

The West Bengal University of Health Sciences
3rd BMLT September, 2023 Examination

Subject: Blood Bank and Special Hematology

Time: 3 hrs.

Full Marks: 100

Attempt all questions

1. Answer the following :

20 x 1

- a) All of the following are transfusable components that can be derived from donated blood, except:
 i) Platelets. ii) Plasma. iii) Cryoprecipitated AHF. iv) Agranulocytes.
- b) Red cells and whole blood must always be stored at a temperature between:
 i) $+2^{\circ}\text{C}$ to $+6^{\circ}\text{C}$. ii) 0°C to $+2^{\circ}\text{C}$. iii) -8°C to $+0^{\circ}\text{C}$. iv) -15°C to -8°C .
- c) At the time of platelet release reaction, alpha granules contain:
 i) ADP. ii) Histamine. iii) Epinephrine. iv) All of above.
- d) Endothelial injury is of significance in:
 i) Arterial thrombi. ii) Platelet plugging. iii) Blood clot. iv) Cardiac surgery.
- e) No specific esterase staining technique is used to confirm:
 i) AML-7. ii) AML-4. iii) AML-9. iv) CML.
- f) CML is a kind of:
 i) Erythroid cell disorder. ii) Myeloid series disorder.
 iii) Lymphoid disorder. iv) None of above.
- g) Saturated Copper sulphate is used for determination of:
 i) Blood group. ii) Rh typing. iii) Haemoglobin. iv) Coomb's test.
- h) CLL is a malignancy of mature WBC & which cells are related?
 i) Platelets. ii) Lymphocytes. iii) Neutrophils. iv) Basophils.
- i) ALP is present in the cytoplasm of:
 i) Lymphocytes. ii) Neutrophils. iii) Eosinophils. iv) Platelets.
- j) The surface of RBC contain:
 i) Plasma protein. ii) Antibodies. iii) Antigens. iv) Enzymes.
- k) Human blood group system is discovered by Landsteiner in:
 i) 1800 AD. ii) 1900 AD. iii) 1910 AD. iv) 1780 AD.
- l) A person is carrying blood group A, so plasma consists:
 i) Anti- B antibodies. ii) Anti- A antibodies.
 iii) Anti- AB antibodies. iv) Anti- Rh D antibodies.
- m) A person is able to donate blood in Blood Bank whose Hb is minimum:
 i) 10 gm%. ii) 1.5 gm%. iii) 14 gm%. iv) 15 gm%.

P.T.O

- n) The platelets is responsible for formation of:
- i) Intrinsic prothrombin activator.
 - ii) Extrinsic prothrombin activator.
 - iii) Calcium activator.
 - iv) All of the above.
- o) Prothrombin activator that is formed in intrinsic & extrinsic pathways converts Prothrombin to:
- i) Thrombin.
 - ii) Fibrinogen.
 - iii) Calcium.
 - iv) Thromboplastin.
- p) Which type of test is performed for Blood grouping in the lab?
- i) Genotype.
 - ii) Phenotype.
 - iii) Offspring system.
 - iv) Hereditary.
- q) In case leukemia reaction, the TLC is:
- i) Highly increased.
 - ii) Moderately increased.
 - iii) Normal count.
 - iv) Markedly decreased.
- r) Du conformation test is done for detection of:
- i) ABO group.
 - ii) RH typing.
 - iii) Coomb's reation.
 - iv) Cross matching.
- s) Which is the following condition cause leukaemoid reaction?
- i) Down's syndrome.
 - ii) Symon's disease.
 - iii) HIV.
 - iv) Hbs Ag.
- t) Which is the following as example for haemorrhagic disorders?
- i) Thrombosis.
 - ii) Von Willebrand disease.
 - iii) P. Vera.
 - iv) Arteriosclerosis.

2. Write short notes on the following :

5 x 2

- a) Thrombosis.
- b) ITP.
- c) Hemophilia.
- d) Leukaemia.
- e) Blood donor.

3. Write short notes on *any six* of the following :

6 x 5

- a) Du confirmation.
- b) Rejection of donor.
- c) Platelet rich plasma.
- d) Coagulation factors.
- e) Titration of Anti D.
- f) CML.
- g) Forward blood group.
- h) Cytochemistry for Acute leukemia.

4. Answer *any one* of the following questions :

1 x 10

- a) What is Rh Anti- D? How do you perform indirect commb's test?
- b) Differentiate in between CML & AML.

2+8

10

5. Answer *any two* of the following questions :

2 x 15

- a) Give the PBF features of CML. Write the importance of peroxidase test? How do you select a donor?
- b) How do you prepare antisera in the lab? Write in details about post transfusion reaction.
- c) What is pilot tube? Write about various methods for disposal of materials in blood bank.

5+5+5

7+8

15

The West Bengal University of Health Sciences
3rd BMLT September, 2023 Examination

Subject: Clinical Immunology Mycobacteriology and
 Applied Microbiology

Time: 3 hrs.

Full Marks : 100

Attempt all questions

1. Answer the following questions : 10 x 1
- The inappropriate response of immune system towards a relatively harmless antigen causing harm to the host is referred as:

☒ i) Hypersensitivity
ii) Auto-Immune Diseases
iii) Immunodeficiency
iv) Tolerance
 - Which of the following Ig is involved in mediating allergic reactions?

i) IgG
ii) IgM
☒ iii) IgE
iv) IgA
 - Which one of the following is a cell mediated hypersensitive reaction

i) Type I
ii) Type II
iii) Type III
☒ iv) Type IV
 - HIV attacks

☒ i) T helper cells
ii) T cytotoxic cells
iii) B cells
iv) Mast cell
 - Name the congenital defect of thymus development that can lead to T-cell deficiency

i) Graves' disease
ii) Anaphylaxis
☒ iii) DiGeorge's syndrome
iv) None of these
 - The major chemical messenger involved in hypersensitivity is

i) Interleukines
ii) Lymphokines
☒ iii) Histamines
iv) Interferons
 - A living microbe with reduced virulence that is used for vaccination is considered:

i) A toxoid
ii) Dormant
iii) Virulent
☒ iv) Attenuated
 - Large parasites such as helminthes may be killed extracellularly by the action of

i) Basophils
ii) Monocytes
☒ iii) Eosinophils
iv) Neutrophils
 - In an agglutination reactions, the antigen is a..... and in a precipitation reaction, the antigen is a.....

i) Bacterium/virus
ii) Soluble molecule/whole-cell

☒ iii) whole-cell/soluble molecule
iv) Protein/antibody
 - B cells that produce and release large amounts of antibody are called:

i) Memory cells
ii) Basophils
☒ iii) Plasma cells
iv) Neutrophils
2. Answer **any four** the following questions. 4 x 5
- Type III hypersensitivity.
 - HAT medium.
 - ☒ Classical Complement Pathway.
 - ☒ Coombs Test.
 - ☒ Radio Immuno Assay.
3. Answer **any two** of the following :
- Explain antibody-independent cell-mediated cytotoxicity. Differentiate between active and passive immunity. Define Opsonization. 5+3+2
 - Describe the mechanisms for antigen processing and presentation via MHC class I and class II molecules to T lymphocytes. 10
 - ☒ Define structure and properties of immunoglobulin classes. Discuss about natural killer cells. 7+3

P.T.O.

