

# Class 12 Medical Diagnostics Sample Paper 2024

## SECTION A: OBJECTIVE TYPE QUESTIONS

*1 Answer any 4 out of the given 6 questions on Employability Skills (1 x 4 = 4 marks)*

**i. Being punctual is not an interview skill?**

**State whether True or False.**

**Ans:** False

**ii. Explain anti-social personality disorder?**

**Ans:** Antisocial is characterized by a pattern of persistent disregard for and violation of the rights of others.

**iii. What is the format of writing any function?**

**Ans:** The format of writing any function in Calc is:  
=function\_name(Argument1;Argument2; Argument3;.....)

**iv. Define creativity?**

**Ans:** Creativity is a process of continually improving ideas and solutions by making gradual alterations and refinements. Entrepreneurs exhibit creativity by applying the process of design thinking, thinking of alternatives, trying unconventional ways to do things, and continuously improving and iterating.

**v. What are green jobs?**

**Ans:** Green jobs play a crucial role in reducing the environmental footprint of economic activity. This reduction is gradual, and the different jobs contribute to different degrees. Workers manufacturing fuel-efficient or hybrid cars, for example, contribute less to reducing emissions from transport than those working in public transport systems.

**vi.      is used to find the average of numbers in a range of cell.**

**Ans:** Average function

*2 Answer any 5 out of the given 7 questions (1 x 5 = 5 marks)*

**i. Write down the full form of CBC.**

- a) Common blood count
- b) Complete blood count**
- c) Complete bone count

**ii. Name the anticoagulant that is best to use for coagulation studies.**

- a) EDTA
- b) Trisodium Citrate**
- c) Heparin

**iii. What do you mean by MCHC?**

- a) Major Corpuscular hemoglobin Concentration
- b) Mean Corpuscular hemoglobin Concentration**
- c) Major Cellular hemoglobin Concentration

**iv. What do you mean by MCH?**

- a) Mean Corpuscular hemoglobin**
- b) Major Corpuscular hemoglobin
- c) Major Cellular hemoglobin

**v. In which condition decreased osmotic fragility is seen?**

- a) Congenital spherocytosis
- b) Thalassemia**
- c) Autoimmune hemolytic anemia

**vi. Write down the full form of PCV.**

- a) Pus cell Volume
- b) Periodic cell Volume
- c) Packed cell Volume**

**vii. Name the instrument to separate solution into sediment and supernatant by using required speed.**

- a) Centrifuge**
- b) Microscope
- c) Hemocytometer

**3 Answer any 6 out of the given 7 questions (1 x 6 = 6 marks)**

**i. Name one commonly used method to measure ESR.**

- a) Benedict's test method
- b) Fehling's test method
- c) Westergren's Method.**

**ii. \_\_\_\_\_ is the ideal fixative used for cellblock preparation of fluid specimens.**

- a) Formalin
- b) AAF Fixative**
- c) Xylene

**iii. Which is a better RBC diluting fluid if one wants to prevent rouleaux formation?**

- a) Hingleman's solution
- b) Toisson's fluid
- c) Gower's Solution**

**iv. What do you mean by Hematopoiesis?**

- a) An increase in platelet count
- b) Production of blood cells**
- c) An increase in WBC count

**v. Who discovered the Rhesus blood group system?**

- a) Land Steiner and Wiener**
- b) Thompson
- c) Charles Darwin

**vi. The titer of an antibody is usually determined by testing a two-fold serial dilution of the serum against selected \_\_\_\_\_ cells.**

- a) Red**
- b) White
- c) Blue

**vii. Name two antigens of the Kidd blood group system.**

- a) Jkd and Jke
- b) Jkm and Jkn
- c) Jka and Jkb**

*4 Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)*

**i. \_\_\_\_\_ is defined as the clumping of particles that have an antigen on their surface and is brought about by antibodies.**

- a) Agglutination**
- b) Hemolysis
- c) Reaction

**ii. \_\_\_\_\_ develop due to immunization following pregnancy, previous transfusion or deliberate injection of immunogenic material.**

- a) Ig G**
- b) Ig M
- c) Ig E

iii. \_\_\_\_\_ are serum proteins, more specifically immunoglobulins.

- a) Antigens
- b) Antibodies**
- c) Pathogen

iv. An increase in lymphocyte count above normal reference range is known as \_\_\_\_\_

- a) Lymphocytosis**
- b) Lymphopenia
- c) Lymphoedema

v. What are the antigens of the Lutheran system?

