Q.1 A 68 year old female underwent a total knee replacement. She received 2 units of group specific red cell concentrate during surgical procedure. Post operative period was un-eventful. On 10th post operative day, she reported in surgical unit with jaundice, diarrhea and skin rash. Her peripheral blood examination revealed Hb 10 g/dl, TLC 1.5x10^9/l and platelet count 12x10^9/l.

a) What is the most likely diagnosis?
b) How will you investigate her further to reach to a conclusive diagnosis? Give justification of your suggested investigations.
c) How can you prevent this complication?

Q.2 A 29 year old male visited blood bank for blood donation. The donor interview did not reveal high risk life style. Post donation initial viral screening results showed anti HIV antibodies as 1.2 (cut off 1.0), HBsAg 0.8 (cut off 1.0) and anti HCV antibodies 2.0 (cut off 1.0) by third generation ELISA methodology. Tests for malaria and syphilis were negative.

a) What is the interpretation of viral screening tests?
b) What further tests would you like to perform on the donor samples and why?
c) How would you decide re-entry of this donor in blood donation programme?

Q.3 A 50 year old male presented with fever, cough and generalized weakness. On examination, left cervical and axillary lymph nodes were palpable. Spleen was palpable 3 cm below the left costal margin. His blood counts showed Hb 11 g/dl, TLC 50x10^9/L with 95% lymphocytes/atypical lymphoid cells, and platelet count was 170x10^9/L.

a) Give five differential diagnoses.
b) How will you investigate this patient in the laboratory? Give justification for suggested investigations.
Q.4 A 25 year old male presented with progressive pallor, lethargy and easy fatigability since last few weeks. On examination, there was no visceromegaly. His CBC showed Hb 8.0 g/dl, TLC 8.0x10^9/l and platelets 20x10^9/l with occasional circulating blast cell; bone marrow examination revealed 25% blast. The blasts were large with abundant granular cytoplasm. Blasts expressed CD34, HLA-DR, CD13, CD33, CD15, MPO, CD117, and CD19 on immunophenotyping.

a) What is the FAB type of acute leukaemia based on the data provided?
b) What is the likely cytogenetic abnormality found in this phenotypic type of acute leukaemia?
c) What is the likely molecular genetic abnormality found in this acute leukaemia?

Q.5 A 55 year old male is referred to you by a dermatologist. He had been treated for intractable generalized pruritis for the last 2 weeks. His CBC showed Hb 19.2 g/dL, HCT 59%, TLC 13.5x10^9/L, Platelets 390x10^9/l. He is a known case of hypertension for the last 10 years. Outline the evidence-based risk stratification and investigations in this patient.

Q.6 List any ten situations where peripheral blood film examination provides additional help in diagnosis despite the availability of fully automated haematology analyzers.
Q.7 Your hospital administration has made a 20% budget reduction in blood bank and haematology laboratory. Write a memo for consideration to the executive director of the hospital explaining to him about the adverse implications on:

a) The quality of Lab services because of this budget reduction &,
b) Its negative impact on the increase in workload of your department due to the recent inauguration of cardiothoracic and burns units in the hospital.

Q.8 A 28 year old female at 10th week of gestation presented in the antenatal clinic. Her CBC revealed Hb10.0 g/dl, RBC count 5.5x10^6/l, MCV 65 fl, and MCH 20 pg. Her serum ferritin was 110 ng/ml (reference range 12-100 ng /ml). She was asymptomatic, and there was no visceromegaly.

a) Enlist 3 differential diagnoses in order of probability,
b) Enlist the diagnostic investigations (with justification) and mention the limitation of these investigations.
c) In case, if initial diagnostic investigations are negative, how will you proceed further?

Q.9 A 5 year old boy, diagnosed as acute lymphoblastic leukaemia (CALLA POSITIVE); received induction chemotherapy with standard risk protocol. On day 28 of treatment, bone marrow biopsy revealed 5% blast. His oncologist is concerned about persistence of minimal residual disease.

a) Name the techniques available to detect minimal residual disease in ALL.
b) Which method will you select in this case and why?

