"ECO-FRIENDLY CHEMISTRY FOR A BETTER FUTURE."

QUESTION BANK

ON

PHARMACEUTICAL & NANO & GREEN CHEMISTRY

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B.Sc. CHEMISTRY- SIXTH SEMESTER
Skill Based Elective Course -V
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PHARMACEUTICAL CHEMISTRY

UNIT-I

1.1 Definition of the terms-drug, pharmacophore, pharmacodynamics, pharmacopoea, pharmacology, bacteria, virus ,fungus, actinomycetes, metabolites, antimetabolites, LD50, ED50. Therapeuticindex and its significance.

UNIT-II

2.1 Sulphonamides-mechanism and action of sulpha drugs- preparation and uses of sulphadiazine, sulphapyridine.

2.2 Antibiotics-Definition-classification as broad and narrow spectrum, Antibiotics-penicillin, ampicillin, structure, mode of action only (no structural elucidation) and uses.

UNIT-III

3.1 Analgesics-definition and actions-narcotic and non narcotic-morphine,Heroin.

3.2 Antipyretic analgesics-salicylic acid derivatives-methyl salicylate,aspirin. Anti-inflammatory agents.

UNIT –IV

4.1 Anaesthetics-definition-classification-local and general- volatile, nitrous oxide, ether, chloroform, uses and disadvantages – nonvolatile – intravenous - thiopental sodium, -local anaesthetics – cocaine and benzocaine.

4.2 Antianaemic drugs-iron, vitamin B12 and folic acid-mode of action.

UNIT-V

5.1 Diabetics-Hypoglycemic agents-sulphonyl urea, biguanides.

5.2 AIDS-causes, prevention and control.

5.3 Cardio Vascular Drugs – Cardiac glycosides-Antiarrhythmic Drugs-preparation, dosage and therapeutic uses.

5.4 Indian medicinal plants and uses-tulasi, kilanelli, mango, semparuthi, adadodai and thoothuvalai.

UNIT-I

1-MARKS

1.What is the definition of a drug?

a. Any substance that alters the structure or function of the body

b. Only prescription medications

c. Herbal remedies

d. Only substances with psychoactive effects

2. Which of the following is included in the broad definition of a drug?

a. Food b. Water

c. Vitamins d. All of the above

3. A drug can be defined as:

a. Only synthetic substances

b. Any substance used to treat diseases

c. Any substance used for recreational purposes

d. Both b and c

4. What distinguishes a drug from other substances?

a. Its legal status b. Its effects on the body

c. Its cost d. Its taste

5. Which of the following statements is true regarding drug classification?

a. All drugs have the same mode of action

b. Drugs are classified based on their legal status only

c. Drugs are classified based on their therapeutic uses, mechanisms of action, and chemical structure

d. All drugs have the same side effects

6. What is a pharmacophore?

a. The chemical formula of a drug

b. The active site of an enzyme

c. A molecular framework that carries the essential features responsible for a drug's biological activity

d. The half-life of a drug in the body

7. Which of the following best describes the role of a pharmacophore in drug design?

a. It determines the color of a drug

b. It identifies the optimal temperature for drug stability

c. It represents the minimum structural elements required for a drug to bind to its target

d. It specifies the size of the drug molecule

8. Why is the concept of pharmacophore important in drug discovery?

a. It helps in determining the market value of a drug

b. It guides the synthesis of new drug candidates with improved efficacy

c. It influences the marketing strategy of pharmaceutical companies

d. It dictates the physical appearance of a drug

9. Which term is often used synonymously with pharmacophore?

a. Chemophore b. Biophore

c. Pharmaceutiphore d. Mediphore

10. In drug design, what does the pharmacophore hypothesis aim to achieve?

a. To maximize the side effects of a drug

b. To identify the essential elements for a drug's therapeutic activity

c. To determine the cost of drug production

d. To establish the shelf life of a drug

11. What is pharmacodynamics?

a. The study of drug absorption in the body

b. The study of drug interactions

c. The study of the physiological effects of drugs and their mechanisms of action

d. The study of drug metabolism

12. Which term is used to describe the relationship between the concentration of a drug and its effects on the body?

a. Pharmacokinetics b. Pharmacogenomics

c. Pharmacodynamics d. Pharmaceutics

13. What does the term "drug potency" refer to in pharmacodynamics?

a. The maximum effect a drug can produce

b. The concentration of a drug required to produce a specific effect

c. The duration of action of a drug

d. The rate of drug metabolism

14. Which of the following is an example of a pharmacodynamic parameter?

a. Bioavailability b. Clearance

c. Maximum Efficacy d. Volume of Distribution

15. In pharmacodynamics, what does the term "agonist" refer to?

a. A substance that blocks the effects of a drug

b. A substance that enhances the effects of a drug

c. A substance that has no effect on the body

d. A substance that inhibits drug absorption

16. What is a pharmacopoeia?

a. A book containing recipes for cooking

b. A standard reference book that provides information on the preparation and standards of drugs

c. A medical encyclopedia

d. A list of prohibited substances

17. What is the primary purpose of a pharmacopoeia?

a. To regulate the advertising of pharmaceutical products

b. To guide the diagnosis of medical conditions

c. To establish standards for the identity, purity, and strength of drugs

d. To provide information on the history of medicine

18. Who typically publishes and maintains a pharmacopoeia?

a. Individual pharmaceutical companies

b. World Health Organization (WHO)

c. National or regional pharmacopoeia commissions

d. Academic research institutions

19. Which term is often used to describe a substance listed in a pharmacopoeia?

a. Therapeutic b. Pharmacodynamic
c. Off-label d. Pharmacopeial

20. What information can be found in a pharmacopoeia?
a. Only information on the synthesis of drugs
b. Only information on the therapeutic uses of drugs
c. Standards for drug quality, purity, and dosage forms
d. Only information on over-the-counter drugs

