JIMMA UNIVERSITY

COLLAGE OF HEALTH SCIENCE

DEPARTMENT OF MEDICAL LABORATOY AND PATHOLOGY

COMPRHENSIVE EXAM FOR GRADUATING MEDICAL LABORATORY SCIENCE STUDENTS, 2016

Time allowed 2:30

Name _____

ID no._____

sign_____

BOOKLET II

GENERAL INSTRUCTION: the booklet contains 115 multiple choice questions. Attempt all the questions and write your answers on the answer sheet (IN BLOCK LETTER).

Choose the best answers for the following questions and write your answers on the answer sheet (IN BLOCK LETTER).

1. Which additive does the light blue tube implies?
   A. Fluoride
   B. Heparin
   C. Sodium citrate an
   D. EDTA
2. What is the preferred antiseptic for venipuncture?
   A. Oil
   B. Water
   C. Isopropyl alcohol an
   D. Xylene
3. Why should a tourniquet be removed with 1-2min?
   A. When it is left longer, it may cause hemoconcentration
   B. When it is left longer, it may hurt the patient
   C. When it is left longer, it may cause hematoma
   D. When it is left longer, it may cause fainting
4. What is the slanting surface at the end of a needle?

   A. Bevel an
   B. Barrel
   C. Plunger
   D. sucker

5. What is the difference between plasma and serum?
   A. Plasma has a fibrin in it tiru
   B. Serum is the one with an anticoagulant falset
   C. Plasma has a fibrinogen in it tirue
   D. Serum has a fibrinogen in it false
6. A capillary prick sample is not appropriate for?
   A. Platelet count an
   B. WBC count
   C. RBC count
   D. Differential WBC count

7. Which of the following is a potential problem in smear preparation using two-slide (wedge method)?
    A. Wrong angle by which too low angle creates too short smear and too high angle creates too long smear
    B. Pushing the spreader slide too fast which creates too long smear and too slowly which creates too short smear
    C. Dirty slides which may create holes and ridges
    D. Too much blood which yields too thin smear
8. Which of the following statement is true about the advantage of capillary blood collection?
    A. Multiple and repeated tests can be done
    B. Plasma or serum may be produced
    C. Preferred for making peripheral blood films an
    D. Reduces errors resulting from dilution of blood with tissue fluids
    E. Technically difficult in children, obese people and patients in shock
9. Which of the following isnot true about red blood cells?
    A. A large portion of the cytoplasm contains hemoglobin
    B. They are non-nucleated cells
    C. In stained smears, RBCs look like a circle with a central pallor
    D. The life span of RBC is approximately 120 days
    E. The size of the erythrocytes is about the same as small resting lymphocyte
10. The extrinsic pathway involves the following except?

    A. II B. VII C. XI D. III

11. Which of the following represents hemoglobin with ferric (Fe^{+3}) form iron?

A. Deoxyhemoglobin

B. Sulfhemoglobin

C. Methemoglobin

D. Carboxyhemoglobin

12. Which of the following statement is not true about platelets?

A. Platelets are fragment of megakaryocytes

B. The primary function is to stop bleeding at the site of injury

C. platelets are small and non-nucleated

D. platelets are mainly involved in secondary phase of hemostasis

13. Which of the following represents the function of hemostatic mechanism?

A. Maintain blood in a fluid state

B. Ensure the removal of the haemostatic plug

C. Arrests bleeding at the site of injury

D. All

14. What pathway does prothrombin time tests on?

A. Intrinsic

B. Common an

C. Extrinsic

D. All

15. The following are components of primary hemostasis except?

A. platelet adhesion

B. platelet aggregation

C. fibrin formation

D. platelet plug formation

16. The following is true about reticulocyte count except?

A. It is an index of bone marrow red cell production
B. It is a fairly accurate reflection of erythropoietic activity
C. There is an increase in reticulocyte count in hemolytic anemia
D. Reticulocyte count increase during iron deficiency anemia

17. The following results were obtained on a patient blood sample:

RBC =3.72 x 10^{12} /L

Hemoglobin =120 g/L

Hematocrit =0.36

What would the RBC indices be?

