CANDIDATE NUMBER.....

AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES

NSLS100: LABORATORY PRINCIPLES

END OF FIRST SEMESTER EXAM
NOVEMBER 2022
LECTURER: MR Z. CHIWODZA

DURATION: 3 HOURS

INSTRUCTIONS

1. Write your candidate number on the space provided on top of each page and on the answer script you will submit
2. Answer **all** questions in sections A on this question paper.
3. Answer **all** questions in section B on a separate answer sheet provided.
4. Answer any **3** questions in section on a separate answer sheet provided.
5. The mark allocation for each question is indicated at the end of the question
6. Credit will be given for logical, systematic and neat presentations in sections B and C

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SECTION A : MULTIPLE CHOICE [40 MARKS]

- **Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions**
- **Each correct response is allocated ONE MARK**

1. Which health institution does not have laboratory services provided directly or remotely
   - T F a) Clinic
   - T F b) Mission hospital
   - T F c) Central Hospital
   - T F d) Private hospital

2. The following methods reduces transmission of infectious material from the laboratory
   - T F a) Wearing laboratory coats or gowns outside the laboratory
   - T F b) disinfecting work benches before and after work
   - T F c) restricting entry to the laboratory to authorized personnel only
   - T F d) Disposing sample waste together with office waste

3. Match the PPE to its use in the laboratory
   - T F a) gloves - protect the wearer from infectious samples
   - T F b) laboratory coat - protects the wearer from chemical or infectious substances
   - T F c) googles - protects the wearer from chemical splashes.
   - T F d) N95 respirator - protects from laboratory dust which can cause silicosis.

4. The following information should be available on the laboratory request form
   - T F a) Age of patient
   - T F b) Method of payment and medical insurance details
   - T F c) Clinical Data
   - T F d) Sex of patient

5. A spill kit should always contain
   - T F a) brush
   - T F b) disinfectant
   - T F c) cotton wool or any other absorbent material
   - T F d) gloves

6. The following is true about laboratory disinfectants
   - T F a) 1% NaClO can be used to disinfect a work benches
   - T F b) 0.1% NaClO can be used to disinfect a blood sample spillage
   - T F c) 100% alcohol can be used to disinfect skin
   - T F d) 90% alcohol can be prepared from a 70% alcohol solution.

7. The following are some laboratory acquired infections that lab personnel need to be vaccinated against
   - T F a) HIV
   - T F b) Hepatitis B Virus
   - T F c) Human Papilloma Virus
   - T F d) COVID-19

8. The following are common blood sample preservatives and their colour codes
   - T F a) EDTA - Purple top
   - T F b) Serum separator tube - Green
   - T F c) Plain tube - Red top
   - T F d) Sodium flouride - Grey top

9. When collecting a urine sample for urine chemistries and microscopy and culture, it is important that patients
   - T F a) collect mid-stream urine
   - T F b) clean the genital area to avoid contamination
   - T F c) avoid eating for at least 12 hours
   - T F d) avoid taking antibiotics before collection of the sample

10. Before purchasing a piece of equipment, the following parameters should always be considered
   - T F a) accuracy
   - T F b) Precision
   - T F c) Sensitivity
   - T F d) Specificity

11. The following documents are crucial for a haematology analyzer
   - T F a) Daily maintenance chart
   - T F b) Service records
   - T F c) Levey-Jennings Chart
   - T F d) Temperature Chart

12. The objective lens on a microscope
   - T F a) controls contrast
   - T F b) increases the magnification of material on a slide
   - T F c) is also called a field diaphragm
   - T F d) scatters light from the bulb

13. Which of the following is not a method of decontamination
   - T F a) UV radiation
   - T F b) 100% Formaldehyde
   - T F c) Ethylene oxide
   - T F d)1% Sodium hypochlorite

14. During centrifugation of a sample, separation of particles is affected by
   - T F a) particle shape
   - T F b) volume of sample
   - T F c) differences between density of particles and the liquid
   - T F d) speed of revolutions

15. When sorting samples that are coming into the laboratory
    - T F a) match the name of the patient on the form and the sample
    - T F b) ensure that the sample meets the acceptance criteria
    - T F c) acknowledge time and date of receipt of sample
    - T F d) refrigerate all samples to ensure sample integrity.

16. Regarding left over samples after a test
    - T F a) they should be immediately thrown away to prevent contamination
    - T F b) All samples should be thrown down the drain or dustbin
    - T F c) they can be kept in freezers and used for future research
    - T F d) they should be immediately autoclaved to prevent further contamination

17. The following variables affect the total turn around time in a clinic-laboratory interface
    - T F a) availability of reagents
    - T F b) transport system from clinic to lab
    - T F c) medium used to dispatch results from laboratory
    - T F d) quality of specimens sent to the laboratory

18. The following practices ensure efficient workflow on a lab bench
    - T F a) SOPs or Bench Aides for tests done
    - T F b) following the 5S approach
    - T F c) Having reference ranges close to the testing area
    - T F d) keeping stock of reagents and material used.

19. The following are examples of laboratory records that should be found in the laboratory
    - T F a) Laboratory worksheets
    - T F b) Equipment service reports
    - T F c) Personnel evaluation reports
    - T F d) Personnel Curriculum Vitae

20. Principles of Good Clinical Laboratory Practice include
    - T F a) Stock management
    - T F b) Proficiency testing
    - T F c) Continuous professional development
    - T F d) Customer surveys

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SECTION B [20 MARKS]

Answer all questions

1. List 5 essential components of a Standard Operating Procedure that is used in the laboratory [5]

2. Describe how you can make

2 litres of 3 **mol/l** H_2SO_4 from a stock solution of H_2SO_4 which has a label with the following information:

90% H_2SO_4
MW 98.08
1L = 1.84Kg (Density) [5]

3. Give 3 parts or a Bio-safety cabinet Class II and their uses. What 2 equipment maintaince documents should be found near or associated with the BSC II. [5]

4. List 5 essential details that should be filled in on a laboratory request form and explain why each component is necessary
[5]

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SECTION C [75 marks]

Answer any 3 questions from this section on separate answer sheets provided

1. You have been awarded funds to purchase a new chemistry analyzer. What factors will you consider before and after purchasing the equipment? How will you make sure is keeps in good working condition? [25]

2. Your clients have lost confidence in the laboratory and are no longer bringing samples. Discuss how establishing a QMS system can improve services. [25]

3. You have been asked to help design a Bio-safety level 3 laboratory. Discuss issues you will put into consideration. [25]

4. Three patients have died in the same month due to wrong laboratory results. Discuss how you can investigate how lab operations have led to this issue and what measures you can put in place to prevent similar occurrences. [25]

5. The laboratory just discarded close to USD $100, 000.00 worth of expired reagents. Explain in detail on laboratory operations that can prevent this situation from happening again. [25]