21. What is pharmacology?
a. The study of ancient remedies and traditional medicine
b. The study of the effects of drugs on living organisms
c. The study of surgery techniques
d. The study of microbiology

22. Which of the following is a primary focus of pharmacology?
a. The development of new surgical procedures
b. The study of disease transmission
c. The discovery and characterization of new drugs
d. The study of nutritional science

23. What does pharmacodynamics focus on?
a. The absorption, distribution, metabolism, and excretion of drugs
b. The study of drug interactions
c. The physiological effects and mechanisms of action of drugs
d. The study of drug dosage forms

24. Which term is used to describe the study of how the body handles a drug, including absorption, distribution, metabolism, and excretion?

a. Pharmacotherapy b. Pharmacodynamics
c. Pharmacokinetics d. Pharmacognosy

25. In pharmacology, what does the term "toxicology" refer to?

a. The study of drug interactions
b. The study of the adverse effects of drugs and poisons
c. The study of drug dosage forms
d. The study of herbal medicine

26. which of the following structures is NOT found in a typical bacterial cell?

a. Nucleus b. Cell wall
c. Ribosome d. Cytoplasm

27. Bacteria reproduce mainly by

a. Mitosis b. Meiosis
c. Binary fission d. Budding

28. Which bacterial shape is described as spiral or corkscrew?

a. Cocci b. Bacilli
c. Spirilla d. Vibrios

29. Gram-positive bacteria stain which color in the Gram staining process?

a. Blue b. Red
c. Purple d. Pink

30. Which bacterial structure is primarily responsible for locomotion?

a. Capsule b. Flagellum
c. Plasmid d. Pili

31. Endospores are primarily associated with:
a. Nutrient storage
b. Reproduction
c. Survival under harsh conditions
d. Energy production

32. Antibiotics are primarily used to:
a. Kill viruses
b. Kill fungi
c. Kill bacteria or inhibit their growth
d. Boost the immune system

33. Which of the following bacterial genera is known to fix nitrogen?
a. Escherichia b. Mycobacterium
c. Rhizobium d. Streptococcus

34. Which bacterial process is responsible for the production of alcohol in beer and wine?
a. Fermentation b. Photosynthesis
c. Respiration d. Transduction

35. Bacterial conjugation primarily involves the transfer of:
a. DNA from one bacterium to another
b. Nutrients
c. Ribosomes
d. Endospores

36. Which of the following is NOT a characteristic of viruses?

a. Ability to reproduce independently
b. Possession of genetic material
c. Requires a host for replication
d. Can cause diseases in hosts

37. Which type of genetic material is found in viruses?
a. Double-stranded RNA
b. Single-stranded DNA
c. Double-stranded DNA
d. Single-stranded RNA

38. The protein coat surrounding the genetic material of a virus is called:
a. Capsule b. Ribosome
c. Envelope d. Capsid

39.A virus that infects bacteria is called a:
a. Bacteriophage b. Viroid
c. Retrovirus d. Prion

40. Which of the following is an example of a retrovirus?
a. Influenza virus b. HIV
c. Herpes simplex virus d. Adenovirus

41.The process by which a virus enters a host cell is called:
a. Translation b. Transduction
c. Transformation d. Adsorption

42. Which statement about viruses is true?
a. All viruses cause diseases.
b. Viruses can reproduce outside a host cell.
c. Viruses are larger than bacteria.
d. Viruses lack metabolic machinery.

43. The influenza virus primarily affects which system of the human body?

a. Respiratory system b. Digestive system
c. Circulatory system d. Nervous system

44. Which of the following is a strategy to prevent viral infections in humans?

a. Antibiotic consumption
b. Vaccination
c. Consumption of antifungal drugs
d. Excessive sunlight exposure

45. Which disease is caused by the Epstein-Barr virus?

a. Measles b. Chickenpox
c. Mononucleosis d. Rabies

46. Which of the following is NOT a characteristic of fungi?

a. They are photosynthetic.
b. They have a cell wall primarily made of chitin.
c. They reproduce by spores.
d. They can be unicellular or multicellular.

47.Fungi obtain nutrients through:

a. Ingestion b. Absorption
c. Photosynthesis d. Secretion

48. The thread-like structures of fungi that collectively form the main body are called:

a. Hyphae b. Spores
c. Capsule d. Mycelium

49. Which of the following fungi is used in baking bread and brewing alcoholic beverages?

a. Candida b. Aspergillus
c. Saccharomyces d. Penicillium

50. Athlete's foot is caused by a fungus belonging to the genus:
a. Candida b. Aspergillus
c. Epidermophyton d. Penicillium

51. Fungi that decompose dead organic matter and recycle nutrients are called:
a. Parasites b. Mutualists
c. Saprophytes d. Symbionts

52. Which of the following is a common fungal infection of the nails?
a. Ringworm b. Thrush
c. Tinea unguium d. Candidiasis

53. Fungi reproduce both sexually and asexually. Which of the following is a method of sexual reproduction in fungi?
a. Budding b. Fragmentation
c. Conjugation d. Binary fission

54. Which fungus produces the antibiotic penicillin?
a. Aspergillus b. Candida
c. Epidermophyton d. Rhizopus

55. Which of the following is NOT a type of fungi?
a. Mold b. Yeast
c. Virus d. Mushrooms

56. Actinomycetes are primarily known for their:
a. Ability to fix nitrogen
b. Role in decomposing organic matter

c. Production of antibiotics
d. Photosynthetic capabilities

57. Which of the following is NOT a characteristic feature of actinomycetes?
a. Filamentous growth
b. Formation of spores
c. Unicellular structure
d. Gram-positive cell wall