A. MCV = 96, MCH = 29, MCHC = 320

B. MCV = 97, MCH = 32, MCHC = 333

C. MCV = 103, MCH = 31, MCHC = 300

D. MCV = 105, MCH = 28, MCHC = 310

18. How would you expect the RBC in question #1 to look on a peripheral blood smear?

A. normocytic, normochromic

B. macrocytic, normochromic

C. normocytic, hypochromic

D. macrocytic, hypochromic

19. If the RBC count on a sample is 4.22 x 1012 /L and the relative reticulocyte count is 2.5%, what is the absolute reticulocyte count?

A. 92.8 x 109 /L

B. 97.1 x 109 /L

C. 101.3 x 109 /L

D. 105.5 x 109 /L

20. What is meant by the term "coincidence" as it refers to the Coulter principle for counting cells?

A. some cells will not be counted by the instrument because they are above the threshold limit

B. some cells will not be counted by the instrument because they are below the threshold limit

C. some interferences in the blood sample will cause a falsely elevated hemoglobin value

D. occasionally more than one cell goes through the aperture at the same time, but only one cell is counted

21. When doing a manual WBC count, a technologist counts an average of 102 white cells in the white cell squares of a hemocytometer. If he has made the usual dilution in a white cell pipette, what will the calculated WBC count be?

A. 2.6 x 109/L

B. 5.1 x 109/L

C. 10.7 x 109/L

D. 20.4 x 109/L

22. If a WBC count is 12.6 x 10^9/L and there are 15 nucleated RBC's per 100 WBC on the smear, what is the corrected WBC count (x 10^9/L)?

A. 7.5

B. 8.3

C. 11

D. 12.1

23. Which of the following is true about red cell indices?

A. RDW indicates the variation in shape of red cells

B. MCHC is determined by femtolitre

C. MCV indicates a size of an average red cell

D. MCH is the hemoglobin concentration in our body

24. Among the following which one isnot included in the red cell indices?

A. Mean cell hemoglobin concentration

B. Mean cell hemoglobin

C. Packed cell volume

D. Mean cell volume

25. Which of the following parameters are directly measured on the Coulter?

A. WBC count

B. MCH

C. MCHC

D. Hematocrit

26. Which of the following statements about Wright's stain is correct?

A. it requires prefixation of the slides

B. it is a true Romanowsky stain anser

C. it contains crystal violet

D. it is a supravital stain

27. Which of the following deficiencies would most likely lead to megaloblastic anemia?

A. vitamin E deficiency

B. vitamin B_6 deficiency

C. iron deficiency

D. folic acid deficiency an

28. The peripheral blood of a patient with iron deficiency anemia will most likely show what picture?

A. microcytic, hypochromic red cells an

B. microcytic, normochromic red cells

C. macrocytic, hypochromic red cells

D. normocytic, hypochromic red cells

29. Increased polychromasia on a peripheral blood smear could indicate which of the following?

A. over-staining of the slide an

B. an increased relative reticulocyte count

C. decreased production of red blood cells

D. nothing in particular

30. A patient's peripheral blood smear shows hypochromic/microcytic RBC. Which of the following anemias might he have?

A. megaloblastic anemia

B. sideroblastic anemia

Hemolytic an

C. aplastic anemia

31. Which of the following is not associated with hypochromia?

A. decreased MCHC

B. iron deficiency
C. increased central pallor
D. aplastic anemia

32. In which of the following disorders is the Philadelphia chormosome most likely to be found?

A. chronic lymphocytic leukemia
B. chronic myelogenous leukemia
C. acute lymphocytic leukemia
D. acute myelogenous leukemia

33. Why is there decreased production of blood cells in the marrow in acute leukemia?

A. there is a stem cell defect
B. there is a growth factor deficiency
C. there is an erythropoietin deficiency
D. the malignant cells replace normal marrow