- a) Lu m and Lu n
- b) Lu c and Lu d**
- c) Lu a and Lu b

vi. Write down the full form of ELISA.

- a) Enzyme-linked immunosorbent Assay**
- b) Energy-linked immunosorbent Assay
- c) Evolution-linked immunosorbent Assay

*5 Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)*

i. What is the basic function of autoclave in laboratory?

- a) Drying
- b) Heating
- c) Sterilization**

ii. \_\_\_\_\_ is rupture of red cells with release of intracellular haemoglobin can occur if the Antibody has the property of hemolysin.

- a) Agglutination
- b) Hemolysis**
- c) Reaction

iii. Name one special-purpose fixative used in cytology laboratory.

- a) AAF fixative**
- b) Carnoy's fixative
- c) Formalin

iv. \_\_\_\_\_ is a special purpose fixative for haemorrhagic samples.

- a) Carnoy's fixative**
- b) AAF fixative

c) Formalin

**v. Name the chemical which is used for dehydration process.**

- a) Alcohol
- b) Water
- c) Xylene

**vi. What do you mean by Cytology?**

- a) Study of tissue
- b) Study of cells
- c) Study of organ

**6 Answer any 5 out of the given 6 questions (1 x 5 = 5 marks)**

**i. Write down full form of FNAC.**

- a) Fine needle aspiration cytology
- b) Free needle aspiration cytology
- c) Fine needle activation cytology

**ii. \_\_\_\_\_ is strictly for taking materials from endocervix.**

- a) Endo-cervical brush
- b) Exo-cervical brush
- c) Endo-cellular brush

**iii. It is important that no air-drying occurs prior to \_\_\_\_\_.**

- a) Fixation
- b) Dehydration
- c) Clearing

**iv. By which process can Respiratory tract malignancies be detected?**

- a) By sputum cytology or by bronchoscopic material
- b) By CSF cytology or by bronchoscopic material
- c) By sputum cytology or by Endoscopic material

**v. Name one routine fixative that was originally recommended by Papanicolaou.**

- a) Carnoy's Fixative
- b) AAF Fixative
- c) Ether alcohol mixture

**vi. Name one clearing agent used in laboratory.**

- a) Formalin

- b) Water
- c) Xylene

## **SECTION B: SUBJECTIVE TYPE QUESTIONS**

*Answer any 3 out of the given 5 questions on Employability Skills in 20 – 30 words each (2 x 3 = 6 marks)*

**7 Describe any 2 steps of active listening?**

**Ans:**

- CONTACT—connect with the participant who is contributing; eye contact, open posture, and nonverbal responses.
- ABSORB—take in all aspects of the spoken message, implicit and explicit, and nonverbal clues. Do not judge or evaluate.
- REFLECTIVE FEEDBACK—mirror, reflect, or provide feedback on what you have heard and why the contributor claims it to be valid.
- CONFIRM—receive confirmation from the speaker that you heard the participant’s message accurately. If not, start the method over again at the beginning by having the speaker restate their view.

**8 What is motivation? Explain the types of motivation.**

**Ans:** Motivation is derived from the word ‘motive’. Thus, directing behaviour towards a certain motive or goal is the essence of motivation.

Intrinsic motivation

It includes activities for which there is no apparent reward, but one derives enjoyment and satisfaction in doing them. It occurs when people are internally motivated to do something because it pleases them. They think it is important or feel that what they are learning is significant. Incentives related to the motive or goal can satisfy one’s needs.

Extrinsic motivation

It arises because of incentives or external rewards. Lack of motivation or incentives may lead to frustration, for example, employees who are kept on a contractual basis for a long time may get frustrated and leave an organisation.

**9 Entrepreneurship is considered to be both an art and a science. Why?**

**Ans:** Entrepreneurship is the perfect combination of art and science as it requires specific progression and procedures to be followed, and also the skill to digress when required, and yet make the entire activity profitable and growth-oriented.

**10 Mention any two ways of minimizing waste and pollution.**

**Ans:**

- Reusing scrap material. For example, in paper mills, damaged rolls are sent back to the beginning of the production line, i.e., they are added as raw material. In the manufacture of plastic items, off-cuts and scrap are re-incorporated into new products.
- Ensuring quality control. If the quality of products is maintained, there will be a decrease in rejected products, thus reducing waste. Automated monitoring equipment is now being used, which can help identify production problems at an early stage.
- Waste exchange: This is where the waste product of one process becomes the raw material for another. It represents the way of reducing waste disposal through reuse.
- Managing e-waste. With advanced technology, we have also encountered problems in managing e-waste like old mobile phones, laptops, and television sets. It is important to have sustainable development and plan judiciously for recycling e-waste.
- Use of eco-friendly material. Scientists have discovered various materials, which are eco-friendly, for example, banana leaf and paper plates that are easily disposable, etc. These must be made easily available, and their use needs to be encouraged.