58. The antibiotic streptomycin is produced by:
a. Streptomyces griseus
b. Streptomyces coelicolor
c. Streptomyces aureofaciens
d. Streptomyces noursei

59. Actinomycetes are often found in which type of habitats?
a. Marine environments
b. Extreme temperatures
c. Soil
d. Inside human intestines

60. The characteristic branching of actinomycetes gives them a resemblance to:
a. Fungi b. Algae
c. Protozoa d. Bacteria

61. Which actinomycete is known for its ability to produce the antibiotic tetracycline?
a. Streptomyces aureofaciens
b. Streptomyces antibioticus
c. Streptomyces noursei

d. Streptomyces coelicolor

62. Actinomycetes play a crucial role in:

a. Nitrogen fixation

b. Fermentation processes

c. Antibiotic resistance

d. Biodegradation of pollutants

63. Which disease is caused by a pathogenic species of actinomycetes?

a. Tuberculosis b. Leprosy

c. Actinomycosis d. Anthrax

64. Actinomycetes are commonly found in association with:

a. Plants b. Animals

c. Fungi d. Bacteria

65. The distinctive aroma of freshly turned soil is attributed to:

a. Algae b. Protozoa

c. Actinomycetes d. Fungi

66.Antimetabolites are drugs that:

a. Inhibit cell wall synthesis

b. Interfere with protein synthesis

c. Mimic natural metabolites, disrupting normal metabolic pathways

d. Act as antioxidants in the body

67. Which of the following is NOT a common use of antimetabolites in medicine?

a. Treating cancer

b. Treating bacterial infections

c. Immunosuppression
d. Treating viral infections

68.5-Fluorouracil (5-FU) is primarily used in the treatment of:

a. Bacterial infections b. Fungal infections
c. Viral infections d. Cancer

69.Methotrexate acts as an antimetabolite by inhibiting:

a. DNA polymerase
b. RNA polymerase
c. Dihydrofolate reductase
d. Ribonucleotide reductase

70. Which of the following antimetabolites is commonly used as an immunosuppressive agent in organ transplant patients?

a. 6-Mercaptopurine b. Azathioprine
c. Gemcitabine d. Capecitabine

71. Antimetabolites interfere with the synthesis of:

a. Lipids b. Carbohydrates
c. Proteins d. Nucleic acids

72. Which antimetabolite is associated with the side effect of hand-foot syndrome, a skin reaction?

a. Cytarabine b. Gemcitabine
c. Methotrexate d. 6-Mercaptopurine

73. Antimetabolites can be classified into several categories based on their structural similarity to:

a. Enzymes b. Hormones
c. Nucleosides or nucleotides d. Lipids

74. Which antimetabolite is associated with inhibiting thymidylate synthase, an enzyme crucial for DNA synthesis?

a. 5-Fluorouracil b. Methotrexate
c. Capecitabine d. Azathioprine

75. The primary mode of action of antimetabolites in cancer treatment is to:

a. Induce cell differentiation
b. Induce cell apoptosis
c. Arrest the cell cycle
d. Enhance DNA repair mechanisms

76. LD50 refers to the dose of a substance that:

a. Is effective in 50% of the population
b. Causes death in 50% of the test animals
c. Is safe for use in 50% of patients
d. Causes no adverse effects in 50% of the population

77. ED50 stands for the dose of a drug that:

a. Causes death in 50% of the test animals
b. Is effective in 50% of the population
c. Causes adverse effects in 50% of the population
d. Is equivalent to the LD50

78. In pharmacology, the ED50 value indicates:**

a. The therapeutic index of a drug
b. The potency of a drug
c. The safety profile of a drug
d. The lethal dose of a drug

79. A drug with a high therapeutic index (TI) will have:

a. A small difference between the LD50 and ED50

b. A large difference between the LD50 and ED50

c. A very high LD50 value

d. No therapeutic effect

80. Which statement best describes the relationship between LD50 and toxicity?**

a. A lower LD50 indicates higher toxicity.

b. A higher LD50 indicates higher toxicity.

c. LD50 is not related to toxicity.

d. LD50 measures the therapeutic effect, not toxicity.

81. If a drug has an LD50 value of 200 mg/kg and an ED50 value of 50 mg/kg, the therapeutic index is:

a. 2 b. 4

c. 250 d. 150

82. The LD50 value is primarily used to determine:

a. The therapeutic efficacy of a drug

b. The safety margin of a drug

c. The route of administration for a drug

d. The pharmacokinetics of a drug

83. A drug with a narrow therapeutic index is:

a. Safe for use in a wide range of doses

b. Safe only within a very specific dose range

c. Safe at any dose

d. Completely unsafe and should be withdrawn from the market

84. In drug development, knowing the ED50 is crucial because it helps determine:

a. The maximum tolerated dose

b. The therapeutic window of a drug

c. The side effects of a drug

d. The mode of action of a drug

85. Which of the following best represents the therapeutic window of a drug?

a. The range between the minimum effective concentration and the minimum toxic concentration

b. The range between the maximum effective concentration and the maximum tolerated concentration

c. The range between the LD50 and ED50 values

d. The range between the onset of action and the peak concentration of a drug

ANSWERS:

1.a,2.a,3.d,4.b,5.c,6.c,7.c,8.b,9.a,10.b,11.c,12.c,13.b,14.c ,15.b,16.b,17.c,18.c,19.d,20.c,21.b,22.c,23.c,24.c,25.b,26 .a,27.c,28.c,29.c,30.b,31.c,32.c,33.c,34.a,35.a,36.a,37.d, 38.d,39.a,40.b,41.d,42.d,43.a,44.b,45.c,46.a,47.b,48.a,49 .c,50.c,51.c,52.c,53.c,54.a,55.c,56.c,57.c,58.a,59.c,60.a, 61.b,62.d,63.c,64.a,65.c,66.c,67.b,68.d,69.c,70.b,71.d,72 .b,73.c,74.a,75.c,76.b,77.b,78.b,79.b,80.a,81.a,82.b,83.b, 84.b,85.a.