4. Answer the following questions :

10 x 1

- a) Which one is considered to be the positive result of Presumptive test?
 - i) Production of acid after 24-48hrs of incubation
 - ii) Production of gas after 24-48hrs of incubation
 - ☒ iii) Production of both acid and gas after 24-48hrs of incubation
 - iv) None of these
- b) Which of the following organism is positive quality control strain of Albert staining?
 - i) Staphylococcus aureus
 - ii) Mycobacterium tuberculosis
 - iii) Clostridium tetani
 - ☒ iv) Corynebacterium diphtheriae
- c) The association which involves the exchange of nutrients between two species is called:
 - ☒ i) Mutualism
 - ii) Commensalism
 - iii) Syntrophism
 - iv) Antagonism
- d) Which of the following organism is the quality control strain of mannitol salt agar?
 - ☒ i) Staphylococcus aureus
 - ii) Streptococcus pyogenes
 - iii) Clostridium perfringens
 - iv) Bacillus anthracis
- e) Bacterial load in an operation theatre is determined by:
 - i) Slit sampler method
 - ii) Open petridish method
 - ☒ iii) Settle plate method
 - iv) all of the above
- f) Which bacteriocin is produced by E.coli ?
 - i) Pyocin
 - ☒ ii) Colicin
 - iii) Marcescin
 - iv) Klebicin
- g) Which of the following bacteria is present as normal flora in the acidic pH of the vagina?
 - i) Clostridium botulinum
 - ☒ ii) Lactobacillus acidophilus
 - iii) Neisseria gonorrhoeae
 - iv) Streptococcus mutans.
- h) Which of the following microorganism can be found as normal flora in the nasopharynx of healthy individuals?
 - i) Mycobacterium tuberculosis
 - ☒ ii) Streptococcus pneumonia
 - iii) Clostridium difficile
 - iv) Bacillus cereus
- i) Which of the following microorganism is a predominant flora of the skin?
 - i) Bacillus anthracis
 - ii) Clostridium perfringens
 - iii) Leptospira interrogans
 - ☒ iv) Staphylococcus epidermidis
- j) Which of the following bacteria are a part of normal flora present inside the mouth and also a frequent cause of bacterial dental caries?
 - i) Staphylococcus epidermidis
 - ii) Lactobacillus acidophilus
 - ☒ iii) Streptococcus mutans
 - iv) Candida albicans

4. Write short note on **any four** of the following :

4 x 5

- ☒ a) Quality control of staining technique.
- ☒ b) Any one method of measuring air contamination.
- ☒ c) Normal flora of Urogenital tract.
- ☒ d) Advantages and disadvantages of Normal flora of human body.
- ☒ e) Write down a short note on Membrane filter method.

5. Answer **any two** of the following :

- ☒ a) Describe the pathogenesis and clinical manifestations of TB. Write down the lab diagnosis of this disease. 3+3+4
- ☒ b) How can you isolate and enumerate microorganisms from soil sample? Which physical and chemical parameters should you check during a culture media preparation? 7+3
- ☒ c) Describe about the normal flora of GI tract. 10

The West Bengal University of Health Sciences

3rd BMLT September, 2023 Examination

Subject: Clinical Biochemistry

Full Marks: 100

Time: 3 hrs.

Attempt all questions

20 x 1

1. Answer all the questions :

- a) What does QA and QC stand for?
 - i) Quality assurance and quality control
 - ii) Quality assurance and quality completion
 - iii) Both of these
 - iv) None of these
- b) Which technique separates charged particles using electric field?
 - i) Hydrolysis
 - ii) Centrifugation
 - iii) Electrophoresis
 - iv) Both ii) and iii)
- c) The speed of migration of ions in electric field depends upon:
 - i) Shape and size of the molecule
 - ii) Magnitude of charge and shape of molecule
 - iii) Magnitude of charge and mass of molecule
 - iv) Both i) and ii)
- d) Which of the following option involves material and component control?
 - i) Development of standards
 - ii) Development of specification
 - iii) Quality control
 - iv) Feedback
- e) Process control is carried out:
 - i) Before production
 - ii) During production
 - iii) After production control
 - iv) All of these
- f) The mean sampling distribution is:
 - i) Less than mean process distribution
 - ii) More than mean process distribution
 - iii) Equal to mean process distribution
 - iv) Both ii) and iii)
- g) When is electrophoresis not used?
 - i) Separation of proteins
 - ii) Separation of lipids
 - iii) Separation of nucleic acid
 - iv) Separation of amino acids
- h) Nucleic acids cannot be separated by:
 - i) SDS-PAGE
 - ii) Native PAGE
 - iii) Agarose gel electrophoresis
 - iv) Both i) and ii)
- i) The pH of the stacking gel in SDS-PAGE is:
 - i) 7.0
 - ii) 6.8
 - iii) 8.0
 - iv) None of these
- j) In electrophoresis DNA will migrate towards:
 - i) Cathode or positive electrode
 - ii) Anode or negative electrode
 - iii) Cathode or negative electrode
 - iv) Anode or positive electrode
- k) The most common type of gel used for DNA separation:
 - i) Agar
 - ii) Polyacrylamide
 - iii) Agarose
 - iv) Cellulose
- l) In SDS-PAGE separation is based on:
 - i) Molecular weight
 - ii) Shape
 - iii) Charge
 - iv) All of these
- m) Chromatography is a physical method that is used to separate:
 - i) Simple mixtures
 - ii) Complex mixtures
 - iii) Viscous mixtures
 - iv) Metals
- n) Which force is involved in chromatography:
 - i) Hydrogen bonding
 - ii) Electrostatic interaction
 - iii) Hydrophobic interaction
 - iv) All of these
- o) Ion exchange chromatography is based on:
 - i) Electrostatic interaction
 - ii) Electrical mobility of ionic species
 - iii) Partition chromatography
 - iv) All of these

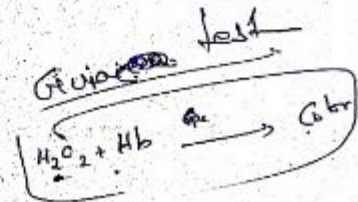
P.T.O.

- p) Primer used for the process of polymerase chain reaction are _____
☒ i) Single stranded DNA oligonucleotide ii) Double stranded DNA oligonucleotide
☐ iii) Single stranded RNA oligonucleotide iv) Double stranded RNA oligonucleotide
- q) Which of the following is not an application of ELISA?
☐ i) Detection of hepatitis B markers in serum
☒ ii) Percentage of Hb in blood
☐ iii) Detection of HIV antibodies in blood sample
☐ iv) Detection of mycobacterium antibodies in tuberculosis.
- r) At what temperature does denaturation of DNA double helix takes place?
☐ i) 60° ☐ ii) 54° ☐ iii) 74° ☒ iv) 94°
- s) The technique used to transfer DNA molecules separated by gel electrophoresis to the nitrocellulose or nylon membrane is called _____
☐ i) Western blotting ☐ ii) Northern blotting ☒ iii) Southern blotting ☐ iv) None of these
- t) Reverse transcription PCR uses _____
☒ i) RNA as a template to form DNA ☐ ii) mRNA as a template to form cDNA
☐ iii) DNA as a template to form ssDNA ☐ iv) all of these

2. Answer the following :

5 x 2

- a) What is paper chromatography?
b) Write the usefulness of centrifugation.
c) What is ion-selective electrodes used for?
d) Define quality control protocol.
e) What is the clinical significance of cardiac troponin?



6 x 5

3. Answer *any six* of the following :

- a) Distinguish between PCR and real time PCR.
b) Write a short note on two-dimension gel electrophoresis.
c) Explain the relationship between quality control and quality management.
d) What is creatine kinase and what is its significance?
e) Explain the role of carbonic anhydrase in digestion.
f) Write a short note on thin layer chromatography.
g) Distinguish between HPLC and HPTLC.
h) Name two isozymes and state their clinical significance.

4. Answer *any one* of the following:

1 x 10

- a) Write a short note on clinical application of chemiluminescence.
b) What is proficiency testing? Define its role in laboratory processes.

5. Answer *any two* of the following :

2 x 15

- a) Write short notes on:
i) Gel filtration chromatography ii) Sandwich ELISA iii) Prostate specific antigen
b) Enumerate the tests to diagnose HIV-AIDS. Enumerate on the various stages of the disease and for various objectives these tests are being used.
c) Distinguish between isoelectric focusing and SDS-PAGE.

5+10

The West Bengal University of Health Sciences
3rd BMLT November-December, 2022 Examination

Subject: Clinical Biochemistry

Time: 3 hrs.

