Technical University of Mombasa

Faculty of Applied and Health Sciences

DEPARTMENT OF MEDICAL SCIENCES

UNIVERSITY EXAMINATION FOR THE DEGREE OF BACHELOR OF MEDICAL LABORATORY SCIENCES

BMLS 13S

AML 4102 : INTRODUCTION TO INSTRUMENTATION

SEMESTER EXAMINATION

APRIL 2014 SERIES

2 HOURS

Instructions to candidates:

This paper consists of **TWO** sections **A** and **B**
Section A –Contains MCQS, Answer **ALL** questions in **Section B**.

SECTION A – MCQs – (30marks)

1. The resolving power of an objective lens is dependent on
   a) Numerical aperture
   b) Magnification
   c) Refractive index
   d) The object being observed
   e) The eye-piece

2. The use of oil in oil immersion objective is to
   a) Magnify the object
   b) Allow the bending of light as it passes through the lense
   c) Convert the image so as to fit in the eyepiece
   d) Provide better resolution and brighter image
   e) Focus light on the object

3. The following are uses of filters in microscopy except

a) Reduce the intensity of light where needed
b) Transmit light of a selected wavelengths
c) Prevent injury of eyes from UV light
d) Increase the resolution of the microscope
e) Reduce condenser aperture thereby reducing glare

4. Which of the following would best purify water that contains pyrogens
a) Distillation
b) Filtration (0.9nM porosity)
c) Deionization
d) Centrifugation
e) Decanting

5. The following is true for deionized water except
a) It is near neutral pH
b) It is free from water soluble salts
c) It is not sterile
d) It has a low electrical conductivity
e) It undergoes filtration immediately deionzation

6. Which of the following is not a factor to consider when selecting manual or automated pipettes
a) Availability
b) The work-load
c) Ease of use
d) Laboratory space
e) Cost

7. According to safety recommendations for caring of centrifuges, where should a centrifuge be placed?
a) In a clear area of 10 cm around the centrifuge
b) In a clear area of 20cm around the centrifuge
c) Is a clear area of 30cm around the centrifuge
d) In a clear area of 40cm around the centrifuge
e) In a clear area of 50cm around the centrifuge

8. What is the recommended autoclaving condition for most laboratory applications?
a) 141˚C for 10-15minutes
b) 131˚C for 20-30minutes
c) 151˚C for 30-40 minutes
d) 101˚C for 15-30 minutes
e) 121˚C for 15-20 minutes

9. In examination of a specimen with the 40X objective the best image can be obtained by:
a) Opening the iris with about 2/3 (two thirds) closed
b) Opening the iris fully
c) Increasing the illumination
d) Placing a drop of immersion oil on the specimen
e) Raising the condenser

10. Under what conditions can the autoclave be vented?
    a) When the thermometer reads 80˚C and the pressure gauge registers 10PSI
    b) When the thermometer reads 50˚C and the pressure gauge registers 20 PSI
    c) When the thermometer reads 50˚C and the pressure gauge
    d) When the thermometer reads 50˚C and the pressure gauge registers zero
    e) When the thermometer reads 50˚C and the pressure gauge register 5PSI

11. Compared with a water bath, a heat block is
    a) Less expensive to run
    b) Requires a lot more maintenance
    c) Risky to incubate using glass tubes
    d) More expensive to buy
    e) It can easily dry up samples

12. Which of the following wavelengths form visible light
    a) 400nm to 700nm
    b) 300nm to 600nm
    c) 200nm to 500nm
    d) 100nm to 400nm
    e) 50nm to 350nm

13. The following are specifications of a colorimeter for district laboratories except
    a) Preferably operating from both alternating current mains and rechargeable battery
    b) Preferably analogue readout absorbance
    c) Preferably with a cuvette chamber that can hold 2 cuvettes
    d) Capable of reading small volumes
    e) Easy to use, clean and maintain