5-MARKS

1. Define the term "drug" and explain how it differs from other substances.

2. Discuss the concept of pharmacophore and its relevance in drug design. Provide an example to illustrate.
3. Explain the fundamental principles of pharmacodynamics and its importance in understanding drug action.
4. Define the term "pharmacopoea" and discuss its role in standardizing medicinal substances. Provide examples of pharmacopoeias commonly used in healthcare.
5. Differentiate between pharmacology and pharmacy, highlighting their distinct focuses and contributions to the field of medicine.
6. Provide an overview of bacteria, emphasizing their significance in infectious diseases and the development of antibacterial drugs.
7. Explain the characteristics of viruses and discuss the challenges in designing antiviral drugs. Provide examples of antiviral medications.
8. Define the term "fungus" and discuss the role of antifungal drugs in medical treatment. Include examples of common antifungal medications.
9. Describe actinomycetes and their relevance in the field of medicine. Provide examples of drugs derived from actinomycetes.
10. Define the term "metabolites" and discuss their importance in drug metabolism. Provide examples

of drugs that undergo significant metabolism in the body

11. Explain the concept of antimetabolites and their applications in chemotherapy. Provide examples of antimetabolite drugs and the diseases they target.
12. Define LD50 and ED50, and explain how these parameters are used in toxicology studies. Discuss their significance in assessing drug safety.
13. Elaborate on the concept of therapeutic index and its importance in evaluating the safety and efficacy of drugs. Provide an example to illustrate the calculation of therapeutic index.
14. Discuss the significance of understanding pharmacokinetics in drug development. Provide examples of pharmacokinetic parameters and their relevance.
15. Explain the mechanism of action of a drug that exhibits agonistic activity. Provide an example of such a drug and its therapeutic applications.
16. Define the term "pharmacogenomics" and discuss its implications in personalized medicine. Provide examples of drugs influenced by genetic variations.
17. Discuss the challenges and opportunities in developing drugs targeting the central nervous system. Provide examples of drugs used in treating neurological disorders.

18. Explain the concept of drug interactions and their potential impact on therapeutic outcomes. Provide examples of drug combinations with significant interactions.
19. Define the term "pharmacovigilance" and discuss its role in monitoring and ensuring drug safety. Provide examples of situations where pharmacovigilance is crucial.
20. Discuss the ethical considerations in pharmaceutical research and development. Highlight the importance of ethical practices in ensuring patient safety and trust in the healthcare system.

10-MARKS

1. Define the term "drug" and elaborate on the various factors that contribute to a substance being classified as a drug. Discuss the role of pharmacology in understanding the actions, effects, and applications of drugs.
2. Explain the concept of pharmacophore and its significance in drug design. Discuss how understanding pharmacodynamics contributes to the development and optimization of therapeutic agents. Provide examples to illustrate the application of pharmacophores in drug development.
3. "pharmacopoea" and discuss its role in standardizing medicinal substances. Explore the characteristics of

bacteria, highlighting their significance in infectious diseases and the development of antibacterial drugs. Explain how pharmacopoeial standards contribute to the quality control of antibacterial medications.

4. Differentiate between viruses, fungi, and actinomycetes. Discuss their respective roles in causing diseases and the challenges in developing drugs to target them. Provide examples of antiviral, antifungal, and antibacterial drugs and discuss their modes of action.

5. Define the term "metabolites" and discuss their significance in drug metabolism. Explore the concept of antimetabolites and their applications in chemotherapy. Provide examples of drugs classified as metabolites and antimetabolites, and explain their roles in therapeutic interventions.

6. Define LD50 and ED50, and explain how these parameters are used in toxicology studies. Discuss their significance in assessing the safety and efficacy of drugs. Provide examples of situations where LD50 and ED50 are crucial in evaluating the toxic and therapeutic effects of substances

7. Define the term "therapeutic index" and elaborate on its significance in drug safety assessment. Discuss the calculation of therapeutic index and how it is interpreted in clinical practice. Provide examples of drugs with different therapeutic indices and explain their implications.

8. Explore the intricacies of pharmacodynamics in the context of drug development. Discuss how understanding the interactions between drugs and their targets influences the design and optimization of therapeutic agents. Provide examples to illustrate the impact of pharmacodynamics on drug development strategies.

9. Discuss the role of pharmacopoeial standards in drug regulation. Explore how adherence to pharmacopoeial standards contributes to the safety, efficacy, and quality of pharmaceutical products. Highlight examples of regulatory agencies and their reliance on pharmacopoeial standards in approving and monitoring drugs.

10. Examine emerging trends in pharmacology research and their potential impact on drug discovery and development. Discuss advancements such as personalized medicine, pharmacogenomics, and novel drug delivery systems. Evaluate the implications of these trends on the future of pharmacology and patient care.