Full Marks: 100

Attempt all questions

1. Answer all the questions :

20 x 1

- a) Incubating an ELISA plate with antigen or antibody is known as _____ :
 i) Sandwiching. ii) Detection. iii) Coating. iv) Blocking.
- b) Which of the following chemicals will you prefer to visualize the band of extracted DNA in PAGE technique?
 i) EtBr. ii) EDTA. iii) Ba(OH)₂. iv) CH₃COONa.
- c) Which of the following chemicals is used for phase separation?
 i) Phenol. ii) Chloroform. iii) Sulphuric acid. iv) Ethanol.
- d) Which technique will you prefer to quantify the isolated DNA molecules?
 i) Chromatography. ii) ELISA.
 iii) Spectrophotometry. iv) Colorimeter.
- e) Why are monoclonal antibodies useful?
 i) They work quicker than regular antibody preparations.
 ii) They are longer lasting than regular antibody preparations.
 iii) They are obtained from a single animal.
 iv) They are pure preparations of a single antibody molecule.
- f) The polymerization of the gel used in PAGE occurs between polyacrylamide and _____ :
 i) N, N – acrylamide. ii) Bisacrylamide.
 iii) N – methyleneacrylamide. iv) N, N – methylene bisacrylamide.
- g) Which membrane is used in blotting?
 i) Agarose. ii) Sucrose. iii) Polythene. iv) Nylon.
- h) If the values of two variables move in the same direction, _____
 i) The correlation is said to be non-linear.
 ii) The correlation is said to be linear.
 iii) The correlation is said to be negative.
 iv) The correlation is said to be positive.
- i) Find the median of the given set of numbers: 2,6,6,4,8,9,2,7 :
 i) 6. ii) 8. iii) 4. iv) 5.
- j) What is agarose gel?
 i) Cross linkage molecules.
 ii) Purified unchanged polysaccharide.
 iii) It is prepared by dissolving 0.5% agarose in boiling water and allowing it to cool to 40°C.
 iv) All of the above.
- k) The total process whereby the quality of laboratory report can be guaranteed is called as :
 i) Quality Control. ii) Quality Assurance.
 iii) Quality Assessment. iv) All of these.
- l) A system for measuring all the aspects of quality policies is known as :
 i) Quality Control. ii) Quality Assessment.
 iii) Quality Assurance. iv) All of these.
- m) Quality Assurance requires :
 i) Quality Improvement. ii) Quality Planning.
 iii) Quality Control. iv) All of these.
- n) Which of the following is not the characteristic of ion selective electrodes?
 i) It is fragile. ii) Easy to use.
 iii) Available in different sizes and shapes. iv) It is insensitive to many ions.
- o) In liquid membrane electrode, the liquid ion exchanger is held in a porous disc of _____ :
 i) Solid material. ii) Semi-permeable membrane.
 iii) Hydrophobic material. iv) Water absorbing material.

P. T. O.

- p) In which of the following condition, the level of creatinine kinase 1 is increased?
 i) Myocardial ischemia. ii) Brain ischaemia.
 iii) Kidney Damage. iv) Electrical cardioversion.
- q) The coefficient of variation is computed by :
 i) $S.D./Mean \times 100$. ii) $S.D./Mean$.
 iii) $Mean./S.D \times 100$. iv) $Mean/S.D$.
- r) Range of the data 4, 7, 8, 9, 10, 12, 13 and 17 is :
 i) 4. ii) 17. iii) 13. iv) 21.
- s) If Mean = Median = Mode, then it is :
 i) Symmetric distribution. ii) Asymmetric distribution.
 iii) Both symmetric and asymmetric distribution. iv) None of these.
- t) Which one is a measure of dispersion :
 i) Range. ii) Quartile deviation.
 iii) Mean deviation. iv) All of the above.

2. Answer **any four** of the following :

4 x 5

- a) Write down the difference between normal phase and reverse phase chromatography.
 b) What do you mean by IMAC?
 c) Write down the name of different isoenzymes of LDH by mentioning the composition of their subunits.
 d) Write down the importance of blocking in western blotting.
 e) Describe the role of SDS in SDS-PAGE.

3. Answer **any six** of the following :

6 x 5

- a) Write a short note on: Southern Blotting.
 b) Write a short note on : Competitive ELISA.
 c) Write a short note on : Ion Selective Electrode.
 d) Write a short note on : Real Time PCR.
 e) Write a short note on: Paper Electrophoresis.
 f) Discuss the methods and importance of DNA isolation.
 g) Write a short note on : Ion Exchange Chromatography.
 h) Describe the importance of carbonic anhydrase as a biomarker.

4. Answer **any one** of the following :

- a) Mention the factors influence electrophoresis and explain in detail. Write down the classification of electrophoresis. 7+3
 b) What is total quality management? Discuss about Westgard Multirule. 3+7

5. Answer **any two** of the following :

- a) Write down the principle, instrumentation, application, advantage, limitation and maintenance of the semi autoanalyzer. 15
 b) Describe about regulatory bodies concerned with biosafety and bioethics of the laboratory. Discuss in brief about the different quality control measurement process. What are the importance of IQC and EQC? 5+5+5
 c) Why CV is preferred over SD? Calculate the SD of both group and find out whether or not there is a significant correlation between these two parameters. 3+3+3+6

	1	2	3	4	5	6	7	8	9
Group A(Height in cm)	165	182	170	162	160	165	170	170	165
Group B(Weight in Kg)	58.5	60.0	52.0	48.5	49.5	59.0	49.0	56.0	58.0

The West Bengal University of Health Sciences
3rd BMLT November-December, 2022 Examination

**Subject: Clinical Immunology Mycobacteriology and
 Applied Microbiology**

Time: 3 hrs.

Full Marks : 100

Attempt all questions

1. Answer the following questions : 10 x 1
 - a) Name the molecule which is constitutively expressed on the dendritic cell.
 i) Class I MHC. ii) Class II MHC. iii) Immunoglobulin. iv) Antigen.
 - b) Monocytes differentiate into which kind of phagocytic cells?
 i) Neutrophil. ii) B cell. iii) Macrophage. iv) T cell.
 - c) Which of the following substances will not stimulate an immune response unless they are bound to a larger molecule?
 i) Antigen. ii) Virus. iii) Hapten. iv) Antibody.
 - d) Monocytes differentiate into which kind of phagocytic cells?
 i) Neutrophil. ii) B cell. iii) Macrophage. iv) T cell.
 - e) The ability of the immune system to recognise self-antigens versus non-self-antigen is an example of :
 i) Specific immunity. ii) Cell mediated immunity.
 iii) Tolerance. iv) Humoral immunity.
 - f) Which of the following immunity is obtained during a lifetime?
 i) Acquired immunity. ii) Active immunity.
 iii) Passive immunity. iv) None of the above.
 - g) How do CD8 eliminate their targets?
 i) Via activation of alternating pathway of complement.
 ii) After recognition of antigen connected with class II MHC molecule.
 iii) After recognition of antigen, connected with class I MHC molecule.
 iv) Due releasing of interferon.
 - h) Which of the following part of the HIV is bound to CD4 receptor of T per cell?
 i) gp 100. ii) gp 120. iii) gp 130. iv) gp 140.
 - i) What do mature B-lymphocytes express on their surface?
 i) IgM & IgA. ii) Ig & IgE. iii) IgM & IgD. iv) IgG & IgD.
 - j) Injection of antiserum induces :
 i) Active Immunity. ii) Passive Immunity. iii) Tertiary Immunity. iv) Class I immunity.
2. Answer **any four** of the following : 4 x 5
 - a) Delayed-type hypersensitivity. b) Structure of MHC I. c) Immuno diffusion techniques.
 - d) Secondary lymphoid organs. e) Organ transplantation.
3. Answer **any two** of the following :
 - a) Describe the mechanisms for antigen processing and presentation via MHC class I and class II molecules to T lymphocytes. 10
 - b) Write down the importance of precipitation reactions. Describe the mechanism of alternating pathway of complement system. 5+5
 - c) Describe the steps of Monoclonal Antibody production. 10
4. Select the correct single answer : 10 x 1
 - a) Which bacteriocin is produced by E.coli?
 i) Pyocin. ii) Colicin. iii) Marcescin. iv) Klebicin.
 - b) Which of the following bacteria is present as normal flora in the acidic pH of the vagina?
 i) *Clostridium botulinum*. ii) *Lactobacillus acidophilus*.
 iii) *Neisseria gonorrhoeae*. iv) *Streptococcus mutans*.