**11 Give reasons for the following: #####, #DIV/0!**

**Ans:**

- The column is not wide enough to display the value.
- The formula contains an invalid operation, i.e., division by zero.

**Answer any 3 out of the given 5 questions in 20 – 30 words each (2 x 3 = 6 marks)**

**12 Write down the advantages of Evacuated Tube System.**

**Ans:**

- An adequate sample is ensured (vacuum in the tube controls the amount of blood entering the tube).
- The correct ratio of anticoagulant to blood is ensured.
- This is a closed system and spillage of blood, and hence any Biohazard is thus avoided.
- Large amounts of blood (in multiple tubes) can be collected with minimal discomfort to the patient.

**13 What do you mean by neutrophilia and neutropenia?**

**Ans:** Neutrophilia: It refers to an increase in the number/percentage of neutrophils in the blood.

Neutropenia: It refers to a decrease in the number of neutrophils in the blood.

**14 Write down the importance of blood storage cabinets.**

**Ans:**

- Uniform temperature between 2 °C and 6 °C (in an AC room)
- Stainless steel inner chamber and an Inside acrylic door to avoid temperature loss.
- Digital temperature indicator cum controller with audio-visual alarm
- Full-view glass doors for observation without disturbing the inside conditions.

**15 Explain two types of processes that can be done by using cell separator.**

**Ans:** Continuous flow: It is a two-arm procedure where blood is drawn from one arm. The components are separated in a cart rid & the remaining cells & plasma flow back to the donor through the other area. Here, the volume of blood that is outside the body is very small.

Interrupted flow: This is a one-arm process. One line is connected to the donor, the blood will be coming out after processing, components will be separated, the remaining required plasma & RBCs will be reinfused back to the donor with the same line, and this process will take a little longer than the continuous flow.

**16 How can endometrial aspiration smear be made?**

**Ans:** Endometrial aspiration smear: After preliminary visualization and cleaning of cervix, a sterile cannula is introduced into the uterine cavity, and aspiration is then carried out with a syringe. The specimen is squirted on a clean glass slide, gently spread, and rapidly fixed.

*Answer any 2 out of the given 3 questions in 30– 50 words each (3 x 2 = 6 marks)*

**17 Enumerate three stages of ESR experiment.**

**Ans:** Sedimentation is defined as the settlement of red cells to the bottom with an upper plasma layer when anti-coagulated blood is kept undisturbed for a period of time. There are three stages in which this occurs:

- The stage of aggregation - This is the first stage when the red cells form rouleaux, and is the most important stage in sedimentation.
- Stage of sedimentation - is the phase of actual falling of the cells. The larger the aggregates formed in stage I, the faster the rate of fall. This is related to both weights to surface area.
- The stage of packing is the final one, when individual cells and aggregates slow down due to crowding.

**18 Enumerate any six features of cold centrifuge.**

**Ans:** Features of a cold centrifuge:

- 1. Digital speed indicator
- 2. Stepless speed regulator with 'O' start switch
- 3. Digital automatic timer
- 4. Dynamic break
- 5. Digital temperature indicator cum controller
- 6. Unbalanced cut-out switch

**19 Enlist the indications of FNAC. Outline its methodology.**

**Ans:** INDICATIONS:

Aspiration is done using disposable needles of 21 gauge (external diameter approximately 0.6

-1.0mm) attached to a 20ml syringe.

- The FNAC needles are available in a variety of lengths. Lengths of a to ½ inches are found to be adequate for most palpable masses.
- The 3 1/2 inches 22-gauge disposable needle is used for deep-seated soft tissue masses.
- Ultrasound or computerized tomography (CT) guidance can be utilized whenever indicated.

#### METHODOLOGY:

Taking all aseptic precautions, the lump is palpated and localized, and the site of puncture is determined.