34. In relative polycythemia, the red cell mass is _____.

A. Decreased
B. Elevated an
C. Normal
D. none of the above

35. Warfarin therapy will affect which clotting factors?

A. factor XI.
B. factor IX
C. factor XIII
D. factor XII

36. Which type of liver cells are responsible for metabolic and synthetic function

A. Kupffer cells
B. Hepatocytes anser
C. Stellate cells
D. All

37. Nutrient-enriched blood from the gastrointestinal tract(GIT) is supplied to liver through

A. Hepatic artery
B. Hepatic vein
C. Portal vein
D. A & C

38. Identify true statement about Kupffer cells

A. Contain lysosomes that break down phagocytized bacteria
B. Are the main sites for clearance of antigen-antibody complexes
C. Derived from monocytes
D. All anser

39. Liver cells that are used to store vitamin A, and synthesize nitric oxide which helps to regulate intra-hepatic blood flow is

A. Kupffer cells
B. Hepatocytes
C. Stellate cells anser
D. Ito cells
E. C & D

40. _____is endogenously produced compound used to measure hepatic excretory function

A. Albumin
B. Bilirubin
C. Fibrinogen
D. Globulin

41. Which one of the following is exclusively synthesized in the liver

A. Alpha globulin
B. Albumin
C. Beta globulin
D. Direct bilirubin

42. Liver synthetic inability can be measured by all of the following serum analyte except

A. Albumin
B. Immunoglobulin
C. Ceruloplasmin
D. Fibrinogen

43. Jaundice is characterized by yellow discoloration of

A. Skin
B. Mucous membrane
C. Sclera
D. All anser
E. None

44. The ability of liver enzyme to assist in diagnosis is based on the following except
    A. Tissue specificity
    B. Subcellular distribution
    C. Relative degree of enzyme activity in liver and plasma
    D. Clearance in plasma
    E. None of the above
45. Identify enzyme that is found on the canalicular membrane of hepatocytes
    A. AST
    B. ALT
    C. GGT
    D. A & C
46. In alcohol-induced chronic liver hepatitis , the ratio of ALT to AST is more likely
    A. Less than 1
    B. Greater than 1
    C. Equal to 1
    D. Greater or equal 1
47. Identify risk factors for developing alcoholic liver diseases
    A. Duration and magnitude of alcohol abuse
    B. Presence of co-infection with HBV or HCV
    C. Nutritional state
    D. Sex
    E. All of the above
48. Identify factors that do not affect the activity of enzymes
    A. Extreme PH

B. High temperature
C. Substrate concentration
D. All of the above
E. None of the above

49. The enzyme inhibition whose inhibitory effect can be reversed by increasing the substrate concentration is

A. Competitive inhibition
B. Uncompetitive inhibition
C. Irreversible inhibition
D. Mechanism based inhibition

50. Kinetic saturation in enzyme-catalyzed reaction is attained when

A. Vmax is equal to initial velocity
B. All active sites of enzyme are occupied by competitive inhibitor
C. All active sites of enzyme are occupied by substrate
D. Adding more substrate concentration has no impact on the rate of reaction
E. All but B

51. Bilirubin is typically measured using

A. Dye binding
B. Jaffe reaction
C. diazotized sulfanilic acid
D. A & C are correct answers

52. Identify the hepatocellular liver enzyme with highest half-life

A. Mithocondrial AST
B. ALT
C. GGT
D. ALP

53. The liver enzyme whose activity is more specific for detecting liver disease in nonalcoholic, asymptomatic patients is

A. ALT
B. AST
C. LDH
D. GGT
E. 5`-nuclotidase

54. The marker of primary biliary cirrhosis, which is the most common autoimmune liver disease, is

A. Ceruloplasmin
B. Alpha fetoprotein
C. Anti-mithchondrial antibody
D. 5`-nuclotidase

55. The replacement of normal liver tissue by scar tissue and blockage of blood circulation in the liver is

A. Hepatitis
B. Inflammation
C. Cirrhosis
D. Drug induced hepatitis

56. The build up and deposition of unconjugated bilirubin in nuclei of brain and nerve cells of premature new born is

A. Icterus
B. Kernicterus
C. Hypobilirubinemia
D. Hyper lipidemia
E. None of the above

57. Hemolysis does not cause significant errors in

A. Potassium ion determination
B. Sodium ion determination
C. Bicarbonate determination
D. Chloride ion determination

58. Not a clinical specimen in electrolyte determination

A. Serum
B. Urine
C. Sweat
D. None

59. The most commonly used analytical method for sodium ion determination is

A. Atomic absorption spectrophotometry
B. Flame emission spectrophotometry
C. ISE
D. All of the above

60. Which one of the following contributes the most to serum total carbon dioxide

A. PCo_2
B. dCo_2
C. HCo_3^-
D. Carbonium ion

61. Osmolal gap is

A. The difference between measured and calculated osmolalities
B. Used in the assessment of electrolyte and acid-base disorders
C. Important in determination of the presence of exogenous osmotic substance
D. All
E. A & C

