

Class 12 Medical Diagnostics Sample Paper 2020

PART A: EMPLOYABILITY SKILLS (10 MARKS)

Answer any 4 questions out of the given 6 questions of 1 mark each:

1. A _____ is one independent clause that has a subject and a verb and expresses a complete thought.

Ans: Simple sentence

2. _____ is defined as the drive required to engage in goal-oriented behavior.

Ans: Motivation

3. _____ is a condition marked by an overreliance on other people to meet one's emotional and physical needs.

Ans: Dependent personality disorder.

4. _____ It is located at the top and displays the name of the application and the name of the current document.

Ans: Title bar

5. _____ is a process of developing a business plan, launching and running a business using innovation to meet customer needs and to make a profit.

Ans: Entrepreneurship.

6. The key to environmental protection is to prevent the degradation of the _____ which is important for all living creatures.

Ans: Natural environment

Answer any 3 questions out of the given 5 questions of 2 marks each:

7. Write the differences between hearing and listening.

Ans:

Hearing	Listening
1)Hearing is passive	Listening is active
2) It's perceiving a sound through the ear	It's a conscious effort to perceive the sound
3)Does not require a conscious effort	Requires a conscious effort
4)Involuntary	Voluntary

8. Enumerate any four basic personality traits.

Ans:

- Extraversion: Gregarious, assertive, and sociable. (Opposite reserved, timid, quiet.)
- Agreeableness: Cooperative, warm, and agreeable. (Opposite cold, disagreeable, and antagonistic)
- Conscientiousness: Hardworking, organized, and dependable (lazy, disorganized and unreliable)
- Emotional stability: Calm, self-confident and cool (insecure, anxious and depressed)

9. Name two software that can be used to create presentation.

Ans: MS PowerPoint and OpenOffice Impress

10. What should you keep in your mind while understanding your competitors in any business field?

Ans:

- Positioning
- Pricing
- Offers
- Customer Relations

11. Enlist any four green jobs.

Ans:

- Construction worker, crew member
- Designer
- Carpenters
- Building Planner and coordinators

PART B: SUBJECT SKILLS (50 MARKS)

Answer any 10 questions out of the given 12 questions:

12. Which instrument is used to separate solution in supernatant and sediment by using a required speed?

Ans: Centrifuge

13. Which chemicals are used to prevent blood clotting?

Ans: Anticoagulants

14. Write down the full form of EDTA.

Ans: EthyleneDiamineTetra-Acetic acid.

15. Name the instrument used for counting blood cells?

Ans: Hemocytometer.

16. Name the equipment that is used to sterilize various materials in the laboratory by steam sterilization method.

Ans: Autoclave

17. Write down the full form of ELISA.

Ans: Enzyme-linked immunosorbent assay (ELISA)

18. What is the normal pH of blood?

Ans: 7.42

19. Who discovered the Rhesus blood group system?

Ans: Land Steiner and Wiener

20. Name the study of cells that have been shed or removed from the epithelial or mesothelial linings.

Ans: Exfoliative cytology

21. Write down the full form of FNAC.

Ans: Fine Needle Aspiration Cytology

22. Name one cytological fixative.

Ans: 95% Ethyl Alcohol (Ethanol)

23. Name one special fixative used for hemorrhagic samples.

Ans: Carnoy's fixative

Answer any 5 questions out of the given 7 questions of 2 marks each:

24. List a few diseases in which bone marrow examination is indicated.

Ans:

- Thrombocytopenia,
- Leukemia,
- Refractory anaemia,
- Paraproteinemias

25. Write down the life span and function of RBC.

Ans:

- Life Span of RBCs is 120 days.
- Function of RBCs is to carry oxygen and carbon dioxide.

26. Enumerate two conditions where increased and decreased osmotic fragility can be seen?

Ans:

- Increased Osmotic fragility is seen in conditions such as hereditary spherocytosis.
- Decreased Osmotic fragility is seen in conditions seen as iron deficiency and thalassemia.

27. Enumerate two types of process that can be done by using cell separator in blood bank.

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, remaining required plasma & RBCs will be reinfused back to the donor with the same line, and this process will take la ittle longer time than the continuous flow.

28. Write down the uses of incubator in blood bank.

Ans: Incubators are mainly used for

- Determination of enzyme's in the specimen by endpoint reaction methods.
- Determination of glucose, urea, uric acid, etc., by enzymatic methods.
- Growing microorganisms on various culture media.
- The right temperature for the immune antigen reaction.