- The lump is then immobilized with the left hand in a position favorable for needle aspiration and holding the syringe by the barrel in the right hand; the needle is pushed into the predetermined site of the lump until the needle tip penetrates the center of the lump.
- The plunger of the needle is then retracted backward to create a negative pressure inside the syringe and needle bore; and without withdrawing the needle through the skin, the syringe is rotated and moved in and out through the lump whilst negative pressure sucks cells into the lumen of the needle.
- In order to obtain sufficient material, particularly from fibrotic lesions, the needle is moved back and forth three or more times and directed into different areas of the tumor.
- Throughout this manipulation, negative pressure is maintained in the syringe by keeping the piston retracted.
- After completion of the aspiration, the pressure in the syringe is allowed to equalize before the needle is withdrawn from the lesion.
- This is achieved by releasing the piston of the syringe. After the needle had been withdrawn, the syringe is disconnected from the needle, filled with air, and reconnected.
- The material in the needle is expelled onto a glass slide, care being taken to deposit it as a single drop at one end of the slide.
- The needle tip is then brought into light contact with the slide, and the aspirate carefully expressed from it.

*Answer any 3 out of the given 5 questions in 50– 80 words each (4 x 3 = 12 marks)*

#### **20 How can the microscope be handled properly in laboratory?**

**Ans:** This instrument helps us to examine tiny objects that cannot be visualized with the naked eye. It is a delicate instrument and needs utmost care.

- Cleaning of the objective and eyepiece should be done regularly, and they should be kept free from dust. The optical part is cleaned to remove grease using a soft cloth or lens paper.
- Hold the microscope firmly while moving it to prevent the lenses from dropping down.
- Exposure to sunlight should be avoided, and it should be kept at room temperature.
- After one use oil immersion, one must always clean the oil from the objective.

### **21 How can the bleeding time be measured by IVY method?**

**Ans:** The following steps are followed to measure bleeding time: -

- The BP cuff is placed on the patient's arm about 2 to 3 inches above the elbow joint. Pressure is increased to 40 mm Hg. This pressure is kept for the entire procedure.
- An area is selected on the volar surface of the forearm (devoid of any superficial veins) and cleaned with a spirit swab. The area is allowed to dry, and there will be 2 skin punctures, 5 -10 cm apart, 2.5 mm deep, 1mm wide are made, and the stopwatch started.
- Blood is blotted from each puncture site on a piece of filter paper every 15seconds. The filter paper should not touch the wound. (As this may interfere with the process of platelet plug formation). When bleeding stops, the watch is stopped, time noted, and the BP cuff is released.
- Bleeding times of the two puncture sites are noted, and the average of the two results is reported.

### **22 Who discovered ABO blood grouping system? Write down the importance of ABO blood grouping system.**

**Ans:** Landsteiner discovered the ABO group antigens in 1900, and since then, this is one of the most important discoveries in the field of medicine.

The importance of blood grouping:

- Safe blood transfusion
- Organ transplant, especially the liver, heart, and kidney
- Medicolegal and forensic paternity disputes
- Immunology and genetics

### **23 Enumerate two major categories of cytological samples that are examined in laboratory.**

**Ans:** Two broad categories of samples are received in the cytology laboratory:

1. Exfoliative cytology: It is the study of cells that have been shed or removed from the epithelial or mesothelial linings. Normal cells are cohesive in nature, but malignancy and infection increase exfoliation.

Malignant cells show reduced intercellular adhesion due to defective desmosomes. These cells can be recovered either from natural secretions, such as urine, sputum, vaginal, and prostatic fluids, or by artificial means, such as paracentesis or lavage of fluids like pleural, pericardial, cerebrospinal, synovial, ascetic, CSF, cyst fluid, bronchial washings, etc.

2. Fine needle aspiration cytology includes aspiration done by the pathologist or the clinician, as well as guided aspiration done by the radiologists. It is a diagnostic procedure used to investigate pathological lesions in organs that do not shed cells spontaneously. In this technique, a thin, hollow needle is inserted into the lesion (usually a lump or a swelling) to obtain cells and tissue fragments, which, after being stained, are examined under a microscope.

**24 Enumerate the functions of four special-purpose fixatives.**

**Ans:**

- Carnoy's fixative: This is a special-purpose fixative for haemorrhagic samples. The acetic acid in the fixative haemolyses the red blood cells. It is an excellent nuclear fixative as well as preservative for glycogen, but results in considerable shrinkage of cells. Carnoy's fixative must be prepared fresh when needed and discarded after each use. It loses its effectiveness on long standing, and chloroform can react with acetic acid to form hydrochloric acid.
- AAF Fixative: This is the ideal fixative used for cellblock preparation of fluid specimens.
- Saccomanno collection fluid: A green coloured fixative of the collection of sputum.
- Cytolyt solution: This is a clear water-based buffered fixative for the collection of fluid specimens. A 50:50 ratio of specimen to fixative is appropriate (if this is unavailable, use 50% alcohol).

BioSmartNotes