CHAPTER 5 DRUGS

SECTION 1 LEARNING OBJECTIVES:
1. Define psychological and physical dependence.
2. Name and classify the commonly abused drugs.
3. Describe the tendency to develop psychological and physical dependency for the more commonly abused drugs.
4. Describe the schedules I-V of the Controlled Substances Act.
5. Describe the laboratory tests that forensic chemists normally rely upon to comprise a routine drug identification scheme.
6. Describe the process of chromatography.
7. Describe the parts of a gas chromatograph.
8. Define retention time.
9. Explain the difference between thin-layer and gas chromatography.
10. Define Rf value.
12. Name the parts of a simple absorption spectrophotometer.
13. Describe the utility of an ultraviolet and infrared absorption spectrum for the identification of organic compounds.
14. Describe the concept of mass spectrometry.
15. Describe the significance of a mass spectrum.
16. Discuss the proper collection and preservation of drug evidence.

SUPPLEMENTARY QUESTIONS AND ANSWERS

1. a. Marquis
   b. Duquenois-Levine
   c. Scott reagent
   d. Van Urk

2. a. Depressant
   b. Stimulant
   c. Narcotic
   d. Hallucinogen

3. a. UV spectrophotometry
   b. Infrared spectrophotometry
   c. Neutron activation analysis
   d. Chromatography
4. Drugs deemed to have the highest potential for abuse and also having a current medical use are listed in which schedule of the Controlled Substances Act?
   a. I  
   b. II  
   c. III  
   d. IV  
   e. V

5. The most common diluent of heroin is:
   a. Mannitol  
   b. Quinine  
   c. Procaine  
   d. Starch

6. A police officer performs a field test on a white powder, obtaining a purple color. The most likely drug present is:
   a. Cocaine  
   b. Heroin  
   c. LSD  
   d. Methadone

7. There is a significant likelihood that continued use of________will result in a low degree of psychological dependence.
   a. Cocaine  
   b. Heroin  
   c. Marijuana  
   d. Barbiturates

8. Regular use of the following drug may lead to physical dependency:
   a. LSD  
   b. Marijuana  
   c. Caffeine  
   d. Ethyl alcohol

9. Which of the following is NOT a stimulant?
   a. Caffeine  
   b. Amphetamine  
   c. Cocaine  
   d. Ethyl alcohol

10. Heroin is a chemical derivative of:
    a. Morphine  
    b. Barbituric acid  
    c. Codeine  
    d. Methadone

11. The following analytical technique is considered to be a specific test in a drug identification scheme:
    a. Color test  
    b. Microcrystalline test  
    c. Thin-layer chromatography  
    d. IR spectrophotometry

12. Which of the following is synthetically produced and does NOT occur naturally?
    a. Cocaine  
    b. Amphetamine  
    c. Morphine  
    d. Opium

13. Which of the following is NOT a depressant?
    a. Librium  
    b. Valium  
    c. Cocaine  
    d. Ethyl alcohol
14. Which of the following statements is FALSE?
   a. Hashish is a concentrated preparation of marijuana.
   b. The active ingredient of marijuana is tetrahydrocannabinol.
   c. Prior to 1970 marijuana was classified as a narcotic drug.
   d. Marijuana is synthesized from the *Cannabis sativa* plant.
   e. Marijuana can tentatively be identified by the Duquenois-Levine color test.

15. Which of the following is considered to be a hallucinogen?
   a. Phencyclidine (PCP)
   b. Mescaline
   c. Psilocybin
   d. STP
   e. All of the above

16. The tranquilizers Valium and Librium are classified in which schedule of the Controlled Substances Act?
   a. I
   b. II
   c. III
   d. IV
   e. V

17. Which of the following is (are) considered to be “club drugs”?
   a. Ketamine
   b. MDMA
   c. Rohypnol
   d. GHB
   e. All of the above

18. A technique for separating and tentatively identifying the components of a mixture is:
   a. Spectrophotometry
   b. Infrared
   c. Chromatography
   d. Mass spectrometry

19. A compound can tentatively be identified by gas chromatography from its:
   a. Carrier gas
   b. Rf value
   c. Partition coefficient
   d. Retention time

20. A single specific test for identification is:
   a. IR spectrophotometry
   b. UV spectrophotometry
   c. Gas chromatography
   d. TLC

21. The last step in a thin-layer chromatographic analysis is:
   a. Visualization
   b. Spotting the unknown
   c. Spotting a standard
   d. Developing the plate in an enclosed tank

22. The distribution of a substance between a mobile and stationary phase describes:
   a. Spectrophotometry
   b. Dispersion
   c. Density-gradient tubes
   d. Chromatography
23. The recorder of a spectrophotometer measures:
   a. The Rf value of light
   b. The retention time of light
   c. Absorption of light at specific frequencies
   d. The refractive index of light

24. Which of the following statements is FALSE?
   a. A gas chromatograph can be coupled to a mass spectrometer.
   b. Gas chromatography cannot produce a specific identification of a chemical substance.
   c. In mass spectrometry, a chemical substance enters a chamber where it is fragmented by high-energy electrons.
   d. Many chemical substances have similar mass spectra fragmentation patterns.
   e. A mass spectrometer can detect materials weighing only one millionth of a gram.

Review Questions—Fill In
1. True or False: Underlying emotional factors are the primary motives leading to the repeated use of a drug. ___________

2. Drugs such as alcohol, heroin, amphetamines, barbiturates, and cocaine can lead to a (high, low) degree of psychological dependence with repeated use.