P. T. O.

- c) Which of the following microorganism can be found as normal flora in the nasopharynx of healthy individuals?
- i) *Mycobacterium tuberculosis*. ii) *Streptococcus pneumonia*.
 iii) *Clostridium difficile*. iv) *Bacillus cereus*.
- d) *Mycobacterium leprae* is decolourised with :
- i) 5% Sulphuric Acid. ii) 5% Hydrochloric acid.
 iii) 5% Nitric acid. iv) 20% Sulphuric acid.
- e) LJ Media is sterilized by :
- i) Boiling. ii) Autoclaving. iii) Inspissation. iv) Tyndalisation.
- f) Eijkman test is carried out at which of the following temperature?
- i) 37°C. ii) 25°C. iii) 44°C. iv) 54°C.
- g) Bacterial load in an operation theatre is determined by :
- i) Slit sampler method. ii) Open petridish method.
 iii) Settle plate method. iv) All of the above.
- h) The association which involves the exchange of nutrients between two species is called :
- i) Mutualism. ii) Commensalism. iii) Syntrophism. iv) Antagonism.
- i) Which of the following organism is the quality control strain of mannitol salt agar?
- i) *Bacillus anthracis*. ii) *Streptococcus pyogenes*.
 iii) *Clostridium perfringens*. iv) *Staphylococcus aureus*.
- j) Which of the following organism is positive quality control strain of Zeihl-Neelson staining?
- i) *Staphylococcus aureus*. ii) *Mycobacterium tuberculosis*.
 iii) *Clostridium tetani*. iv) *Corynebacterium diphtheria*.
5. Write short notes **any four** of the following : 4 x 5
- a) Quality control of staining technique.
 b) Measurement of Air contamination.
 c) Lepromin test.
 d) Isolation and Enumeration of microorganisms from soil sample.
 e) Preparation of LJ Media.
6. Answer **any two** of the following :
- a) Write a short note on presumptive test. Which physical and chemical parameters should you check during a culture media preparation? 8+2
- b) Describe the pathogenesis and clinical manifestations of TB. Write down the lab diagnosis of this disease. 3+3+4
- c) Describe about the Normal flora of GI tract. Write two advantages and one disadvantage of Normal flora of human body. 7+3

The West Bengal University of Health Sciences
3rd BMLT November-December, 2022 Examination

Subject: Blood Bank and Special Hematology

Time: 3 hrs.

Full Marks: 100

Attempt all questions

1. Answer the following :

20 x 1

- a) Formation of blood cell is called :
 i) Mitosis. ii) Hemopoiesis. iii) Photosynthesis. iv) Complement fixation.
- b) During blood donation, the removal of blood components is called :
 i) Cytopheresis. ii) Plasmapheresis. iii) Apheresis. iv) Leukopheresis.
- c) Factor VII is also known as :
 i) Labile factor. ii) Stuart- Power factor.
 iii) Stable factor. iv) Hagmen factor.
- d) In Sickle cell anemia, red cell count is :
 i) Reduced. ii) Increased. iii) Normal. iv) None.
- e) Which of the following investigations should be done immediately to best confirm a non matched blood transfusion reaction?
 i) Indirect Coomb's test. ii) Direct Coomb's test.
 iii) Antibody in patient's serum. iv) Antibody in donor serum.
- f) What is the minimum you should weigh to donate blood?
 i) 40kg. ii) 50kg. iii) 55kg. iv) 60kg.
- g) Packed Red Cells can be stored at :
 i) 1-6°C. ii) 37°C. iii) 20°C. iv) -20°C.
- h) Clotting time has a normal value of :
 i) 1 to 2 min. ii) 2 to 8min. iii) 10 to 15 min. iv) 15 to 18 min.
- i) Which agglutinin is present in plasma of blood group A person?
 i) Anti A. ii) Anti B. iii) Anti Rh. iv) Both i and ii.
- j) Blood components products are :
 i) Whole blood. ii) Platelets. iii) Fresh frozen plasma. iv) All of these.
- k) Hemolytic disease of newborn is also called :
 i) Erythroblastosis Fetalis. ii) Hemoblastosis fetalis.
 iii) Thomsen -Freidenreich phenomenon. iv) Both i) and ii).
- l) Centrifuge whole blood in low speed give us :
 i) RPR. ii) PPP. iii) PC. iv) WBC.
- m) When fresh frozen plasma is thawed, a small precipitate remain adherent to the sides of the bag, which is called :
 i) Cryoprecipitate. ii) Lyophilized Fibrinogen.
 iii) Platelet Concentrate. iv) Fresh Frozen Plasma.
- n) Bombay phenotypes are individual who lack :
 i) A antigens. ii) B antigens. iii) H substance. iv) Anti H antibody.
- o) Malignant change in leucocytosis is observed in which condition?
 i) Bacterial infection. ii) Viral Infection. iii) Congenital Abnormality. iv) Leukemia.
- p) In which type of leukemia, 30-90% myeloblast cells are present in the peripheral Blood smear :
 i) Acute Myeloid Leukemia. ii) Chronic myeloid leukemia.
 iii) Chronic lymphocytic leukemia. iv) Acute lymphocytic Leukemia.
- q) In hemolytic disease of new born, Direct coombs test is used to detect :
 i) Sensitized antibodies in patients serum. ii) IgG antibodies.
 iii) Sensitized RBCs in patient serum. iv) IgM antibodies.
- r) In the case, if the recipient is AB+ve and donor is O-ve _____ Compatibility test show agglutination :
 i) Major Crossmatch. ii) Minor Crossmatch. iii) Both i & ii. iv) None of these.

P.T.O.

- ^ The D antigen is present in?
 i) Platelets. ii) RBCs. iii) WBCs. iv) None of these.
- t) Donated blood undergoes screening for which diseases?
 i) AIDS. ii) Viral hepatitis. iii) Diabetes. iv) i) and ii)
2. Write short notes on **any four** of the following : 5 x 2
- Polycythemia.
 - FFP.
 - Define leukemia.
 - What are the importance of reticulocyte count?
 - What do you know about Rh blood group system?
3. Write short notes on **any six** of the following : 6 x 5
- Importance of cross matching.
 - Change in blood on storage.
 - Disposal of laboratory waste.
 - Pre transfusion testing.
 - Maturation stages of Neutrophil.
 - Different types of blood collection bags.
 - Erythroblastosis fetalis.
 - Direct Coombs test.
4. Answer **any one** of the following questions :
- Discuss about the criteria for donor selection. Describe safe blood collection procedure in a camp. 4+6
 - What is an anti-coagulant? Describe different anticoagulants used in blood bank. Name two clotting factors present in blood. 2+6+2
5. Answer **any two** of the following questions :
- Describe the procedure of component separation. Describe briefly the use of different blood component in a hospital. 7+8
 - Describe briefly the instruments, staff pattern and Standard Operational Procedure (SOPs) to set up a Regional Blood Transfusion Centre. 15
 - Write about the diseases transmitted by blood transfusion? Write about clinical significance of blood transfusion? 9+6

The West Bengal University of Health Sciences

3rd BMLT December, 2021 Examination

Subject: Clinical Immunology and Endocrinology

Time: 3 hrs.

Full Marks: 70

Attempt all questions

1. Tick the correct answer : 5 x 1
 - a) Which of the following does not protect body surfaces?
 - i) Skin. ii) Mucus. iii) Salivary amylase. iv) Gut microflora.
 - b) Which of the following is a non-organ-specific (systemic) autoimmune disease?
 - i) Insulin dependent diabetes mellitus. ii) Myasthenia gravis.
 - iii) Systemic lupus erythematosus. iv) Pernicious anemia.
 - c) Which of the following statements does not apply to IgG?
 - i) Appears early in the primary immune response. ii) Neutralizes bacterial toxins.
 - iii) Crosses the human placenta. iv) Can fix complement.
 - d) Which one of the following is a primary lymphoid organ?
 - i) Thymus. ii) Tonsils. iii) Spleen. iv) Lymph nodes.
 - e) Which type of hypersensitivity cannot be transferred with serum antibody?
 - i) Type I. ii) Type II. iii) Type III. iv) Type IV.
2. Answer **any four** of the following : 4 x 5
 - a) Diagrammatic representation of Immunoglobulin M.
 - b) Difference between Active and Passive immunity.
 - c) Cytokines.
 - d) Major Histocompatibility complex.
 - e) Erythroblastosis fetalis.
3. Answer **any one** of the following :
 - a) Compare and contrast the structure, expression and functions of MHC class I and class II molecules. 3+3+4
 - b) Write about B cells activation and its function. 5+5
4. Answer all the questions : 5 x 1
 - a) When vasopressin is not secreted, the condition that occurs is called :
 - i) Acromegaly. ii) Diabetes insipidus. iii) Diabetes mellitus. iv) Dwarfism.
 - b) Which gland controls basal metabolic rate (BMR)?
 - i) Thyroid. ii) Parathyroid. iii) Testis. iv) Pancreas.
 - c) Which gland is located just superior to the kidneys?
 - i) Ovaries. ii) Pituitary. iii) Pancreas. iv) Adrenal.

d) The Glucagon is :

- i) Accelerates the conversion of glycogen into glucose.
- ii) Slows down glucose formation from lactic acid.
- iii) Decreases the conversion of glycogen into glucose.
- iv) Speeds up protein synthesis within cells.

e) The clusters of cells in the pancreas that produce hormones are the :

- i) Nodules. ii) Islets of Langerhans. iii) Pancreatic medulla. iv) Pancreatic cortex.