14. The ohms Havard trip weighing balance with a capacity of 200g and readability of 0.1g is suitable for which of the following uses?
    a) Determine the weight of water for preparing solutions
    b) Balancing centrifuge buckets
    c) Weighing chemicals is small amounts
    d) Weighing specimens such as urine
    e) Measuring self-indicating resin

15. The conductivity of deionized water is measured using
    a) Thermometer
    b) pH meter
    c) Pure water test meter
    d) Colorimete r
    e) Spectrophotometer

16. A Sphygmomanometer is used for
    a) Counting cells
    b) Lybing red blood cells
    c) Collecting blood
    d) Checking blood pressure
    e) Transporting blood specimens

17. A vortex mixer is used for
    a) Emulsification of cultures and specimens
    b) Segmenting specimens
    c) Heating of cultures and specimens
    d) Mixing of agglutation tests
    e) Preparation of culture media and reagents

18. The following are used during blood collection except
    a) Spencer wells forceps
    b) Cool box
    c) Syringes
    d) Sphygmomanometer
    e) Lancets

19. Which of the following is not used during dressing wounds?
    a) Cotton wool
    b) Syringes
    c) Scissors
    d) Cellulose wadding
    e) Elastoplast

20. Which of the following is a cleaning equipment
    a) Rubber gloves
    b) Wire loop
    c) Spatula
    d) Applicator sticks
    e) Scissors

21. Which of the following is true about polymethylpentene made plastic – ware?
    a) Can be sterilized in hot air oven
    b) Cannot be used to store boric acid
    c) It is autoclavable
    d) Cannot be used to store calcium hydroxide
    e) It is resistant to chloroform

22. Which of the following is reactive to polystyrene ?
    a) Acetic acid
    b) Acetone
    c) Amorium hydroxide
    d) Benzoic acid
    e) Boric acid

23. Which of the following is resistant to toluene?
    a) Polymethypentene
    b) Polysterence
    c) Polypropylene

d) Polycarbonate
e) Polytetrafluoraethylene

24. A colorimeter is used for
a) Determining the color of a given specimen/sample
b) Determining the distance a specimen can be transported without spoiling
c) Determining the wavelength of a given specimen/sample
d) Determining the chemical composition of a given color in a specimen/sample
e) Determining the concentration of a substance in a specimen/sample

25. Which of the following are specifications for a water bath to be used in a small laboratory?
a) Unstirred with hydraulic thermostat or electronic temperature control
b) Operating over a temperature range from ambient to 60˚C or above.
c) Having a 10 liter capacity
d) With a fitted thermometer
e) Supplied with a lid

26. For care of an incubator, it is recommended that the flex is checked for signs of wear every
a) 3 to 6 days
b) 3 to 6 weeks
c) 3 to 6 months
d) 3 to 6 years
e) Time after use

27. For which of the following reasons is sufficient space left when loading an autoclave ?
a) for steam to circulate freely
b) to avoid breaking the objects being autoclaved
c) to allow water to boils properly
d) to allow proper aeration
e) for ease during unloading

28. Which of the following is not a specification of a gravity filter
a) To liters capacity with 100liters every 24hrs
b) Fitted with self –sterilizing system
c) No external plumbing required
d) Easy to clean
e) Easy to maintain

29. Which of the following parts of an incident fluorescence light is used to transmit long wave length fluorescence light on a specimen?
a) Objective lense
b) Excitation filter
c) Dichotic mirror
d) Barrier filter
e) Eyepiece

30. For maintenance of deionizer resin, where should unused resin be kept?
a) At the bottom of a tube with heat scaling machine

b) At temperature above 50˚C
c) A way from strong oxidizers
d) In a translucent tin/bag
e) In a well ventilated container

SECTION B ESSAY
(ANSWER ALL QUESTION IN THIS SECTION)

1. (a) Briefly describe the specifications, care , and use of a still producing water for a medium sized laboratory **(10marks)**

(b) Briefly describe the specifications, use and maintenance of a gravity filter **(10marks)**

2. Discuss the good microscopy practices to be observed before, during, and after use of a microscope **(20marks)**