UNIT-II

1-MARKS

1. What is the primary target of sulpha drugs in bacterial cells?
   a. DNA replication b. Cell membrane synthesis
   c. Protein synthesis d. Folic acid synthesis
2. How do sulpha drugs interfere with bacterial folic acid synthesis?
   a. Inhibiting DNA polymerase
   b. Blocking RNA synthesis
   c. Inactivating dihydrofolate reductase
   d. Enhancing folic acid production
3. Which of the following best describes the mode of action of sulpha drugs?
   a. Bactericidal b. Bacteriostatic
   c. Antiviral d. Antifungal
4. What is the consequence of inhibiting folic acid synthesis in bacteria?
   a. Disruption of cell membrane integrity
   b. Impaired protein synthesis
   c. Inhibition of DNA replication
   d. Defective cell wall formation
5. Which of the following is a common side effect associated with sulpha drug therapy?
   a. Photosensitivity b. Hypertension
   c. Respiratory depression d. Hypoglycemia
6. How are sulpha drugs typically prepared for medical use?

a. Extraction from plants b. Fermentation process
c. Chemical synthesis d. Isolation from fungi

7. Which sulpha drug is commonly used in the treatment of urinary tract infections?
a. Sulphadiazine b. Sulphapyridine
c. Sulfamethoxazole d. Sulfisoxazole

8. What role does folic acid play in bacterial cells, making it a target for sulpha drugs?
a. Protein synthesis b. Nucleic acid synthesis
c. Cell wall synthesis d. Energy production

9. In which medical condition is sulphadiazine commonly employed?
a. Gastrointestinal disorder b. Respiratory infections
c. Urinary tract infections d. Cardiovascular diseases

10. What is the primary therapeutic use of sulpha drugs like sulphapyridine?
a. Antifungal treatment
b. Antiviral treatment
c. Treatment of bacterial infections
d. Antipyretic treatment

11. How is sulphadiazine typically prepared for medical use?
a. Extraction from plants b. Fermentation process
c. Chemical synthesis d. Isolation from fungi

12. What class of drugs does sulphadiazine belong to?
a. Antibiotics b. Antifungals
c. Antivirals d. Antipyretics

13. In which of the following conditions is sulphadiazine commonly used?

a. Respiratory infections
b. Cardiovascular diseases
c. Urinary tract infections
d. Gastrointestinal disorders

14. What is the primary therapeutic action of sulphadiazine in the treatment of infections?

a. Inhibition of protein synthesis
b. Disruption of cell membrane
c. Inhibition of folic acid synthesis
d. Inhibition of DNA replication

15. Which of the following is a common side effect associated with sulphadiazine use?**

a. Photosensitivity b. Hypoglycemia
c. Respiratory depression d. Hypertension

16. How is sulphapyridine typically prepared for medical use?

a. Extraction from plants b. Fermentation process
c. Chemical synthesis d. Isolation from fungi

17. Which class of drugs does sulphapyridine belong to?

a. Antibiotics b. Antifungals
c. Antivirals d. Antipyretics

18. In which medical condition is sulphapyridine commonly employed?

a. Gastrointestinal disorders
b. Respiratory infections
c. Urinary tract infections

d. Cardiovascular diseases

19. What is the primary therapeutic action of sulphapyridine in the treatment of infections?

a. Inhibition of protein synthesis
b. Disruption of cell membrane
c. Inhibition of folic acid synthesis
d. Inhibition of DNA replication

20. Which of the following is a common side effect associated with sulphapyridine use?

a. Photosensitivity b. Hypoglycemia
c. Respiratory depression d. Hypertension

21. What is the primary definition of antibiotics?

a. Compounds that kill all microorganisms
b. Substances that inhibit the growth of bacteria
c. Drugs exclusively used for viral infections
d. Compounds that enhance immune response

22. How are antibiotics generally classified based on their spectrum of activity?

a. According to their chemical structure
b. Based on their route of administration
c. According to their mechanism of action
d.Based on their range of effectiveness against bacteria

23. Which term describes antibiotics effective against a wide range of bacteria, including both Gram-positive and Gram-negative species?

a. Narrow-spectrum antibiotics
b. Broad-spectrum antibiotics
c. Targeted antibiotics

d. Selective antibiotics

24. In the classification of antibiotics, what does "narrow spectrum" indicate?

a. Effective against a specific group of bacteria
b. Effective against all bacteria
c. Limited therapeutic uses
d. Exclusive use in topical applications

25. Which of the following is a characteristic feature of broad-spectrum antibiotics?

a. Effective against specific bacteria
b. Effective against a wide range of bacteria
c. Only used in topical applications
d. Lack of antibacterial activity

26. What is the primary advantage of using broad-spectrum antibiotics?

a. Targeted therapy with fewer side effects
b. Reduced risk of antibiotic resistance
c.Broader coverage against various bacterial infections
d. Lower cost of treatment

27. Which of the following antibiotics is an example of a broad-spectrum antibiotic?

a. Penicillin b. Ciprofloxacin
c. Vancomycin d. Erythromycin

28. What is the primary disadvantage of using broad-spectrum antibiotics?

a. Limited therapeutic uses
b. Increased risk of antibiotic resistance
c. Higher cost of treatment

d. Greater likelihood of side effects

29. Which term describes antibiotics effective against a specific group of bacteria?

a. Selective antibiotics
b. General antibiotics
c. Universal antibiotics
d. Wide-spectrum antibiotics

30. Why might narrow-spectrum antibiotics be preferred in certain situations?

a. To minimize side effects
b. To treat a wide range of infections
c. To reduce the risk of antibiotic resistance
d. To lower the cost of treatment