29. Write down the properties of good cytological fixatives.

Ans:

- It should not excessively shrink or swell cells.
- It should not distort or dissolve cellular components.
- It should help preserve nuclear details.
- It should improve optical differentiation and enhance the staining properties of the tissues and cell components.

30. Enumerate the procedure for disinfection of plastic reusable cytopsin cuvettes.

Ans:

- Cuvettes are immersed in 4% hypochlorite solution for 1 hour.
- Later washed with soap water and after washing, dried and reused.

Answer any 5 questions out of the given 7 questions of 3 marks each:

31. In which conditions prolonged bleeding time is seen?

Ans: Prolonged Bleeding time is seen in the following conditions

- Low Platelet Count- in conditions like ITP (Idiopathic Thrombocytopenic Purpura)
- Platelet functional disorders like thrombasthenia, uraemia, and myeloproliferative disorders. 1
- Vascular Abnormalities like Ehler-Danlos Syndrome.

32. How the disease can anemia be classified based on the absolute value?

Ans: In microcytic anemia, MCV < 80 fl. It may be accompanied by low MCH and MCHC, and then is called microcytic hypochromic anemia. If one examines the peripheral blood film, microcytic cells are seen. Common clinical conditions where this is seen are Iron deficiency anemia and thalassemia. In macrocytic anemia on the other hand, MCV > 100fl. There is usually an increased MCH with a normal MCHC. Peripheral blood examination in such cases shows macrocytes.

Macrocytic anemia could be because of vitamin B12 and/or folic acid deficiency (then it is labelled as megaloblastic anemia) Or it could be due to other causes like liver disease, alcohol intake, hypothyroidism, aplastic anemia, and accelerated erythropoiesis. Some drugs such as cytotoxic drugs, immunosuppressants, and anticonvulsants, can also cause macrocytic anemia.

In Normocytic anemia, the MCV is normal. These are usually accompanied by normal MCH and MCHC. There may be however a reduction in RBC Count. Peripheral blood film reveals relatively normal appearing red cells. Such anemia is found in chronic diseases and after acute blood loss.

33. Enumerate the records that can be kept in blood bank.

Ans:

- Blood donor record.
- Master record for blood and components.
- Issue register: serial number, date and time of issue, bag serial number, ABO, Rh, total quantity in ml, name and address of the recipient, group of recipient, unit/institution, details of cross-matching report, indication for transfusion, components issued, quantity issued, signature of the issuing person.
- Records of the ACD, CPD, CPD-A, and SAGM bags having details of the manufacturer, batch number, date of supply, and results of testing.
- Register for diagnostic kits and reagents used.
- Transfusion adverse reaction reports.
- Records of purchase, use, and stock in hand of disposable needles, syringes, blood bags, all the records must be maintained for a minimum of 5 years.

34. Write down the uses and working principle of hot air oven.

Ans: Use: A Hot air oven is mainly used for the following purposes.

- Dry sterilization of syringes & needles.
- Preparation of anticoagulated bulbs.
- Drying of glassware.
- Heating of chemicals used for the preparation of primary standards.

Principle: When electricity is passed through the heating coils, electrical energy is converted to heat energy.

35. Write down the functions of parts of microscope.

Ans: The support system consists of the base or foot rest, which also holds the light source 2.

- The tube or the arm holds the optical system and also the coarse/fine adjustments.
- The objectives are at the lower end of the tube, and the eye pieces are at the upper end.
- The objectives are attached to the revolving nose piece and can be shifted. The objectives are 10x (low power), 40x (high power), and 100x (oil immersion).
- Below the objectives is the stage that holds the object/slide. The stage has a central hole through which the light passes. The stage may be fixed or movable. Below the stage is the iris/diaphragm, which focuses the light.
- The eye pieces are also of varying magnification; the commonly used one is 10X. The eye pieces are situated in the binocular tube. 1/2

36. Write down the procedures of Giemsa staining.

Ans: Procedure:

This stain is performed on air-dried smears.

- The smears are appropriately assigned a cytology number using a diamond pencil.
- Air-dried smears are fixed in methanol for 10 min.
- Smears are placed on the staining rack and flooded with the working solution for 25 min.
- Wash in running tap water
- Allow to dry at room temperature

37. How can you prepare a cell block?

Ans:

- Cell blocks are made from all fluid aspirates received where sediment is present.
- Fluid received is centrifuged at 3000 rpm for 10 minutes.
- Smears are made and stained.
- To the sediment, approximately double the volume of Bouin's fluid is added, followed by one drop of egg albumin.
- This is then centrifuged at 200 rpm for 10 minutes.
- Supernatant is poured off and the button is transferred with forceps to formalin for 4 to 6 hours, after which it is taken for processing.

