Hematology Exam 1

1. Which one of the following statements is not a universal/standard condition for application in haematological settings
(a) Phlebotomy trays should be appropriately labelled to indicate potentially infectious conditions
(b) Mouth-pipetting should be prohibited
(c) Laboratory equipment and clothing should be brightly coloured to support quick perception
(d) Contaminated sharps must be disposed immediately and never be manipulated in any way

2. Haemophilia
(a) Characterised by repeated haemorrhages and reduced coagulation time
(b) Occurs only in males
(c) Is transmitted only by males and affected females
(d) Is associated with an overexpression of thromboplastinogen

3. The mean corpuscular volume (MCV)
(a) Is the average concentration of haemoglobin in the red blood cells
(b) Is unaffected by thalasaemia, reticulocytosis, and alcoholism
(c) Can be used to classify anaemia as microcytic or macrocytic
(d) Is the variation in cellular volume of the red blood cell population

4. In acute leukaemia
(a) There is rapid increase number of mature red blood cells
(b) The condition should be monitored for some time before treatment to ensure maximum effectiveness of therapy
(c) Mostly occurs on older people
(d) Malignant cells can spill into the bloodstream spread to other organs if uncontrolled

5. In blood transfusion science
(a) Donated blood can be transformed into medication by fractionation
(b) Examination of the donated blood for infectious agents, blood group and rhesus compatibility are more important than the donor's medical history
(c) Red blood cells can be stored for up to 100 days in refrigeration
(d) The pumping of blood directly from the donor to the recipient is common in modern practice

6. Hemostasis
(a) Involves the changing of blood from liquid to solid state and is the second stage in wound healing
(b) Involves platelet aggragation which is caused by nitric acid and hepcidin
(c) Involves an aspect of the Von Willebrand factor encouraging haemorrhage
(d) Vascular spasms are followed by the formation of the platelet plug

7. Which one of the following statements concerning leucopoiesis and its products is NOT TRUE
(a) Leukopoiesis occurs in the same locations as erythropoiesis
(b) It involves granulopoiesis, monopoiesis and megakaryopoiesis
(c) Agranulocytes contain non-specific granules which are lysosomes

(d) Neutrophils act as first responders in inflammatory processes

8. In the variant forms of haemoglobin
(a) Haemoglobin S occurs due to a variation in the alpha chain gene
(b) Haemoglobin H is formed by a tetramer of gamma chains
(c) The haemoglobin C variant causes a mild chronic haemolytic anaemia
(d) Haemoglobin barts is formed by a tetramer of beta chains

9. Which one of the following statements is UNTRUE of maturing erythrocytes
(a) They show an increase in cell size
(b) The cytoplasmic matrix reduces in amount
(c) There is decrease in the amount of RNA and DNA
(d) The nucleus decreases in size and finally disappears

10. In the physiology of platelet activation, activated platelets release the following EXCEPT
(a) Thromboxane A2
(b) Serotonin
(c) Histamine
(d) Platelet activating factor

11. In the estimation of the red blood cell membrane potential
(a) The zeta potential of normal erythrocytes is -115.7 millivolts (mV)
(b) The net charge of surface-exposed molecules is not an accurate estimation of the zeta potential
(c) The zeta potential gives details of the electrochemical properties of the cell surface
(d) Much of the potential is reduced by sialic acid residues

12. Select a protein which CAN BE categorised as a transport protein in red blood cells
(a) Protein 4.1 R
(b) Aquaporin 1
(c) Laminin-binding protein
(d) Adducin

13. Which one of the following statements is NOT TRUE concerning the bone marrow
(a) Early in its formation the mesenchyme differentiates into three types of tissues
(b) Its haematopoietic stem cells gradually disappear from certain areas and are then replaced by the yellow marrow
(c) The yellow marrow is incapable of reverting back to haemopoietic function
(d) Its microenvironment has a predominantly carbon dioxide environment

14. Within the splenic tissue
(a) The red pulp has a reticular tissue with narrow interstices, blood vessels and few cells
(b) The white pulp has vascular sinusoids and sinuses separated by Cords of Billroth
(c) Phagocytes degrade stressed and senescent cells
(d) Germinal centers are involved majorly in Immuboglobulin E synthesis

15. Select a structure which is NOT among the protein components found in the red blood cell lipid rafts
(a) ICAM-4

(b) Flotilins
(c) Stomatins
(d) G-proteins

16. Identify a cellular product that DOES NOT arise from the common myeloid progenitor from MPHSCs
(a) Neutrophils
(b) Natural Killer (NK) cells
(c)Megakaryocyte
(d) Monocytes

17. Which one of the following DOES NOT significantly support haematopoietic production
(a) The steel factor
(b) GM-CSF
(c) Interleukin-19
(d) IFN-?

18. In the haematopoietic process cytokine endocrine activity
(a) Involves a cytokine that is being produced by a cell affecting other neighbouring cells
(b) Involves a cytokine that is being produced by a cell affecting the cell that is producing it
(c) Involves a cytokine that is being produced by a cell and affecting distant cells
(d) Involves a cytokine that is being produced by a cell affecting the producing cell and neighbouring cells

19. Erythropoiesis proceeds via the maturation of red blood cells in the following terminal sequence
(a) Polychromatophilic normoblast, orthochromatic normoblast, reticulocyte
(b) Orthochromatic normoblast, reticulocyte, polychromatophilic normoblast,
(c) Reticulocyte, polychromatophilic normoblast, orthochromatic normoblast
(d) Orthochromatic normoblast, basophilic normoblast, reticulocyte

20. Identify the UNTRUE statement among the following
(a) Haemoglobin's globulin components are usually metabolised into amino acids
(b) Ubilinogen leaves the body in feaces in a pigment called bilirubin
(c) When iron is removed haemoglobin, it is stored in hemosiderin or transfferin
(d) When the porphyrin ring is brocken up, the fragments are normally secreted in by the liver

SECTION B: SHORT ANSWER QUESTIONS [40 MARKS]
1. Outline the needs provided for by the bone marrow microenvironment in its promotion of haematopoietic proliferation and differentiation
(4 marks)

2. Outline the general properties of colony stimulating factors (CSF) and the kit ligand
(4 marks)
3. Explain how erythropoiesis is regulated by erythropoietin (EPO) and hepcidin
(4 marks)
4. Describe the functions of T lymphocyte subtypes
(5 marks)
5. Outline the main layers that compose the red blood cell membrane

(4 marks)
6. Outline the characteristics shared by interleukins involved in regulation of haematopoiesis (4 marks)
7. Describe the events that occur in red blood cell (RBC) senescence and eryptosis
(4 marks)
8. Distinguish between the following;
(a) Autocrine and paracrine effects
(2 marks)
(b) Primary and secondary lymphoid organs (with examples)
(2 marks)
(c) The erythron concept and erythropoiesis
(2 marks)
(d) Intercellular adhesion molecules and caspaces
(2 marks)
(e) Apoptosis and angiogenesis (2 marks)
(f) Acute and chronic leukaemia
(2 marks)

SECTION C: LONG ANSWER QUESTIONS [40 MARKS]
1. Discuss the concepts of hemostasis and fibrinolysis
(20 marks)
2. Discuss the erythron concept and erythropoiesis
(20 marks)