31. Which class of antibiotics does penicillin belong to?

a. Tetracyclines b. Cephalosporins
c. Aminoglycosides d. Beta-lactams

32. What is the primary structural feature shared by penicillin and ampicillin?

a. Amino side chain b. Beta-lactam ring
c. Carbonyl group d. Quinolone ring

33. How does penicillin primarily exert its antibacterial effect?

a. Inhibition of protein synthesis
b. Disruption of cell membrane
c. Inhibition of folic acid synthesis
d. Inhibition of bacterial cell wall synthesis

34. Which enzyme is targeted by penicillin in its mode of action?

a. DNA polymerase
b. RNA polymerase
c. Dihydrofolate reductase
d. Transpeptidase

35. What is the primary therapeutic use of penicillin?
a. Treatment of viral infections
b. Treatment of fungal infections
c. Treatment of bacterial infections
d. Antipyretic treatment

36. Which structural modification distinguishes ampicillin from penicillin?
a. Amino side chain b. Carbonyl group
c. Sulfonamide group d. Quinolone ring

37. What is the extended spectrum of activity of ampicillin compared to penicillin due to?
a. Enhanced lipid solubility
b. Increased stability in acidic environments
c. The presence of an amino side chain
d. Greater potency against Gram-positive bacteria

38. In what way does ampicillin inhibit bacterial growth?
a. Disruption of cell membrane
b. Inhibition of protein synthesis
c. Inhibition of folic acid synthesis
d. Inhibition of bacterial cell wall synthesis

39. What is the primary therapeutic use of ampicillin?
a. Treatment of viral infections
b. Treatment of fungal infections
c. Treatment of bacterial infections

d. Antipyretic treatment

40. Which bacterial infections are ampicillin and penicillin commonly prescribed for?

a. Tuberculosis b. Respiratory infections

c. Viral infections d. Fungal infections

ANSWERS:

1.d,2.c,3.b,4.c,5.a,6.c,7.c,8.b,9.c,10.c,11.c,12.a,13.c,14.c, 15.a,16.c,17.a,18.c,19.c,20.a,21.b,22.d,23.b,24.a,25.b,26. c,27.b,28.b,29.a,30.a,31.d,32.b,33.d,34.d,35.c,36.a,37.c, 38.d,39.c,40.b

5-MARKS

1. Explain the mechanism of action of sulphonamides in inhibiting bacterial growth. Provide an overview of the specific step in bacterial metabolism that is targeted, and discuss the consequences of this inhibition.

2. Describe the process of preparing sulphadiazine and sulphapyridine, highlighting key steps involved in their synthesis. Discuss any challenges or considerations in the preparation of these sulpha drugs.

3. Explore the therapeutic uses of sulphadiazine in medical practice. Provide detailed information on the types of infections or conditions for which sulphadiazine is commonly prescribed, and discuss its effectiveness in these cases.

4.Investigate the pharmacological properties of sulphapyridine, emphasizing its mechanism of action and how it contributes to its therapeutic effects. Discuss specific bacterial infections that are effectively treated with sulphapyridine.

5. Define the term "antibiotics" and discuss their significance in the context of combating bacterial infections. Highlight the key characteristics that differentiate antibiotics from other classes of drugs.

6. Classify antibiotics based on their spectrum of activity as either broad or narrow spectrum. Provide examples of each type and explain how their classification influences their therapeutic applications.

7. Examine the mode of action of penicillin without delving into its structural details. Discuss how penicillin disrupts bacterial growth and the specific targets within bacterial cells.

8. Illustrate the structural similarities shared by penicillin and ampicillin. Briefly explain the significance of the beta-lactam ring in their structures and how this feature contributes to their mode of action.

9. Discuss the therapeutic uses of penicillin, emphasizing its applications in treating bacterial infections. Provide insights into specific conditions or diseases where penicillin is the drug of choice and explain its effectiveness.

10. Elaborate on the mode of action of ampicillin, focusing on the aspects that distinguish it from penicillin.

Discuss how ampicillin inhibits bacterial growth and the bacterial processes it targets.

11. Explore the diverse therapeutic applications of ampicillin, highlighting specific bacterial infections for which it is commonly prescribed. Discuss any advantages or limitations associated with the use of ampicillin in clinical settings.

12. Compare and contrast the uses of sulphadiazine and ampicillin in medical practice. Discuss the specific conditions or infections for which these drugs are preferred and the factors that contribute to their selection.

13. Evaluate the role of antibiotics in modern medicine. Discuss the challenges associated with antibiotic use, including the development of resistance, and propose potential strategies to address these challenges.

14. Discuss the importance of proper antibiotic classification in clinical settings. Explore how the knowledge of whether an antibiotic is broad or narrow spectrum influences medical decision-making and treatment strategies.

10-MARKS

1. In-depthly explain the mechanism of action of Sulphonamides, highlighting the specific molecular target within bacterial cells and the biochemical process they disrupt.

Discuss the consequences of inhibiting this targeted process, elaborating on how Sulphonamides exert their bacteriostatic effects.

2. Provide a comprehensive overview of the preparation methods for Sulphonamides,with a focus on sulphadiazine and sulphapyridine.

Discuss key synthetic steps involved in the preparation, and highlight any challenges or considerations in the synthesis of these sulpha drugs.

3. Explore the therapeutic uses of sulphadiazine and sulphapyridine, delving into specific medical conditions for which these drugs are commonly prescribed.

Evaluate the effectiveness of Sulphonamides in treating bacterial infections, considering factors such as spectrum of activity and any notable limitations.

4. Integration:

Integrate the information on the mechanism of action, preparation methods, and therapeutic uses, emphasizing the interconnectedness of these aspects.

Discuss how a deeper understanding of the mechanism of action informs the development of Sulphonamides for specific therapeutic applications.