Answer any 3 questions out of the given 5 questions of 5 marks each:

38. Mention the Laboratory factors which influence ESR.

Ans:

- Temperature: ESR is increased at higher temperatures
- Time: The sedimentation is maximum in the first 4 hrs. of collection of the sample, hence the test should preferably be done within this time.
- Anticoagulants: Heparin and oxalate are not suitable. Citrate in a 3.8 percent solution is preferable
- Length of the ESR tube: ESR is greater with longer tubes.
- Inclination of the tube: Deviation from the vertical increases the ESR. A 3-degree tilt from vertical can lead to an increase in ESR by as much as 30%.

39. Enumerate the five properties of well prepared blood film.

Ans:

- Two-thirds of the length of the glass slide should be covered by the film. The film should be narrower than the slide for better examination of side edges.
- A homogeneous spread should be displayed with a gradual transition from thick to thin areas and with no deformities.
- It should end in a slightly curved, feathered end.
- The film should be thin to allow proper fixation during the staining procedure. Thick areas appear dark green or gray or are washed off during staining.
- It should contain at least 10 low-power fields in which 50% of the erythrocytes do not overlap. Single erythrocytes should have a well-preserved central pale area.

40. Write down the principle, sample, method, and interpretation of Rh antibody titers.

Ans: Titration is a semi-quantitative technique of measuring the concentration of an antibody in a serum. The titer of an antibody is usually determined by testing two-fold serial dilution of the serum against selected red cells.

SAMPLE: 4 to 5 ml clotted blood. **REAGENTS:** SALINE AGH Pooled Cells.

METHOD: Label a row of tubes according to serum dilution 1 to 10

- Place 1 volume (0.1 ml) or 1 drop of saline in all tubes except the first.
- Add 1 volume (0.1ml) or 1 drop of serum to tubes 1 and 2 so that the first tube contains neat serum (1:1) and 2nd tube has 1 volume of serum in volumes of saline (1:2).
- Using a clean pipette, mix the contents of tube 2 (1 : 2 dilution) without forming any bubbles and transfer one volume of the mixture to tube 3 (1:4).
- Continue the same process through all dilutions. Remove 1 volume from the last tube and save for use if further dilutions are required. Add 1 volume of 2-5% saline suspension of appropriate red cells to each tube. Mix well and incubate at RT for 60 minutes (IgM antibodies) and centrifuge all tubes at 1000 rpm for 1 minute. Gently dislodge the cell button and record results using grades of agglutination reaction.

- The last tube showing a positive reaction is considered as the titer of the antibody. For detection of IgG antibodies: arrange a 2nd row of tubes with the same serial dilution.
- Incubate at 37°

C. Centrifuge and remove supernatant, incubate at 37 °C for 45 minutes. Wash with saline thrice. Arrange fresh tubes and add 1 drop of AHG, and add the corresponding washed cells. Incubate at room temperature for 5 minutes, spin at 1000 rpm for 1 minute, and look for clumping.

INTERPRETATION: If there is clumping in the first row of test tubes, it indicates the presence of saline antibodies or IgM. If there is clumping in the second row of test tubes, it indicates the presence of IgG antibodies.

41. Enumerate the equipment for blood component preparation.

Ans:

- Electronic weighing machine -for weighing the bags accurately.
- Refrigerated centrifuge -bucket handle type of centrifuge to hold the collected bags with a provision for a wide range of temperatures, is preferred. The main unit is built on a sturdy metal frame resting on castors and enclosed by sheet metal, which has an electrical interlock. Rotor consists of 4 to 6 buckets.
- Plasma expresser- to manually express the plasma
- Cell separator -A Cell separator is an instrument used to separate whatever components required for the patients. But in our blood bank, we are mainly using it for whatever large amount of components, platelets are required.
- Sterile connecting device-used to connect the ends of two different segments in a sterile manner. Widely used for the separation of small volumes of blood for pediatric transfusion, buffy coat pooling, and lab-side leukodepletion.

42. Write down the procedure and result of Hematoxylin and eosin staining method.

Ans:

- Fix the smears in 95% alcohol for 30 min
- Wash in running tap water
- Stain in hematoxylin for 5 min
- Wash in running tap water
- Decolorize in acid alcohol and wash in running tap water
- Ammonia water – 1 dip and then wash in tap water
- Stain in eosin for 2 min
- Dip in 100% alcohol for 2 min
- Dip in acetone for 2 min
- Dehydrate and mount with DPX

Result: Nuclei: Blue/Black and Cytoplasm: Varying shades of pink