5. Answer *any four* of the following :

4 x 5

- a) Acromegaly.
- b) Role of ADH.
- c) Osteoporosis.
- d) Glucocorticoids.
- e) Mechanism of hormone action.

6. Answer *any one* of the following :

a) Describe the synthesis, function and regulation of thyroxine.

4+3+3

b) What is hormone? What are local hormones? What are hormones chemically? Describe the procedure of RIA.

2+2+2+4

The West Bengal University of Health Sciences

3rd BMLT February- March, 2021 Examination

Subject: Blood Bank and Blood Transfusion, Quality Control & Quality Assurance

Time: 3 hrs.

Full Marks: 70

Attempt all questions

Group – A

5 x 1

1. Answer the followings :

- a) When PVC is decreased the condition is called :
i) Polycythemia. ii) Dehydration; iii) Anemia; iv) All of the above.
- b) A recipient of 'B' blood group is compatible with donor of which blood group :
i) O. ii) B. iii) A. iv) Both i & ii.
- c) Find SD of the erythrocyte sedimentation rate (ESR), in normal 5 members it found to be- 4,2,5,8,6:
i) 2.30. ii) 2.24. iii) 2.50. iv) 2.70.
- d) ISO 15189:2007 based on:
i) Medical laboratories: particular requirements for quality and competence.
ii) General requirements for the competence of testing and calibration.
iii) Guidance for quality in maintaining and service industries.
iv) None of the above.
- e) ABO and Rh incompatibility will cause all except :
i) Hemolytic disease of newborn. ii) Hemorrhagic disease of newborn.
iii) Erythroblastosis fetalis. iv) Positive Coombs test.

2. Write short notes on **any four** of the following :

- a) Brief idea about cross matching. Define apheresis. 4+1
- b) What are the main difference between IQA (Internal Quality Audit) & EQA(External Quality Audit). Why correlation coefficient value lies between $-1 < r < +1$. 5
- c) What are the main difference between capillary and venous blood. What are the role of Heparin anticoagulant in biochemical analysis. 4+1
- d) Calculate the correlation Coefficient from the following data: 5
X= value of hemoglobin of people living in slum.
Y= Value of hemoglobin of people living in high society

X	15	16	12	10	8
Y	12	11	10	14	16

- e) What are the process of maintain quality manual and collection of record in clinical laboratory. 4+1
What are the role of laboratory technician in clinical laboratory.
3. a) What are the mandatory blood tests in blood banking with donor's blood. What are the role of ACD solution anticoagulant collection of blood from the donor. 8+2

or

- b) What are the automation in hematology- principle, advantages & clinical application? Write a basic difference between pre and post analytical examination. (3+3+3)+1

P. T. O.

Group – B

4. Answer the followings:

5 x 1

- a) OECD full form is:
 - i) Organization For Economic Cooperation and Development.
 - ii) Organization For Economic Coordination and Development.
 - iii) Organization For Economical Coordinator and Development.
 - iv) None of the above.
- b) Pediatric bottle optimal blood volume is:
 - i) 0-1 ml.
 - ii) 1-3 ml.
 - iii) 3-4 ml.
 - iv) 0.5-5 ml.
- c) BSL-3 laboratories are called:
 - i) Cold zone.
 - ii) life risk zone.
 - iii) Warm or neutral zone.
 - iv) All of the above.
- d) Blood borne pathogens are:
 - i) HIV & HBV.
 - ii) Influenza & malaria.
 - iii) Vibrio chlorae.
 - iv) HAV.
- e) NABH laboratory means:
 - i) To insure that the accredited laboratories adhere to all the conditions of accreditation.
 - ii) is a constituent board of quality council of India, set up to establish and operate accreditation programme.
 - iii) Certificate of compliance with laboratory in compliance with all applicable condition level requirement;
 - iv) None of these.

5. Write short notes *any four* of the following :

4 x 5

- a) Describe about specimen collection.
- b) Briefly describe about universal biosafety precaution.
- c) Brief idea about accreditation in clinical laboratory.
- d) Describe about various types of biosafety label laboratories.
- e) Write a short note about first aid in laboratory accident.

6. Answer *any one* of the following :

1 x 10

- a) Write a brief note about doctor-patient relationship and external quality-assurance.
- b) Write a brief note about disposal laboratory waste.

The West Bengal University of Health Sciences
3rd BMLT February- March, 2021 Examination

**Subject: Blood Bank and Blood Transfusion, Quality Control &
 Quality Assurance**

Time: 3 hrs.

Full Marks: 70

Attempt all questions

Group – A

1. Answer the followings :

5 x 1

- a) When PVC is decreased the condition is called :
 i) Polycythemia. ii) Dehydration; ☒ iii) Anemia; iv) All of the above.
- b) A recipient of 'B' blood group is compatible with donor of which blood group :
 i) O. ii) B. iii) A. ☒ iv) Both i & ii.
- c) Find SD of the erythrocyte sedimentation rate (ESR), in normal 5 members it found to be- 4,2,5,8,6:
 i) 2.30. ☒ ii) 2.24. iii) 2.50. iv) 2.70.
- d) ISO 15189:2007 based on:
☒ i) Medical laboratories: particular requirements for quality and competence.
 ii) General requirements for the competence of testing and calibration.
 iii) Guidance for quality in maintaining and service industries.
 iv) None of the above.
- e) ABO and Rh incompatibility will cause all except :
 i) Hemolytic disease of newborn. ☒ ii) Hemorrhagic disease of newborn.
 iii) Erythroblastosis fetalis. iv) Positive Coombs test.

2. Write short notes on *any four* of the following :

- a) Brief idea about cross matching. Define apheresis. 4+1
- b) What are the main difference between IQA (Internal Quality Audit) & EQA (External Quality Audit). Why correlation coefficient value lies between $-1 < r < +1$. 5
- c) What are the main difference between capillary and venous blood. What are the role of Heparin anticoagulant in biochemical analysis. 4+1
- d) Calculate the correlation Coefficient from the following data: 5
 $X = \text{value of hemoglobin of people living in slum.}$
 $Y = \text{Value of hemoglobin of people living in high society}$

X	15	16	12	10	8
Y	12	11	10	14	16

- e) What are the process of maintain quality manual and collection of record in clinical laboratory. 4+1
 What are the role of laboratory technician in clinical laboratory.
3. a) What are the mandatory blood tests in blood banking with donor's blood. What are the role of ACD solution anticoagulant collection of blood from the donor. 8+2

or

- b) What are the automation in hematology- principle, advantages & clinical application? Write a basic difference between pre and post analytical examination. (3+3+3)+1

P. T. O.

Group - B

5 x 1

4. Answer the followings:

a) OECD full form is:

- i) Organization For Economic Cooperation and Development.
- ii) Organization For Economic Coordination and Development.
- iii) Organization For Economical Coordinator and Development.
- iv) None of the above.

b) Pediatric bottle optimal blood volume is:

- i) 0-1 ml.
- ii) 1-3 ml.
- iii) 3-4 ml.
- iv) 0.5-5 ml.

c) BSL-3 laboratories are called:

- i) Cold zone.
- ii) life risk zone.
- iii) Warm or neutral zone.
- iv) All of the above.

d) Blood borne pathogens are:

- i) HIV & HBV.
- ii) Influenza & malaria.
- iii) Vibrio chlorae.
- iv) HAV.

e) NABH laboratory means:

- i) To insure that the accredited laboratories adhere to all the conditions of accreditation.
- ii) is a constituent board of quality council of India, set up to establish and operate accreditation programme.
- iii) Certificate of compliance with laboratory in compliance with all applicable condition level requirement;
- iv) None of these.