5. Define antibiotics and elucidate their significance in the field of medicine.

Classify antibiotics into broad and narrow spectrum categories, providing clear distinctions between the two. Explain the rationale behind this classification and its implications for medical practice.

6. Briefly outline the general structure of penicillin and ampicillin without providing structural elucidation. Highlight any common structural features that contribute to their mode of action. Discuss the mode of action of penicillin and ampicillin, focusing on the bacterial processes they disrupt. Avoid structural details but emphasize the impact on bacterial cells.

7. Explore the therapeutic uses of penicillin and ampicillin, providing specific examples of bacterial infections for which these antibiotics are commonly prescribed. Discuss any considerations or limitations in the use of penicillin and ampicillin in clinical settings.

8. Compare and contrast the mode of action and therapeutic uses of penicillin and ampicillin, highlighting any unique features of each. Discuss the overall significance of penicillin and ampicillin in the broader context of antibiotic therapy.

UNIT-III

1. What is the primary purpose of analgesics in medicine?
   a. Lowering blood pressure b. Relieving pain
   c. Inducing sleep d. Enhancing appetite
2. Which term best defines substances that relieve pain without causing loss of consciousness?
   a. Antibiotics b. Analgesics
   c. Antipyretics d. Anesthetics
3. What is the main action of analgesics in the human body?
   a. Inhibition of inflammation
   b. Modulation of neurotransmitters
   c. Suppression of the immune system
   d. Stimulation of blood clotting
4. Which of the following is a common non-narcotic analgesic?
   a. Morphine b. Heroin
   c. Acetaminophen d. Codeine
5. Narcotic analgesics are also known as:
   a. Antipyretics b. Pain relievers
   c. Opioids d. Sedatives
6. What is the primary mode of action of non-narcotic analgesics like aspirin?
   a. Stimulation of opioid receptors
   b. Inhibition of prostaglandin synthesis
   c. Blockade of neurotransmitter reuptake
   d. Activation of NMDA receptors

7. Which of the following is a potential side effect of non-narcotic analgesics?
   a. Respiratory depression b. Constipation
   c. Euphoria d. Hallucinations
8. What is the primary action of narcotic analgesics like morphine in the central nervous system?
   a. Inhibition of prostaglandin synthesis
   b. Activation of opioid receptors
   c. Stimulation of NMDA receptors
   d. Blockade of neurotransmitter reuptake
9. Morphine is derived from which plant?
   a. Cannabis sativa b. Opium poppy
   c. Digitalis purpurea d. Erythroxylum coca
10. What class of analgesic does morphine belong to?
   a. Non-narcotic b. Antipyretic
   c. Narcotic d. Anti-inflammatory
11. Which of the following is a common side effect of morphine use?
   a. Increased heart rate b. Respiratory depression
   c. Hypertension d. Euphoria
12. Heroin is derived from a chemical modification of which drug?
   a. Codeine b. Acetaminophen
   c. Ibuprofen d. Morphine
13. What is the primary reason for the illicit use of heroin?
   a. Pain relief
   b. Enhanced cognitive function
   c. Euphoria and recreational effects

d. Anti-inflammatory properties

14. What is the major difference between morphine and heroin in terms of chemical structure?

a. Morphine has a hydroxyl group, while heroin has an acetyl group.

b. Morphine has an acetyl group, while heroin has a hydroxyl group.

c. Morphine lacks the benzene ring present in heroin.

d. Morphine and heroin have identical chemical structures.

15. What is the common route of administration for both morphine and heroin when used illicitly?

a. Intravenous injection

b. Oral

16. What is the primary purpose of antipyretic analgesics in medicine?

a. Enhancing cognitive function

b. Reducing pain and inflammation

c. Inducing sleep

d. Lowering blood pressure

17. Which class of antipyretic analgesics includes methyl salicylate and aspirin?

a. Acetaminophen

b. Nonsteroidal anti-inflammatory drugs (NSAIDs)

c. Opioids

d. Corticosteroids

18. What is the mechanism of action of salicylic acid derivatives like aspirin?

a. Inhibition of prostaglandin synthesis
b. Stimulation of opioid receptors
c. Blockade of NMDA receptors
d. Enhancement of neurotransmitter reuptake

19. Which of the following is a common side effect associated with the use of salicylic acid derivatives?
a. Respiratory depression
b. Constipation
c. Gastrointestinal irritation
d. Hypertension

20. Methyl salicylate is commonly used topically for which purpose?
a. Pain relief b. Fever reduction
c. Sleep induction d. Allergic reactions

21. Which of the following is a major component of oil of wintergreen and exhibits analgesic properties?
a. Acetaminophen b. Methyl salicylate
c. Ibuprofen d. Naproxen

22. What distinguishes methyl salicylate from aspirin in terms of administration?
a. Methyl salicylate is always administered orally.
b.Methyl salicylate is primarily administered intravenously.
c. Methyl salicylate is commonly used topically.
d. Methyl salicylate is only available in injection form.

