32. Which of the following parameters cannot be calculated from the Henderson-Hasselbalch equation?

a) PCO2
b) HCO3
c) PH
d) PO2
e) None of the above

For questions 2-4 below, use this information:
Arterial blood gas analysis and biochemical tests were done for a 12 year old boy in ICU. Results are given as follows:
PH - 7.29, pco2-27mmHg, HCO3 - 15mmol/L
Sodium – 158mmol/L (135-145), K+ - 5.6mmol/L (3.5-5.0)
Chloride – 125mmol/L (98-118)

33. What is the anion gap?

a) 12.6 mmol/L
b) 17.6mmol/L
c) 18.6mmol/L
d) 23.6mmol/L
e) 25.6mmol/L

34. What is the acid base disturbance?

a) Compensated metabolic acidosis
b) Compensated respiratory acidosis
c) Mixed metabolic and respiratory acidosis
d) Uncompensated metabolic acidosis
e) Uncompensated respiratory acidosis

35. A possible cause of the acid-base disorder in this patient is;-

a) Diabetes ketoacidosis
b) Foreign body in trachea
c) Pneumonia
d) Renal tubular acidosis
e) Severe asthma

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
DEPARTMENT OF HUMAN PATHOLOGY
HAEMATOLOGY AND BLOOD TRANSFUSION

MBcHB III - WRITTEN CONTINUOUS ASSESSMENT TEST 1 AND 2

26 TH FEBRUARY 2015 **2PM – 4PM**

SECTION A: MULTIPLE CHOICE QUESTIONS (1 mark for each correct answer)

- Write your index number on your answer sheet
- There is only one correct response
- Write the correct response in the answer sheet
- Make any corrections clearly

1. Hypochromic red cells may characterize all **EXCEPT**
   a) Vitamin E deficiency
   b) Lead Poisoning
   c) Sideroblastic anaemia
   d) Iron Deficiency
   e) B Thalassaemia

A

2. Cells normally confined to the bone marrow include all **EXCEPT**
   a) Metamyelocyte
   b) Megakaryocyte
   c) Stem cells
   d) Progenitor cells
   e) Blast cell

E

3. Vitamin B_{12} is maximally absorbed in
   a) Duodenum
   b) Gastric Antrum
   c) Terminal ileum
   d) Jejunum
   e) Gastric Body

C

4. Factors defined in the determination of anaemia include
   a) Surface area
   b) Body mass index
   c) Weight
   d) Age
   e) Height

D

5. Folate in the plasma is bound to
   a) Haemoglobin
   b) Albumin
   c) Gammaglobulin
   d) Haptoglobulin
   e) Transferrin

B

6. A normal haemoglobin variant
   a) Hb AS – sickle cell trait Hb
   b) Hb Barts – produced in α-thalassemia – Extremely ↑affinity for O_2 – Lethal
   c) HB SF – β-thalassemia
   d) Hb Gower 1 – during embryonic life – primary Hb, together with Hb Gower 2, Hb portland
   e) Hb Nyanza ✓ – Hb T Nyanza : α21 (B2) Ala-Asp

D

7. Red cell inclusions seen in peripheral blood film include:
   a) Dohle bodies
   b) Howell jolly bodies ✓ (purple Nuclear remnants seen in megaloblastic Anaemia)
   c) Primary azurophilic granules
   d) Auer rods
   e) Toxic vacuolations

B

8. Iron absorption is enhanced by
   a) Acchlohydria
   b) Alkaline PH
   c) Ferrous state – Fe^{2+}
   d) Ferric State – Fe^{3+}
   e) Tannin

C

9. Haematopoiesis in the human embryo occurs in the
   a) Bone marrow
   b) Yolk sac
   c) Thymus
   d) Spleen
   e) Liver

B

10. The initial evaluation of anaemia must include all the following EXCEPT
    a) White cell count
    b) Reticulocyte count
    c) Bone marrow aspirate examination
    d) Blood film ✓
    e) Red cell count ✓

A

11. Bone marrow stromal cells include all EXCEPT

A

a) Kuppfer cells
b) Endothelial cells
c) Fibroblasts
d) Reticulocyte cells
e) Macrophages

12. Iron transport in the plasma is mainly in the form of

B

a) Ferritin
b) Transferrin
c) Heme
d) Haemosiderin
e) Methaemoglobin

13. Determination of haemoglobin reference ranges considers all the following EXCEPT

A

a) Body mass index
b) Gender
c) Age
d) Physiological status
e) Residence

14. The following parameter may be used to measure the degree of anaemia

D

a) MCV
b) MCHC
c) MCH
d) Haematocrit
e) Red cell diameter

15. Hormones that play a role in haemopoiesis includes:

B

a) Insulin
b) Thyroxine
c) Parathormone
d) Androgens
e) Prolactin

16. True about vitamin B12

A

a) Synthesized by micro-organisms
b) Available in selected plant foods
c) Easily denatured by boiling
d) Normal diet contains 5-30 mg of Vit B12 daily
e) Highest amounts found in eggs milk and cheese

