IDENTIFICATION OF BODY FLUIDS - TEST QUESTIONS

1. Diagram a sperm cell.

2. Describe how a sperm cell would appear microscopically using the Christmas tree stain and what stains are used.

3. Explain the principle of the acid phosphatase test.

4. List some substances other than semen which have acid phosphatase.

5. Define:

    Semen

    Seminal plasma

    Spermatozoa

    Acid phosphatase

    Aspemic

6. Explain the principle of the Phadebas test.

7. What is luminol.

8. Describe the reactions which take place when luminol comes in contact with blood.

9. Explain why luminol works best with older bloodstains than with fresh liquid blood.

10. What is the sensitivity level of luminol.

11. Name several substances which will cause chemiluminescence when each comes in contact with the luminol spray.

12. List five uses for luminol and the importance of each.

13. Discuss the stability of the luminol solution and when it is best prepared for use.

14. True or False:

_____a. When sprayed, luminol will only give reactions when blood is present.

_____b. Always spray visible blood with luminol even when it will be used for further tests.

_____c. Rust will not give chemiluminescent reactions when sprayed with luminol.

_____d. Luminol examinations can provide useful information for investigative purposes.

_____e. A phenolphthalein test should be conducted on an area which gives a positive luminol reaction.

15. Describe in detail the chemical basis of the phenolphthalein test.

16. Discuss the three step procedure used in the phenolphthalein testing of a suspect stain. List each step and comment on each.

17. List the specific names of substances which give positive test results with the phenolphthalein test.

18. Discuss the limitations and problems of the phenolphthalein test.

19. True or False:

_____a. Phenolphthalein is a colorless solution in the reduced state.

_____b. Phenolphthalein is considered to be highly reactive with plant peroxidases and metal catalysts.

_____c. The phenolphthalein test works in the same fashion as the benzidine test except that the oxidized form of phenolphthalein gives a blue color.

_____d. Methanol is used to decrease the sensitivity of the phenolphthalein reagent.

_____e. A positive phenolphthalein reaction always means that blood is present on the suspected stain.

_____f. The heme group of hemoglobin possesses a peroxidase-like activity which catalyzes the breakdown of hydrogen-peroxide to form free hydroxyl radicals (H_20_2 -> 2OH). These free hydroxyl radicals will then oxidize phenolphthalein to produce a pink color.

20. Describe in detail the chemical basis of the Takayama crystal test.

21. Discuss in detail the reagent preparation and under what conditions the resultant mixture is normally stored.

22. Describe two methods that can be used to prepare a bloodstain for testing with the Takayama crystal test.

23. Discuss any control procedures one would use to ensure that a positive or negative test result is accurate.

24. True or False:

_____a. The Takayama crystal test is a simple and sensitive test used to confirm the presence of blood.

_____b. The time necessary for crystal development may vary with the age of the bloodstain.

_____c. Commercially prepared catalase and peroxidase will give a positive test result with the Takayama reagent.

_____d. Pyridine combines with ferrous iron (Fe+2) to form the insoluable crystals of hemochromogen.

_____e. The pink crystals which are needle shaped or rhomboid are observed microscopically.

25. Discuss in detail the precipitin reaction which takes place in origin determination tests. Describe specifically the principle involved and the step-wise fashion in which the reaction itself takes place.

26. Discuss in detail what reagents and controls are used in determining the species origin of a confirmed bloodstain. Discuss how one would defend a species origin reaction in light of the fact that cross-reactivity may have occurred, i.e. how would one defend the test result as being accurate.

27. List the advantage or disadvantages of the ring precipitin test as opposed to those of the Ouchterlony method.

28. List all the factors and conditions that affect the precipitin reaction and give a brief discussion as to how each specifically affects the precipitin reaction.

29. When testing a dried bloodstain, discuss what specific entity is responsible for the positive precipitin test.

30. True or False:

_____a. Antibody (immunoglobulin) molecules react with antigens (soluble protein) to form a precipitate which is readily visible when viewed under the correct light conditions.

_____b. The precipitin reaction requires an equivalent concentration of both antigen and antibody for a clear-cut positive reaction and an excess of either may result in a negative result.

_____c. Heat causes protein denaturation and can interfere with obtaining a precipitin reaction.

_____d. A control should be run simultaneously for the type of animal serum in which the antiserum was prepared when testing a questioned bloodstain.

_____e. Monkey and rabbit serum each will give a positive precipitin reaction with antiruminant serum.

_____f. Human tissue as well as human serum will give a positive precipitin reaction when tested with primate antiserum.

_____g. Serum proteins cannot be separated electrophoretically because these proteins have no charge.

_____h. A possible source for a false positive reaction is the Forssman antigen which occurs in animal blood but not in human blood.

31. Forensic test for p30 include:

a. Immunodiffusion
b. Differential protein staining
c. Rocket electrophoresis
d. Cross-over electrophoresis
e. ELISA

Which are based on an antigen-antibody reaction?

32. p30 is produced in which tissue or gland?

33. What effect does cancer of this tissue or gland have on the expression of p30?

34. True or False:

p30 is a monomer.
p30 is polymorphic.
Anti-human semen serum is specific for p30.

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