - Prolonged prothrombin time
 - Haemolysis
 - Thrombocytopenia
20. DNA is packaged into chromosomes. How many chromosomes do a human have?
- 23
 - 46
 - 52
 - 64

21. Each statement about *Giardia lamblia* is correct except:
- G.lamblia* has both trophozoite and cyst stage in its life cycle
 - G.lamblia* is transmitted faeco-orally from both human and animal sources
 - G.lamblia* causes hemolytic anemia
 - G.lamblia* can be detected by string test
22. Which influenza strain caused the pandemic 2009 Swine flu:
- H5N1
 - H1N1
 - H7N1
 - H9N1
23. Which of the following organisms is commonly cultured from the nasopharynx of healthy people but is RARELY pathogenic:
- Beta hemolytic streptococci
 - Corynebacterium* species
 - Neisseria meningitides*
 - Staphylococcus aureus*
24. The counter stain used in the Ziehl Neelson AFB staining technique is
- Safrannin
 - Methylene blue
 - Albert's stain
 - Bromocresyl blue
25. You are given 10 mL stock solution of 20 mg/mL. What would be the concentration of the solution if it is diluted to a final volume of 500 mL ?
- 0.4 mg/mL
 - 25.0 mg/mL
 - 2.0 mg/mL
 - 2.5 mg/mL
26. A Biosafety Cabinet is used to:
- Protect the specimens from outside contamination
 - Protect the worker from the infectious specimens handled inside
 - For the storage of infectious materials and acids
 - None of above
27. Periodic Acid Schiff (PAS) special staining is used to detect;
- Lipids
 - Carbohydrates
 - Proteins
 - Non of above

28. The tissue sample removed from a living body in a diagnostic procedure is called as;
- Biopsy
 - Autopsy
 - Scrapping
 - All the above
29. The organ transplant between genetically unrelated members of the same species is:
- Isograft
 - Allograft
 - Xenograft
 - Autograft
30. Which of the following would be best suited to visualize lipid?
- Wright Stain
 - Haematoxylin and Eosin Stain
 - Sudan Stain
 - Masson's trichrome stain

PART – II : Short Answer Questions (20 marks)

Answer ALL the questions. Each question carries 5 marks.

1. State the principle of Benedicts test used for the determination of glucose in urine. Explain the grades of colours obtained corresponding to the glucose concentration.
2. What is ELISA? Briefly describe the principle of a Sandwich ELISA.
3. What is Quality Control? Describe briefly, how you would prepare your own Levey Jenning QC chart if a control material has been handed to you?
4. Describe briefly the steps of PCR. Write down at least 2 applications of this technique.

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

A 32 year old woman walks into the casualty on a weekend with acute dysuria accompanied with increased urinary frequency and low grade fever, nausea and generalized weakness. Urine microscopy showed the following result: WBCs- Numerous; Bacteria+++; Epithelial cells – 8; Glucose – Nil, Protein –Nil. The physician on duty treated the women with a course of antibiotic “X” and was advised to submit a mid-stream urine sample for culture on Monday.

- a. What is the probable diagnosis? (5 Marks)
- b. What is the type of therapy given to the woman and what are the advantages and disadvantages of such treatment modality? (10 Marks)
- c. Describe the diagnostic value of the urine sample she would be submitting on Monday? (5 Marks)
- d. What is the probable culture and antimicrobial sensitivity outcome (10 Marks)
- e. What is antimicrobial resistance? How does that happen in a typical bacterial cell? Why is it a cause for alarm? (20 Marks)

CASE 2

A 25 year old woman from Paro presented to the Emergency department reporting that she was in good health until ~ 3 weeks ago when she began experiencing polyuria and polydipsia. She had had an unintentional weight loss ~ 3 kgs in the past 2 months. Urinalysis revealed a specific gravity of 1.010 (normal 1.005 - 1.300). Glucose of 3+, and ketones of 1+. Her finger prick glucose on admission was 318 mg/dl.

After insulin initiation, finger prick glucose level improved to 126 mg/dl.

- a. What is the woman suffering from? Briefly explain some common causes? (10 Marks)
- b. What does the presence of glucose in the urine signify? What are ketones and why does it appear in urine of some individuals suffering from this condition? (15 Marks)
- c. Mention some common complications following this condition. (5 Marks)
- d. How would you confirm the condition? Mention the significance of fasting and post-prandial specimen. (5 + 10 Marks)
- e. How would you advise a patient already on treatment wanting to a blood test? (5Marks)