5. Write short notes *any four* of the following :

4 x 5

- a) Describe about specimen collection.
- b) Briefly describe about universal biosafety precaution.
- c) Brief idea about accreditation in clinical laboratory.
- d) Describe about various types of biosafety label laboratories.
- e) Write a short note about first aid in laboratory accident.

6. Answer *any one* of the following :

1 x 10

- a) Write a brief note about doctor-patient relationship and external quality assurance.
- b) Write a brief note about disposal laboratory waste.

The West Bengal University of Health Sciences

3rd BMLT February- March, 2021 Examination

Subject: Blood Bank and Blood Transfusion, Quality Control &
Quality Assurance

Time: 3 hrs.

Full Marks: 70

Attempt all questions

Group - A

5 x 1

1. Answer the followings :

- a) When PVC is decreased the condition is called :
 - i) Polycythemia. ii) Dehydration; ☒ iii) Anemia; iv) All of the above.
- b) A recipient of 'B' blood group is compatible with donor of which blood group :
 - i) O. ii) B. iii) A. ☒ iv) Both i & ii.
- c) Find SD of the erythrocyte sedimentation rate (ESR), in normal 5 members it found to be- 4,2,5,8,6:
 - i) 2.30. ☒ ii) 2.24. iii) 2.50. iv) 2.70.
- d) ISO 15189:2007 based on:
 - ☒ i) Medical laboratories: particular requirements for quality and competence.
 - ii) General requirements for the competence of testing and calibration.
 - iii) Guidance for quality in maintaining and service industries.
 - iv) None of the above.
- e) ABO and Rh incompatibility will cause all except :
 - i) Hemolytic disease of newborn. ☒ ii) Hemorrhagic disease of newborn.
 - iii) Erythroblastosis fetalis. iv) Positive Coombs test.

2. Write short notes on any four of the following :

- a) Brief idea about cross matching. Define apheresis. 4+1
- b) What are the main difference between IQA (Internal Quality Audit) & EQA (External Quality Audit). Why correlation coefficient value lies between $-1 < r < +1$. 5
- c) What are the main difference between capillary and venous blood. What are the role of Heparin anticoagulant in biochemical analysis. 4+1
- d) Calculate the correlation Coefficient from the following data: 5

X = value of hemoglobin of people living in slum.

Y = Value of hemoglobin of people living in high society

X	15	16	12	10	8
Y	12	11	10	14	16

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- e) What are the process of maintain quality manual and collection of record in clinical laboratory. 4+1

What are the role of laboratory technician in clinical laboratory.

3. a) What are the mandatory blood tests in blood banking with donor's blood. What are the role of ACD solution anticoagulant collection of blood from the donor. 8+2

or

- b) What are the automation in hematology- principle, advantages & clinical application? Write a basic difference between pre and post analytical examination. (3+3+3)+1

P. T. O.

Group - B

5 x 1

4. Answer the followings:

a) OECD full form is:

- i) Organization For Economic Cooperation and Development.
- ii) Organization For Economic Coordination and Development.
- iii) Organization For Economical Coordinator and Development.
- iv) None of the above.

b) Pediatric bottle optimal blood volume is:

- i) 0-1 ml.
- ii) 1-3 ml.
- iii) 3-4 ml.
- iv) 0.5-5 ml.

c) BSL-3 laboratories are called:

- i) Cold zone.
- ii) Life risk zone.
- iii) Warm or neutral zone.
- iv) All of the above.

d) Blood borne pathogens are:

- i) HIV & HBV.
- ii) Influenza & malaria.
- iii) Vibrio chlorac.
- iv) HAV.

e) NABH laboratory means:

- i) To insure that the accredited laboratories adhere to all the conditions of accreditation.
- ii) is a constituent board of quality council of India, set up to establish and operate accreditation programme.
- iii) Certificate of compliance with laboratory in compliance with all applicable condition level requirement;
- iv) None of these.

5. Write short notes *any four* of the following :

- a) Describe about specimen collection.
- b) Briefly describe about universal biosafety precaution.
- c) Brief idea about accreditation in clinical laboratory.
- d) Describe about various types of biosafety label laboratories.
- e) Write a short note about first aid in laboratory accident.

6. Answer *any one* of the following :

- a) Write a brief note about doctor-patient relationship and external quality assurance.
- b) Write a brief note about disposal laboratory waste.

The West Bengal University of Health Sciences

3rd BMLT Examination, 2017

Subject: Quality Control and Quality Assurance

Full Marks: 70

Time: 3 hrs.

Use separate answer script for each group

Attempt all questions

Group – A

1. Answer all the questions :

5 x

a) The full form of ISO is :

- i) International Standard Organization. ii) Indian Standard Organization.
 iii) International Organization for Standardization. iv) Indian Organization for Standerization.

b) Levey-Jenning chart is prepared to analyze :

- i) Pre-analytical error. ii) Post analytical error.
 iii) Random and Systemic error. iv) None of them.

c) SOP full form is :

- i) Standard operating process. ii) Standard operating production.
 iii) Standard operating procedure. iv) Standard operating position.

d) Internal audit means :

- i) A system in which the performance of a laboratory is assessed periodically and retrospectively.
 ii) Assesses the overall performance of laboratory.
 iii) Retesting of any randomly chosen specimen.
 iv) Audit is a process of critical review of the functioning.

e) Accuracy means :

- i) $\frac{\text{Observed} - \text{true value}}{\text{True value}} \times 100$. ii) $\frac{\text{SD}}{\text{Mean}} \times 100$.
 iii) $\frac{\text{True Positive}}{\text{True positive} + \text{false negative}}$. iv) $\frac{\text{True negative}}{\text{False negative} + \text{true negative}}$.

2. Answer any four of the following :

4 x 5

- a) Explain Quality control of Microbial Media.
 b) Describe about intermediate laboratory services.
 c) What are the requirement of IQC?
 d) What are the limitations of statistics?
 e) Write a short note on different types of error in Laboratory.

3. Answer any one of the following :

- a) Briefly discuss about infrastructure of laboratory. Write a format of requisition form, accession list, worksheet, specimen rejection.

5+5

b) Define Mathematical Expectation & Variance? Find the Standard deviation of the following : 2+2+6

Height	Frequency
1	4
2	3
3	2
4	5
5	6
6	5

Group - B

4. Answer all the questions :

5 x 1

a) Biopiracy is :

- i) Illegal use of genetic material.
- ii) Illegal transfer of knowledge without permission.
- iii) Exploitation of plants and animals without proper compensation.
- iv) Exploitation of indigenous knowledge without proper compensation.

b) The primary strategy for Hepatitis B prevention is :

- i) Immunization.
- ii) Universal precautions.
- iii) Post exposure treatment.
- iv) i and ii only.

c) Biological Safety Cabinets used for infectious /potentially infectious material must be certified at least :

- i) Daily.
- ii) Monthly.
- iii) Yearly.
- iv) Once.

d) Which biological waste is not terminally sterilized prior to disposal :

- i) Blood clots.
- ii) Urine.
- iii) Feces.
- iv) Sputum.

e) Which of the following is the most effective disinfectant :

- i) 50% ethyl alcohol.
- ii) 60% ethyl alcohol.
- iii) 70% ethyl alcohol.
- iv) 100% ethyl alcohol.

5. Answer any four of the following :

4 x 5

- a) Write short note about quality control.
- b) External quality assurance.
- c) Describe about biosafety cabinet.
- d) Write short note about HIV I & II.
- e) Discuss briefly the ethical principles associated with medical practice.

6. Answer any one of the following :

1 x 10

- a) Write the procedure for selecting a complete donor in blood bank.
- b) Write down the modes of exposure of blood in laboratory.

Bengal University of Health Sciences
3rd BMLT Examination, 2017

Subject: Blood Bank and Blood Transfusion

Time: 3 hrs.

Full Marks: 70

Use separate answer script for each group

Attempt all questions

Group – A

1. Answer the followings:

5 x 1

a) In blood bank blood is stored at :

- i) $4-6^{\circ}\text{C}$. ii) 37°C . iii) 20°C . iv) -20°C .

b) In Neonate, blood grouping is done by :

- i) Forward grouping. ii) Reverse grouping.
iii) Both of these. iv) None of these.

c) The Red cell antigen remain :

- i) On the surface of RBC membrane. ii) In the Plasma.
iii) In the Mitochondria. iv) None.

d) The platelets are stored at :

- i) 22°C . ii) -30°C . iii) 4°C . iv) -70°C .

e) Pre transmission testing include all except :

- i) HBsAg . ii) HIV. iii) HCV. iv) Filaria.