62. Identify false statement about ideal tumor markers ,they are

A. Specific for a given type of cancer
B. Sensitive enough to detect small tumors to allow early diagnosis or screening
C. Present in higher quantities in blood from cancer patients than is the case in benign tumors
D. All of the above
E. None

63. The most useful marker for colorectal and breast carcinoma is

A. Carcinoembryonic antigen (CEA)
B. Carbohydrate tumor markers
C. Alpha fetoprotein (AFP)

D. None

64. _____is the leading cancer in older men

A. Breast cancer
C. Prostate cancer
B. Colorectal cancer
D. Hepatocellular cancer

65. Steroid hormones are

A. Hydrophobic and insoluble in water
B. Bound to transport proteins to circulate in the blood
C. Are water soluble hormones
D. A & B are correct answers

66. The cause of endocrine disease may be due to

A. Deficiency of hormone
B. Excess production of hormone
C. Resistance to the action of hormone
D. All of the above
E. None of the above

67. Identify the analytical technique/s that is used to measure hormones

A. Immunoassay
B. Receptor assay
C. Instrumental techniques such as mass spectrometry
D. All of the above
E. None of the above

68. The "unique" or specific action of a hormone on its target tissue is a function of the interaction between the hormone and its receptor. Which one of the following hormone type has cell surface receptor

A. Peptide hormone
B. Steroid hormone
C. Amino-acid derivative hormone
D. A & B are correct answers

69. Identify the laboratory abnormality that is not indicated in liver disease

A. Hypo-albuminemia

B. Prolonged prothrombin time
C. Hyper bilirubinemia
D. Hyperglycemia
E. None of the above

70. Identify the interfering substance/s with bilirubin measurement

A. Hemolysis

B. Lipid

C. Specimen exposure to direct sun light

D. All

E. None

71. The possible reason why plasma AST activity is greater than plasma ALT activity in alcohol induced hepatitis is due to

A. Longer plasma half-life of cytoplasmic AST than ALT

B. ALT activity is more affected by deficiency of P-5`-P in alcoholics

C. Longer half-life of mitochondrial AST than ALT

D. B & C are correct answers

72. The major factors that increase plasma enzyme activities are

A. Death of cells containing enzyme

B. Increased synthesis of enzymes by cells

C. Drugs that stimulate microsomal enzymes

D. All

E. None of the above

73. The possible reason for using co-factors such as NADH in measuring activity of liver enzymes such as ALT is due to their

A. Less exposure to interfering substance

B. Absorbing light at lower wavelength

C. Higher affinity to these enzymes

D. All of the above

E. A & B are correct answers

74. The more recommended dispensing technique when you are dispensing clinical sample for clinical chemistry analysis is

A. Dispensing along sidewall

B. Dispensing directly into liquid surface

C. Dispensing above liquid surface

D. All

75. In order to identify obstructive cholestasis from bone diseases , the elevation of ALP in plasma or serum should be confirmed with the elevation of GGT except in

a. Pregnancy
b. Breast feeding
c. Muscle disease
d. Neonate
e. None

76. To detect an antibodies in the patients serum/plasma, the reagent of choice would be:

A. Anti-serum
B. Coombs Control Cells
C. LISS
D. Reagent RBCs

77. When performing a cross-matching test by the tube method, the two visible endpoints of antigen-antibody reactions are:

A. Agglutination and hemolysis an
B. Aggregation and agglutination
C. Sensitization and agglutination
D. Sensitization and hemolysis