23. The abnormality that reflects defective haemoglobin synthesis is:

a) Macrocytosis
b) Reticulocytosis
c) Heinz bodies
d) Howell-jolly bodies
e) Ring siderobiasts

C

24. Fetal haemoglobin(HbF) consists of the following chains

a) 2 alpha and 2 zeta
b) 2 alpha and 2 gamma
c) 2 alpha and 2 epsilon
d) 2 alpha and 2 delta
e) 2 alpha and 2 beta

B

25. The following range of Hb level is normal for an adult male in Kenya

a) 10-15g/dl
b) 12-16g/dl
c) 13-18g/dl
d) 15-20g/dl
e) 10-20g/dl

C

26. The cause of the sickle shape in sickle cell anaemia is

a) Abnormal rbc membrane structure
b) Defect in the vasculature
c) Abnormal rate of globin chain synthesis
d) Point mutation in red cell enzyme genes
e) Point mutation in β globulin gene

E

27. The sickle cell crises is best defined as

a) Hypoxic state causing sickling of red cells
b) Skeletal abnormalities seen
c) Increased intensity of what is occurring in the steady state
d) Increased jaundice
e) All the above are true

A

28. Diagnostic test in sickle cell anaemia is:

a) Sickling test
b) Haemoglobin electrophoresis
c) Elevated LDH levels
d) Peripheral blood film appearances
e) b and c

B

17. Reticulocyte recognition in supravital staining is based on presence of
    a) Iron
    b) Haemoglobin
    c) DNA
    d) Membrane
    e) RNA

18. Biochemical findings in iron deficiency
    a) Reduced transferrin receptors
    b) Elevated transferrin saturation
    c) Raised serum ferritin levels
    d) Elevated total iron binding capacity
    e) Elevated mean cell volume

19. Deficiency of folate may result in the following condition
    a) Severe haemorrhage
    b) Pernicious anaemia
    c) Chronic haemolysis
    d) Usually accompany Vitamin B12 deficiency
    e) Resection of terminal ileum

20. Target cells may be seen in all the following EXCEPT
    a) Liver disease
    b) Haemoglobin C disease
    c) Sickle cell disease
    d) Aplastic anaemia
    e) Thalassaemia trait

21. The secondary structure of haemoglobin is:
    a) The amino acid chain
    b) Coming together of the four globin chains
    c) Folding of the polypeptide chain to create a niche for the haem group
    d) Folding of the polypeptide chain upon itself to the alpha helix form
    e) Synthesis of the amino acid groups that form the β chain

22. Iron is stored primarily in the form of
    a) Haemosiderin
    b) Myoglobin
    c) Haem
    d) Ferritin
    e) Transferrin

29. The following is NOT a physical feature associated with SCD
    a) Bossing of the skull
    b) Splenomegaly
    c) Proptosis
    d) Non-healing leg ulcers
    e) Hip joint deformity

30. Important aspects of comprehensive care of sickle cell disease includes all EXCEPT
    a) Education of parent/patient
    b) Psychosocial support
    c) Genetic counseling
    d) Multidisciplinary management
    e) Limitation of as much activity as possible

31. Lymphocyte count expected in a normal adult male:
    a) 4-11 x 10^9/l
    b) 0.4 – 0.6 x 10^9/l
    c) 5.2 x10^9/l
    d) 1.5 -4.5 x10^9/l
    e) 2.5-8.5 x 10^9/l

32. Foetal haemoglobin consists of:
    a) 2 a and 2 gamma
    b) 2 a and 2 epilson
    c) 2 a and 2 zeta
    d) 2 a and 3 delta
    e) 2 a and 3 beta

33. Lymphopenia may be seen in
    a) Acute chest syndrome
    b) Steroid therapy
    c) Viral infections
    d) Chronic lymphocytic leukaemia
    e) Chronic Lymphocytic leukaemia

34. Hereditaly spherocytosis is associated with
    a) Abnormal cytochrome p-450 in the red cell
    b) Ringed sideroblasts
    c) Increase in surface area to volume ratio of the red cell membrane
    d) Deficiency of spectrin in the red cell membrane
    e) Absence of mitochondria in the red cell

35. G6PD, deficiency is commonly found in this region
    a) Northern Europe
    b) Middle East
    c) North West Asia
    d) South America
    e) Australasia

36. When haemolytic disease of the newborn is suspected:
a) Coombs test is positive in the mother
b) Coombs test is positive in the baby
c) Coombs test is positive in the father
d) Mother and baby usually have similar ABO blood group
e) Mother and baby usually have similar rhesus blood group