2. Write short notes on *any four* of the following :

4 x 5

- a) Storage of the Whole blood and its components.
b) Separation and storage of fresh frozen plasma.
c) Steps to be taken in suspected mismatch blood transfusion.
d) Indirect coomb test.
e) Different types of blood bag.

3. a) Describe briefly the Instruments, Staff pattern and Standard Operational Procedure (SOPs) to set up a Regional Blood Transfusion Centre.

10

or

b) Name the different methods of determination of blood group. What is reverse grouping and cross matching? What precaution will you take in case of Rh negative pregnant mother?

3+5+2

Group - B

4. Answer the followings :

5 x 1

- a) 1 ml is equal to :
 - i) 10 μ l. ii) 100 μ l. iii) 1000 μ l. iv) 10000 μ l.
- b) One gm molecular wt of a chemical dissolve in 1 litre of a solution is called :
 - i) Normal Solution. ~~ii) Molar solution.~~
 - iii) Formal solution. iv) Buffer solution.
- c) For Blood gas analysis the sample required :
 - i) Venus blood. ii) Capillary blood. ~~iii) Arterial blood.~~ iv) None of these.
- d) General or stationary laboratory waste is collected in :
 - i) Yellow bag. ii) White bag. ~~iii) Black bag.~~ iv) Blue bag.
- e) The cooling effect in the refrigerators is done by :
 - ~~i) Joule Thompson effect.~~ ii) Peltier effect.
 - iii) Heat radiation effect. iv) None.

5. Write short notes *any four* of the following :

4 x 5

- ~~a) Segregation of the laboratory waste.~~
- ~~b) Maintenance and handling of the centrifuge and colorimeter.~~
- c) Accreditation of the clinical lab.
- ~~d) Laboratory staff pattern.~~
- ~~e) Glassware used in Laboratory.~~

6. Answer *any one* of the following :

1 x 10

- a) Discuss briefly about the Laboratory accident and its First Aid.
- b) Discuss briefly the work flow in the clinical laboratory from sample collection to report delivery.

The West Bengal University of Health Sciences
3rd BMLT April, 2022 Examination

**Subject: Blood Bank and Blood Transfusion, Quality Control &
Quality Assurance**

Time: 3 hrs.

Full Marks: 70

Attempt all questions

1. Answer the followings :

5 x 1

- a) A blood specimen collected in a heparinized tube is centrifuged. It will separate into :
i) Serum and Clot. ii) Plasma and Clot.
iii) Serum and Plasma. iv) Plasma, buffy coat and RBC.
- b) The conditions in which Bleeding time does not become prolonged is :
i) Deficiency of vitamin K. ii) Hemophilia.
iii) Thrombocytopenia. iv) Afibrinogenemia.
- c) 500 ml whole blood contain plasma approximately :
i) 100 to 150 ml. ii) 200 to 250 ml. iii) 300 to 350 ml. iv) 350 to 400 ml.
- d) All coagulation factors are stable at low freezing point except :
i) Factors V and VIII. ii) Factors IX and X. iii) Factors IV and V. iv) Factors II.
- e) The size of red blood cell is :
i) 10 micro meter. ii) 7 micro meter. iii) 8 micro meter. iv) 2 micro meter.

2. Write short notes on **any four** of the following :

4 x 5

- a) Different types of blood collection bags. b) Apheresis.
c) Emergency Cross matching. d) Anticoagulants used in blood bank.
e) Haemolytic disease of newborn.

3. Answer **any one** of the following :

- a) Write down the principle and importance of Du test. Define antihuman globulin and describe its role in blood bank. Mention the indications for capillary blood collections. 2+2+2+2+2
- b) Write down the name and importance of the components available in the phlebotomy tray. Describe auto transfusion. What is Rh antigen? 5+3+2

4. Select the correct single answer :

5 x 1

- a) Full form of ISO :
i) International organization for Sampling.
ii) International organization for Standardization.
iii) International organization for Sensitivity.
iv) International organization for Specification.

P. T. O.

b) Mean $\pm 3SD$ limits include :

- i) 99.71 %. ii) 99.72 %. iii) 99.73 %. iv) 99.74 %.

c) First step of Quality Assurance :

- i) Development of standards. ii) Identification of customer need.
iii) Servicing. iv) Material control.

d) Which of the following is an example of Quality Assurance?

- i) Verification. ii) Software testing. iii) Validation. iv) Documentation.

e) Where the nodal point for National Measurement System is located?

- i) Bangalore. ii) Patna. iii) Mumbai. iv) New Delhi.

5. Write short notes *any four* of the following :

4 x 5

- a) Westgard multirule.
b) Transcription errors.
c) Six sigma process control.
d) Coefficient of variation.
e) Multiplication law of probability.

6. Answer *any one* of the following :

a) What is Mean? What is Median? What is Mode? Among these 3 which is used mostly in clinical laboratory & why? 2+2+2+4

b) What is TQM (total quality management)? Draw the TQM framework flowchart. What do you mean by binomial law of probability distribution? 3+5+2

The West Bengal University of Health Sciences
3rd BMLT April, 2022 Examination

Subject: Special Techniques in Laboratory Science

3 hrs.

Full Marks: 70

Attempt all questions

1. Answer all the questions :

5 x 1

a) Frozen section is done using :

- i) Thermostat. ii) Cryostat. iii) Xerostat. iv) Electrostat.

b) Full form of INR is :

- i) Indian Rupee. ii) Indian normal ratio.
iii) International normalised ratio. iv) International normal ration.

c) Which haemoglobin is **not** present in normal adult?

- i) HbA. ii) HbA₃. iii) HbA₂. iv) HbF.

d) Decalcification can be done using all the following **except** :

- i) HNO₃. ii) H₂SO₄. iii) HCOOH. iv) Microwave.

e) Museum specimens are mounted using :

- i) Kaiserling's solution. ii) Darling's solution.
iii) Starling's solution. iv) Burling's solution.

2. Answer **any four** of the following :

4 x 5

a) APTT.

b) Histochemical stains used in hematology.

c) Hemoglobin electrophoresis.

d) Fine Needle Aspiration Cytology.

e) Osmotic fragility.

3. Answer **any one** of the following :

a) Define Leukaemia. Describe WHO classification of Acute Leukaemia. Briefly describe the lab diagnosis of Acute Leukaemia.

1+3+6

b) What are the indications and advantages of frozen section?

5+5

4. Tick the correct answer :

5 x 1

a) All are newer method of TB culture except :

- i) Tuberculin test. ii) Interferon gamma release assay.
iii) Bactec Mgit. iv) BacT/Alert.

b) Eijkman test is done to confirm :

- i) E.coli. ii) Salmonella typhi. iii) Enterococcus. iv) Campylobacter jejuni.

P. T. O.

animal is preferred for diagnosis of leprosy?

- Rat. ii) Guinea pig. iii) Armadillo. iv) Horse.

A positive tuberculin test is indicated by an area of induration of :

- i) <5 mm in diameter. ii) 6-9 mm.
iii) ≥10 mm in diameter. iv) No induration.

e) Media used for culture of – mycobacteria :

- i) Mac Conkey's agar. ii) LJ media.
iii) Nutrient agar. iv) Nutrient broth.

5. Write short notes *any four* of the following :

4 x 5

- a) Automated culture methods of TB.
b) IFA.
c) Role of laboratory animal in diagnosis.
d) Presumptive coliform count.
e) ELISA.

6. Answer *any one* of the following :

- a) Enumerate the different types of antigen antibody reactions. Describe in detail about the principal, types & application of ELISA? 3+7
b) Enumerate different antimicrobial susceptibility testing method. 10

The West Bengal University of Health Sciences
3rd BMLT November, 2019 Examination

Subject: Clinical Immunology and Endocrinology

Time: 3 hrs.

Full Marks: 70

Use separate answer script for each group

Attempt all questions

Group – A

1. Tick the correct answer :

5 x 1

a) Which part of the bacteria is mostly antigenic?

- i) Protein. ii) Carbohydrate. iii) Lipid. iv) Nucleic acid.

b) MHC Class II molecule presents antigen to which type of T-cell?