78. Antihuman Globulin (AHG) reagent causes agglutination of RBCs by:

A. Coating the RBCs with IgG or C3
B. Cross-linking antibodies or complement components that are sensitizing RBCs
C. Cross-linking antigens on opposing RBCs
D. Neutralizing antibodies in the patient□s serum

79. Rh D blood grouping/typing determinations are performed in the laboratory by using the patient□s:

A. Plasma and red blood cells
B. Plasma only

C. Red blood cells only

D. Saliva and RBCs

80. Which of the following tests should be done on a mother□s first pregnancy prenatal sample?

A. ABO grouping
B. Rh typing anser
C. Antibody screening
D. All are correct

81. Agglutination with anti-A and anti-B typing serum indicates the blood is group?

A. O
B. AB
C. B
D. A

82. The ABO blood group system was discovered by?

A. Landsteiner an
B. Levine and Stetson
C. Weiner and Fischer
D. Coomb

83. Blood group AB parent mated with group O parent. Which of the following are possible in the offspring?

A. Group A
B. Group B
C. Group A and B
D. Group O an

84. The actual gene composition of a subjects blood group character is known as the

A. Allele
B. Phenotype
C. Recessive
D. Genotype an

85. The subclasses of immunoglobulin G that possess properties associated with least degree of destruction :

A. IgG_2 and IgG_4
B. IgG_1 and IgG_3
C. IgG_1 and IgG_4
D. IgG_2 and IgG_3

86. Failure to wash the red cells prior to performing a DAT will lead to:

A. False positives due to complement binding

B. False positives due to nonspecific globulin binding

C. False negatives due to unbound globulin binding an

D. False negatives due to failure to remove unbound RBC antigens

87. The minimum acceptable hemoglobin level for homologous female blood donoris:

A. 11.0 g/dl
B. 11.5 g/dl
C. 12.0 g/dl
D. 12.5 g/dl an
E. 13.0 g/dl

88. The major crossmatch consists of a mixture of

A. Donor serum and patient erythrocytes
B. Donor serum and donor erythrocytes
C. Patient serum and donor erythrocytes an
D. Patient serum and patient erythrocytes

89. The indirect antihuman globulin test is used for the detection of antibodies that may cause red cell sensitization:

A. In vitro an
B. In vivo
C. IgM naturally occurring antibody
D. In vitro and in vivo

90. When a patient makes an immune type antibody, red blood cell products are phenotyped and products that are antigen negative for the corresponding antibody should be selected for transfusion. RBC products are already pre-phenotyped for one immune antibody. Which antibody is it?

A. Anti-K
B. Anti-D
C. Anti-E
D. Anti-A

91. A 38-year-old male was recently arrested following his second drunk-driving. He was jailed for 36 hours before his release and comes for blood donation in the bank. He is eligible to donate blood:

A. Today
B. 30 days from his release from prison
C. 2 weeks from his release from prison
D. 1 year from his release from prison
E. Never

92. An individual must inherit which of the following to be classified as a group B

A. The A gene
B. The B gene
C. The H gene
D. B and H genes
E. All

Interpret the following ABO test results:

Reagent:	Anti-A	Anti-B	A cells	B cells
Results:	2+	4+	1+	0

A. A blood group
B. B blood group
C. AB blood group
D. O blood group
E. None of the above grouping

93. Interpret the following ABO test results:

Reagent:	Anti-A	Anti-B	A cells	B cells
Results:	0	0	2+	2+

A. A blood group
B. B blood group
C. AB blood group
D. O blood group
E. None of the above grouping

94. Interpret the following ABO test results:

Reagent:	Anti-A	Anti-B	A cells	B cells
Results:	0	4+	4+	0

A. A blood group
B. B blood group
C. AB blood group
D. O blood group
E. None of the above grouping

95. Regarding pathology which is false?

A. Fine needle aspiration cytology and biopsy are helpful in diagnosis of diseases
B. Autopsy is one of the disciplines in pathology
C. It has an important role in screening of cancer
D. It is a clinical and basic science
E. None

96. The need for sectioning includes;

A. To see internal structure of tissue.
B. Allows light to pass through tissue making structure easily visible.
C. Allows stains or specific markers to more easily infiltrate tissue.
D. All

97. Which one of the following is/are not the main parts of a single microtome?

A. Base
B. Tissue holder
C. Knife
D. None

98. Among the following types of knife which one is preferable to section very hard tissue like un decalcified bone?

A. Wedge shaped
B. Plano concave
C. Biconcave
D. Tool edge

99. Which one of the following is/are a disadvantage of auto method knife sharpening compared to manual method?

A. No time consuming.
B. Dull cutting edge can be replaced by new perfect edge.
C. Over sharpening and vibration may occur when cutting dense, fibrous tissue.