B

37. A laboratory finding in red cell haemolysis
a) Increased haptoblobulin levels
b) Indirect bilirubinaemia
c) Reduced LDH
d) No bilirubin in urine
e) Hyperuricaemia

B

38. The following is true in the management of Anaemia
a) Haematinic supplements are always indicated
b) Bone marrow examination usually reveals the cause
c) The cause is not usually found in those with normocytic normochromic red cell picture
d) The red cell count is a more accurate parameter in the evaluation of anaemia than haemoglobin level
e) Reticulocyte count is a good indicator of red cell production

E

39. A laboratory finding that may indicate the cause of anemia:
a) Reduced MCH
b) Reduced MCHC
c) Raised serum bilirubin
d) Normal MCH
e) Raised neutrophil alkaline phosphatase

40. A feature associated with haemolysis
a) Increased Indirect (unconjugated) bilirubin
b) Increased direct (conjugated) bilirubin
c) Increased haptoglobins
d) Reduced reticulocyte count
e) Reduced bone marrow activity

A

41. The mean osmotic flagility is increased in
a) Sickle cell disease
b) Thalassaemia syndromes
c) Congenital hereditary spherocytosis
d) Iron deficiency anaemia
e) Megaloblastic anaemia

C

42. The following cell is **NOT** a phagocyte:

a) Monocyte
b) Lymphocyte
c) Neutrophil
d) Basophil
e) Eosinophil

43. The highest incidence of Thalassaemia is found in

a) East Africa
b) West Africa
c) South Africa
d) Mediteranean
e) Sri Lanka

44. Causes of monocytosis include:

a) Pertusis
b) Malaria infection
c) Viral infections
d) Infectious hepatitis
e) Infectious mononucleosis

45. **NOT** a cause of eosinophilia:

a) Tropical eosinophilia
b) Typhoid infection
c) Infestation by worms
d) Allergies
e) Dermatological conditions

46. Neutrophil leucocytosis is **NOT** a feature of the following

a) Acute haemorrhage
b) Acute haemolysis
c) Leukaemoid reactions
d) Hypersplenism
e) Acute inflammation

47. One of the following is **NOT** an abnormal haemoglobin

a) Hb J Nyanza
b) Hb C
c) HB Portland
d) Hb Kansas
e) Hb Kolu

48. Bone marrow examination is **NOT** indicated for diagnosis/management of one of the following conditions:
    a) Myeloproliferative disorders
    b) Aplastic anaemia
    c) Paraproteinaemia
    d) Auto immune haemolytic anaemia
    e) Peripheral blood pancytopaenia

49. The preferred site for performing bone marrow aspiration in a 5 year old child is
    a) Tibial tuberosity
    b) Posterior iliac spice
    c) Upper end of the femur
    d) Spinous process
    e) Manubrium sternum

50. The following is **NOT** considered a haematologic effect of parasites:
    a) Thrombocytopenia
    b) Leucocytosis
    c) Polycythaemia
    d) Leucopenia
    e) Splenomegaly

51. The following parasitic disease is associated with anaemia resulting from bleeding oesophageal varices
    a) Malaria
    b) Hookworm
    c) Leishmaniasis
    d) Amoebiasis
    e) Schistosomiasis

52. The mechanisms involved in anaemia causation by parasites include all **EXCEPT:**
    a) Bone marrow suppression
    b) Haemorrhage
    c) Haemolysis
    d) Haemostatic defect
    e) Hypersplenism

53. One of the following viruses is **NOT** known to be one of the idiosyncratic causes of bone marrow failure
    a) EBV
    b) HIV
    c) CMV
    d) HPV
    e) Parvovirus

54. One of the following drugs is **NOT** strongly linked to aplastic anaemia
    a) Phenylbutazone
    b) Phenytain
    c) Paracetamol
    d) Chloramphenicol
    e) Pyrimethamine

55. One of the following is **NOT** a laboratory feature of bone marrow failure
    a) Thrombocytopenia
    b) Neutropenia
    c) Anaemia
    d) Neutrophilia
    e) Pancytopenia

SECTION B – SHORT ANSWER QUESTIONS 50 MARKS

Instructions:

1. Answer all questions.
2. Read each question carefully and answer as directed.
3. Write legibly.

1. Compare and contrast iron and vitamin B12 metabolism under the following subheadings (25 marks)
    a) Dietary sources
    b) Absorption
    c) Functions
    d) Laboratory findings in deficiency states

2. Write an essay on haemoglobin defects under the following headings
    a) i) Definition (1 mark)
        ii) Geographic distribution (4 marks)
        iii) Laboratory findings (4 marks)
    b) Select two (2) parasites and explain three (3) different mechanisms by which each parasite causes anaemia (8 marks)
    c) Write an essay on Bone Marrow Failure under the following headings
        i) Definition (1 mark)
        ii) Aetiology (4 marks)
        iii) Laboratory findings (3 marks)