- i) CD4 + T cell. ii) CD8 + T cell.
iii) CD4 + CD8 + T cell. iv) CD4 - CD8 - T cell.

c) Characteristic of primary immune response are :

- i) Involves IgG. ii) No lag period.
iii) Slow and sluggish. iv) Memory cell not produced.

d) Development of B cell in bone marrow require interaction with :

- i) Macrophage. ii) Stromal cell.
iii) N K cell. iv) Dendritic cell.

e) Which of the following is not a phagocytic cell :

- i) Basophil. ii) Macrophage. iii) B-cell. iv) Neutrophil.

2. Answer *any four* of the following :

4 x 5

a) Structure of immunoglobulin.

b) Innate immunity.

c) Adjuvant.

d) Hematopoiesis.

e) Antibody Diversity.

3. Answer *any one* of the following :

a) Define hypersensitivity. What are the different types of hypersensitivity reactions? Describe type-I reaction with example. 2+2+6

b) What is complement? Explain in details about classical complement pathway. List various functions of complement. 1+6+3

P. T. O.

Group - B

4. Answer all the questions :

- a) Calcitonin is secreted from :
i) Pituitary gland. ii) Parathyroid gland.
iii) Para follicular cells of thyroid. iv) Pancreas.
- b) Iodine is entered within thyrocyte along with :
i) Calcium. ii) Potassium. iii) Sodium. iv) Magnesium.
- c) ACTH is secreted from :
i) Hypothalamus. ii) Pituitary. iii) Adrenal cortex. iv) Adrenal medulla.
- d) Vitamin-D receptor is present in the following compartment/part of chief cell:
~~i) Cell membrane.~~ ii) Cytoplasm. ~~iii) Nucleus.~~ iv) None of these.
- e) Glucocorticoids are secreted from :
i) Zona reticularis. ii) Zona Fasciculata.
iii) Zona glomerulosa. iv) Adrenal medulla.

4 x 5

5. Answer **any four** of the following :

- ☒ a) Grave's disease.
☐ b) Hashimoto's thyroiditis.
☒ c) Cushing's syndrome
☒ d) Ricket.
☒ e) Dwarfism & gigantism.

6. Answer **any one** of the following :

- ☒ a) What is full form of ELISA? How ELISA can be classified? How to increase sensitivity of ELISA?
How to increase specificity of ELISA? 1+3+3+3
- ☒ b) What is the full form of c-AMP? Write any signal transduction pathway, where c-AMP is involved.
How insulin can interfere this pathway? 1+5+4

The West Bengal University of Health Sciences
3rd BMLT November, 2019 Examination

Subject: Special Techniques in Laboratory Science

Time: 3 hrs.

Full Marks: 70

Use separate answer script for each group

Attempt all questions

Group - A

1. Answer all the questions :

5 x 1

a) Reticulocyte is :

- i) White blood cell. ii) Platelet. iii) Juvenile red cells. iv) Mature red cells.

b) Full form of APTT is :

- i) Acute partial thrombin time. ii) Activated partial thromboplastin time.
iii) Activated prolonged thrombin time. iv) Automated partial thromboplastin time.

c) Which haemoglobin is not present in normal adult?

- i) HbA. ii) HbS. iii) HbA₂. iv) HbF.

d) Which microtome is used in frozen section technique?

- i) Rotary microtome. ii) Freezing microtome.
iii) Rocking microtome. iv) Sliding microtome.

e) Mounting medium used in histopathology technique is :

- i) Glycerol. ii) DPX. iii) Paraffin. iv) All of the above.

2. Answer **any four** of the following :

4 x 5

- ☒ a) Methods of Decalcification.
☒ b) Frozen Section.
☒ c) Prothrombin Time
☒ d) Fine Needle Aspiration Cytology.
☒ e) Immunohistochemistry.

3. Answer **any one** of the following :

☒ a) Define Leukaemia. Classify acute leukaemia. Briefly describe the lab diagnosis of Leukaemia.

1+3+6

b) Why frozen section is important? Write the application of cryo-microtome. Write down the principle and protocol of PAP staining.

1+2+2+5.

P. T. O.

Group – B

4. Answer all the questions :

- a) Liquid culture media for Mycobacterium tuberculosis :
i) Dorset egg media. ii) Loeffler serum media.
iii) Middlebrook's media. iv) LJ media.
- b) Example of complement fixation test :
i) Kahn test. ii) Weil felix reaction.
iii) Wasserman reaction. iv) Schick test.
- c) Which animal is preferred for diagnosis of TB?
i) Rat. ii) Guinea pig. iii) Rabbit. iv) Horse.
- d) Which vein of Rabbit is preferred to collect blood?
i) Anterior cubital vein. ii) Marginal vein of ear.
iii) External jugular vein. iv) Femoral vein.
- e) Media used for water bacteriology :
i) Mac Conkey's agar. ii) Mac Conkey's broth.
iii) Nutrient agar. iv) Nutrient broth.

5. Answer **any four** of the following :

4 x 5

- a) Monoclonal antibody.
b) Flow cytometry.
c) Blood collection from sheep.
d) PCR.
e) Water Bacteriology.

6. Answer **any one** of the following :

- a) Importance of quality control in culture media. 10
b) What is DNA vaccine? What is its immunological basis of action? Write down the advantages and disadvantages of the vaccine? 2+4+4

The West Bengal University of Health Sciences
3rd BMLT November, 2019 Examination

**Subject: Blood Bank and Blood Transfusion, Quality Control &
Quality Assurance**

Time: 3 hrs.

Full Marks: 70

Use separate answer script for each group
Attempt all questions

Group – A

Answer the followings :

5 x 1

- a) Amount of anticoagulant in each 350 ml blood using :
i) 19 ml. ii) 29 ml. iii) 39 ml. iv) 49 ml.
- b) All are transfusion transmissible infections except :
i) HAV. ii) HBV. iii) HCV. iv) HIV.
- c) The maximum age for a voluntary blood donor is :
i) 55yr. ii) 60 yr. iii) 65 yr. iv) 70 yr.
- d) All are blood group systems except :
i) ABO. ii) Kell. iii) Duffy. iv) Bombay.
- e) ABO and Rh incompatibility will cause all except :
i) Hemolytic disease of newborn. ii) Hemorrhagic disease of newborn.
iii) Erythroblastosis fetalis. iv) Positive Coombs test.

2. Write short notes on **any four** of the following :

4 x 5

- a) Importance of blood component separation.
b) Method of detection of TTIs.
c) Du test.
d) Minor cross match.
e) Anticoagulants used in blood bags.
f) Bombay blood group.

3. a) What are donor selection criteria? Mention its importance.

7+3

or

b) What are various types of blood transfusion reactions? Mention few methods of preventing them.

7+3

Group - B

4. Answer the followings :

a) Sensitivity can be described in terms of true positive (TP), true negative (TN), false positive (FP) and false negative (FN) as follows :

- i) $TP/(TP+FP)$. ii) $TP/(TP+FN)$. iii) $TN/(TN+FP)$. iv) $TN/(TN+FN)$.

b) A control rule which is commonly used with a Levy-Jennings chart if either of the two control results falls outside of ± 2 SD is called :

- i) Westgard- 1_{2S} rule. ii) Westgard- 2_{2S} rule.
iii) Westgard- 1_{3S} rule. iv) Westgard- 4_{1S} rule.

c) In LJ graph, all are true except :

- i) Control values are plotted against time. ii) Control values are on the X axis.
iii) Average ± 2 SD is drawn. iv) Days of the month are indicated for time.

d) Quality control include all except :

- i) Control of preanalytical variables. ii) Control of analytical variables.
iii) Control of cost of the procedure. iv) Monitoring the quality of analysis.

e) Quality management include all except :

- i) Quality control. ii) Quality planning.
iii) Quality assurance. iv) Quality laboratory staff.

5. Write short notes **any four** of the following :

4 x 5

- a) What is ISO? What is the specific code of ISO for laboratory?
b) When CV is preferred over SD?
c) What do you mean by sensitivity and specificity of an assay?
d) What is meant predictive value of positive test of a screening test?
e) What is the difference between accuracy and precision?

6. Answer **any one** of the following :

1 x 10

- a) What are the causes of system failure in a laboratory? Discuss in brief the corrective action for improving laboratory results?
b) Give a brief account of the three widely used statistics to quantify the reliability of a test.