D. None

100. What is the use of □□water bath□□ in tissue sectioning and processing?

A. Dry tissue section on the microscopic slide
B. Remove folds to obtain wrinkle free tissue section
C. For cutting blocks of tissue to small slices
D. A and B
E. All

101. Substances that assists certain staining reaction to take place by forming a link between tissue and stain are;

A. Accentuators
B. Mordants
C. Counter stains
D. A and B

102. The basic steps in staining and mounting paraffin section, which one is in the correct sequence?

A. Deparaffinization→ Dehydration→ Clearing→ Staining→ Hydration→ Mounting
B. Deparaffinization → Hydration→ Staining→ Dehydration→ Clearing → Mounting an
C. Paraffinization→ Dehydration→ Staining→ Hydration→ Clearing→ Mounting
D. Deparaffinization → Hydration→ Clearing→ Staining → Dehydration→ Mounting

103. Systematic monitoring of working practice, technical procedure, equipments and materials including quality of stain by using control samples refers to;

A. Quality assurance
B. External quality assessment
C. Quality control
D. Total quality management

105. Partial or complete wasting away of a part of the body or decrease in cell size and functional ability refers to.

A. Metaplasia

B. Atrophy

C. Hyperplasia

D. Hypertrophy

Which one of the following is the correct sequence in tissue processing?

A. Clearing → Infiltration → Embedding → Dehydration

B. Dehydration → Clearing → Infiltration → Embedding

C. Infiltration → Clearing → Dehydration → Embedding

D. Clearing → Dehydration → Infiltration → Embedding

106. Hypertonic nature of fixative solution can cause cell swelling during fixation

A. True

B. False

108. Saturation of tissue cavities and cells by a supporting substance or media is called.

A. Dehydration

B. Infiltration

C. Clearing

D. Embedding

109. Among the following conditions (factors), which one can increase the rate of tissue processing?

A. Using vacuum system

B. Increase the viscosity of the medium

C. Insufficient agitation of tissue block

D. All

110. Which one of the following is a good characteristic of a dye used for tissue marking?

A. Soluble in fixative, processing and embedding medium

B. React with histological stains

C. Remain on the surface of the specimen or tissue

D. None

111. Which one of the following activities of tissue block is on their correct sequence starting from the beginning?

A. Tissue processing → Fixation → Embedding → Sectioning

B. Fixation → Tissue processing → Embedding → Sectioning anser

C. Fixation → Embedding → Sectioning → Tissue processing

D. Embedding → Sectioning → Tissue processing → Fixation

112. Clearing in histopathology techniques refers to;

A. Removal of water

B. Removal of dehydrating agent

C. Removal of paraffin wax anser

D. All

113. When the respiratory epithelium of heavy smoker changed to stratified squamous epithelium is called:

A. Metaplasia

B. Pathological atrophy

C. Physiological atrophy

D. Hyperplasia anser

E. Hypertrophy

114. Which of the following describes hypertrophy?

A. Increase in the number of cells (mitosis) in an organ or tissue

B. Decrease in the number of cells (mitosis) in an organ or tissue

C. Increase in individual cell size in an organ or tissue

D. Decrease in individual cell size in an organ or tissue

E. Reversible change in which one adult cell is replaced by another adult cell type

115. Point out correct sequence during tissue processing

A. Formaldehyde → Xylene → Ethanol → Paraffin wax

B. Formaldehyde → Ethanol → Xylene → Paraffin wax

C. Ethanol → Formaldehyde → Xylene → Paraffin wax

D. Formaldehyde → Paraffin wax → Ethanol → Xylene