3. The development of (psychological, physical) dependence on a drug is shown by withdrawal symptoms such as convulsions when the user stops taking the drug.

4. True or False: Abuse of barbiturates can lead to physical dependency. ___________

5. True or False: Repeated use of LSD leads to physical dependency. ___________

6. Physical dependency develops only when the drug user adheres to a __________ schedule of drug intake.

7. Narcotic drugs are __________ that __________ the central nervous system.

8. __________ is a gummy, milky juice exuded through a cut made in the unripe pod of the opium poppy.

9. The primary constituent of opium is __________.

10. __________ is a chemical derivative of morphine made by reacting morphine with acetic anhydride.
11. A legally manufactured drug that is chemically related to heroin and heavily abused is ___________.

12. True or False: Methadone is classified as a narcotic drug, even though it is not derived from opium or morphine. ___________

13. Drugs that cause marked alterations in mood, attitude, thought processes, and perceptions, are called ___________.

14. __________ is the sticky resin extracted from the marijuana plant.

15. The active ingredient of marijuana largely responsible for its hallucinogenic properties is ___________.

16. True or False: The potency of a marijuana preparation depends on the proportion of the various plant parts in the mixture. ___________

17. The marijuana preparation with the highest THC content is ___________.

18. LSD is a chemical derivative of ___________, a chemical obtained from the ergot fungus that grows on certain grasses and grains.

19. The drug phencyclidine is often manufactured for the illicit-drug market in ___________ laboratories.

20. Alcohol (stimulates, depresses) the central nervous system.

21. __________ are called “downers” because they depress the central nervous system.

22. Phenobarbital is an example of a (short-, long-) acting barbiturate.

23. __________ is a powerful sedative and muscle relaxant that possesses many of the depressant properties of barbiturates.

24. __________ are drugs used to relieve anxiety and tension without inducing sleep.

25. True or False: Glue sniffing stimulates the central nervous system. ___________

26. __________ are a group of synthetic drugs that stimulate the central nervous system.

27. The most severe form of amphetamine abuse stems from its (oral, intravenous) administration.

28. An increasing percentage of amphetamines available on the illicit drug market originate from ___________ drug laboratories.
29. ________ is extracted from the leaf of the coca plant.

30. Traditionally, cocaine is ________ into the nostrils.

31. True or False: Cocaine is a powerful central nervous system depressant. ________

32. The two drugs usually associated with drug-facilitated sexual assaults are ________ and ________.

33. ________ steroids are designed to promote muscle growth but have harmful side effects.

34. The federal drug-control law is known as ________.

35. Federal law establishes ________ schedules of classification for the control of dangerous drugs.

36. Drugs that have no accepted medical use are placed in schedule ________.

37. Librium and Valium are listed in schedule ________.

38. True or False: Color tests are used to identify drugs conclusively. ________

39. The ________ color test reagent turns purple in the presence of heroin.

40. The ________ color test reagent turns orange-brown in the presence of amphetamines.

41. The Duquenois-Levine test is a valuable color test for ________.

42. The ________ test is a widely used color test for cocaine.

43. ________ tests tentatively identify drugs by the size and shape of crystals formed when the drug is mixed with specific reagents.

44. ________ provides a means of separating drugs from their diluents while making a tentative identification.

45. The pattern of an ________ absorption spectrum is unique for each drug and thus is a specific test for identification.

46. The gas chromatograph, in combination with the ________, can separate the components of a drug mixture and then unequivocally identify each substance present in the mixture.

47. All packages containing drugs must be marked for identification by the police officer before being sent to the laboratory in order to maintain the_____.
48. The study of the absorption of light by chemical substances is known as ________.

49. A mixture’s components can be separated by the technique of ________.

50. True or False: Henry’s law describes the distribution of a volatile chemical compound between its liquid and gas phases. ________

51. The (higher, lower) the solubility of a gas in a liquid, the greater its tendency to remain dissolved in that liquid.

52. True or False: In order for chromatography to occur, one phase must move continuously in one direction over a stationary phase. ________

53. A technique that separates mixtures on the basis of their distribution between a stationary liquid phase and a moving gas phase is ________.

54. The time required for a substance to travel through the gas chromatographic column is a useful identifying characteristic known as ________.

55. Solid materials that are not readily dissolved in solvents for injection into the gas chromatograph can be ________ into numerous gaseous products prior to entering the gas chromatograph.

56. A technique that uses a moving liquid phase and a stationary solid phase to separate mixtures is ________.

57. Because most chemical compounds are colorless, the final step of the thin-layer development usually requires that they be ________ by spraying with a chemical reagent.

58. The distance a spot has traveled up a thin-layer plate can be assigned a numerical value known as the ________ value.

59. True or False: Thin-layer chromatography yields the positive identification of a material. ________

60. The migration of materials along a stationary phase under the influence of an electrical potential describes the technique of ________.

61. The amount of radiation a substance will absorb is directly proportional to its concentration as defined by ________ law.

62. The ________ is the instrument used to measure and record the absorption spectrum of a chemical substance.

63. The function of the ________ is to select a single frequency of light emanating from the spectrophotometer’s source.
64. An (ultraviolet, infrared) absorption spectrum provides a unique “fingerprint” of a chemical substance.

65. The technique of ___________ exposes molecules to a beam of high-energy electrons in order to fragment them.

66. True or False: A mass spectrum is normally considered a specific means for identifying a chemical substance. __________