Q.10 A 46 year old man is referred to the haematology clinic with an absolute eosinophil count of 3.5x10^5/l.
Briefly outline the investigational algorithm for this case.
Q.11 A 2 year old boy presented in emergency with swollen and tender right knee joint. Patient had a history of frequent episodes of bleeding and bruising post trauma. CBC showed Hb 12 g/dl, TLC 6 x 10^9/l and platelets 250 x 10^9/l. Coagulation profile showed, PT 13 sec (control 10 sec) and APTT 80 sec (control 30 sec).

a) List three differential diagnoses for this patient.
b) What laboratory investigations are required to arrive at a final diagnosis?
c) Enlist the supportive and specific measures for this patient.

Q.12 A 13 year old girl presented with menorrhagia since menarche. She had a history of easy bruising since childhood. No family history of similar problem. CBC showed Hb 4.2 g/dl, MCV 66 fl, MCH 20 pg, TLC 9.5 x 10^9/l and platelets 42 x 10^9/l with flagging for large platelets.

a) Give three differential diagnoses.
b) What laboratory investigations are required to arrive to a final diagnosis? Give reasons to support your investigations.

Q.13 Your hospital obstetrician asked your advice for a 22 year old female who presented with pulmonary embolism at 34th week of pregnancy.

a) Enlist factors which potentiate thromboembolism in pregnancy.
b) What advice will you give to the obstetrician on anticoagulation; during pregnancy, labour and postpartum period?

Q.14 A 5 year old girl presented with generalized weakness, off and on fever and repeated episodes of epistaxis. CBC showed Hb 7.3 g/dl, MCV 99 fl, TLC 2 x 10^9/l and platelets 15 x 10^9/l.

a) Give three likely diagnoses?
b) What laboratory investigations are required? Give reasons to support your laboratory investigations.
Q.15 A 52 year old gentleman presented with easy fatigability and mouth ulcers for the last 3 months. Physical examination showed pallor and no visceromegaly. CBC showed Hb 8.5 g/dl, MCV 99 fl, TLC 2.5 x 10⁹/l and platelets 20 x 10⁹/l. Peripheral film showed hypo-granularity and abnormal nuclear segmentations in neutrophils.

a) What is the most likely diagnosis?
b) What are the laboratory investigations required in this patient? Give justification.

Q.16 A 12 year old boy presented in comatose state in emergency unit with high grade fever, rigors and headache. He was passing dark brown coloured urine since last night (G6PD level was normal). CBC showed Hb 9.0 g/dl, TLC 12.0 x 10⁹/l and platelet count 30 x 10⁹/l.

a) Give the most likely diagnosis.
b) What further laboratory investigations are required to confirm the diagnosis and management of this patient?
c) Enlist haematological indicators which favour poor prognosis in this patient.

Q.17 Outline the factors associated with poor outcome in allogeneic stem cell transplant in patients with severe aplastic anemia.

Q.18 A one month old baby boy presented with bruising, fever, pallor and Down’s facies. CBC showed Hb 6.5 g/dl, TLC 68 x 10⁹/l and platelets 78 x 10⁹/l with flagging for blast cells.

a) Give two differential diagnoses.
b) What laboratory investigations will you do to arrive at a final diagnosis? Justify your answer with reasons.
c) What is the prognosis of each condition?
Q.19 A newborn delivered at 34 weeks of gestation showed Hb 8.2 g/dl, TLC $18 \times 10^9/l$, and platelets $412 \times 10^9/l$.

   a) Give three possible reasons for anaemia in this neonate.
   b) List important requirements for selecting a unit of red cell concentrate for this patient.
   c) What additional measures will you suggest to the neonatologist for correction of anaemia?

Q.20 A 12 year old male with Beta-thalassaemia major is on irregular blood transfusion since the age of 1 year.

   a) How will you assess the iron status of this patient?
   b) What investigations will assist in monitoring of tissue damage?