23. Define anti-inflammatory agents and discuss their primary purpose in the context of pharmacology.
a. Drugs that induce inflammation

b. Medications that relieve pain only
c. Substances that reduce inflammation and swelling
d. Agents that enhance blood clotting

24. Which class of antipyretic analgesics often exhibits anti-inflammatory properties?
a. Opioids b. NSAIDs
c. Corticosteroids d. Acetaminophen

25. What is the primary mechanism of action of anti-inflammatory agents?
a. Inhibition of prostaglandin synthesis
b. Stimulation of opioid receptors
c. Blockade of NMDA receptors
d. Enhancement of neurotransmitter reuptake

26. Which of the following is a commonly used corticosteroid with anti-inflammatory properties?
a. Methyl salicylate
b. Aspirin
c. Prednisone
d. Acetaminophen

27. Discuss the potential side effects associated with prolonged use of corticosteroids for their anti-inflammatory effects.
a. Gastrointestinal irritation
b. Increased risk of bleeding
c. Immunological suppression and metabolic changes
d. Sedation and respiratory depression

28. Which nonsteroidal anti-inflammatory drug (NSAID) is known for its long duration of action and is commonly used for arthritis and musculoskeletal conditions?

a. Aspirin b. Ibuprofen

c. Naproxen d. Acetaminophen

29. In the context of anti-inflammatory agents, what is the significance of inhibiting prostaglandin synthesis?

a. Induction of inflammation

b. Promotion of blood clotting

c. Reduction of pain and inflammation

d. Enhancement of neurotransmitter release

30. Which organ is particularly affected by the long-term use of NSAIDs, leading to concerns about gastrointestinal complications?

a. Liver b. Kidneys

c. Stomach d. Lungs

31. What precaution should individuals taking NSAIDs consider to minimize gastrointestinal irritation?

a. Taking NSAIDs on an empty stomach

b. Taking NSAIDs with a glass of alcohol

c. Concurrent use of acetaminophen

d. Taking NSAIDs with fatty foods

32. Discuss the potential risks associated with the use of NSAIDs, including cardiovascular considerations.

a. Increased risk of bleeding

b. Hypertension and increased cardiovascular events

c. Gastrointestinal irritation

d. Sedation and respiratory depression

ANSWERS:

1.b,2.b,3.b,4.c,5.c,6.b,7.b,8.b,9.b,10.c,11.b,12.d,13.c,14.a,15.b,16.b,17.b,18.a,19.c,20.a,21.b,22.c,23.c,24.b,25.a,26.c,27.c,28.c,29.c,30.c,31.a,32.b

5-MARKS

1.Define analgesics and distinguish between narcotic and non-narcotic analgesics. Provide examples of each.

2. Explain the mechanism of action of morphine as a narcotic analgesic. Discuss how it alleviates pain and its potential side effects.

3. Discuss the therapeutic uses of morphine in medical practice, emphasizing its applications in pain management.

4. What are the potential risks associated with the use of morphine, particularly in terms of dependence and addiction?

5. Compare and contrast the actions of morphine with other non-narcotic analgesics in relieving pain.

6. Explore the relationship between morphine and heroin in terms of chemical structure and pharmacological effects.

7. Discuss the legal and medical considerations associated with the use of heroin, highlighting its classification and potential health risks.

8. Examine the reasons behind the illicit use of heroin and the societal impact of its abuse.

9. Provide a definition of non-narcotic analgesics and elucidate their mechanisms of action. Offer examples, with a focus on aspirin.
10. Discuss the anti-inflammatory properties of aspirin and its applications in addition to pain relief.
11. Explain the antipyretic and analgesic actions of salicylic acid derivatives, specifically focusing on methyl salicylate. Discuss its common applications and potential side effects.
12. Provide an overview of the mechanism of action of aspirin, a salicylic acid derivative, in mitigating pain and reducing fever. Discuss any unique features in its mechanism compared to other nonsteroidal anti-inflammatory drugs (NSAIDs).
13. Explore the significance of inhibiting prostaglandin synthesis in the context of aspirin's anti-inflammatory effects. Highlight specific conditions where aspirin is commonly prescribed.
14. Define anti-inflammatory agents and discuss their primary mechanisms of action. Provide examples beyond salicylic acid derivatives and explain how these agents contribute to reducing inflammation.
15. Discuss the potential side effects associated with the long-term use of anti-inflammatory agents, emphasizing considerations related to gastrointestinal health.
16. Compare the mechanisms of action of corticosteroids and NSAIDs as anti-inflammatory agents. Highlight

situations where corticosteroids may be preferred over NSAID.

17. Explore the dual role of aspirin as an antipyretic analgesic and anti-inflammatory agent. Discuss how these properties contribute to its broad therapeutic applications.

18. Examine the safety considerations and potential risks associated with the use of salicylic acid derivatives and anti-inflammatory agents, emphasizing patient populations that may be more susceptible to adverse effects.

19. Discuss the advantages and limitations of using topical formulations of methyl salicylate for pain relief compared to systemic administration.

20. Provide insights into the considerations for combining different antipyretic analgesics or anti-inflammatory agents in clinical practice. Discuss any potential synergies or risks associated with combination therapy.

10-MARKS

1. Define analgesics and provide a comprehensive classification into narcotic and non-narcotic categories. Discuss the primary purpose and distinguishing features of each category.

2. Explain in detail the mechanism of action of morphine as a narcotic analgesic. Elaborate on its effects on the central nervous system and the specific receptors it interacts with.

3. Discuss the pharmacokinetics of morphine, including absorption, distribution, metabolism, and elimination. Highlight any factors influencing its bioavailability.
4. Explore the therapeutic uses of morphine in pain management, discussing specific medical conditions and situations where its administration is indicated.
5. Evaluate the potential side effects and risks associated with the use of morphine, emphasizing considerations for patient safety and monitoring.
6. Compare and contrast the pharmacological effects of morphine and heroin, emphasizing their similarities and differences in terms of mechanism of action and clinical use.
7. Discuss the legal and medical considerations surrounding the use of heroin, including its classification, potential for abuse, and societal impact.
8. Examine the process of heroin metabolism in the body and discuss the formation of morphine as one of its major metabolites.
9. Explore the challenges associated with the management of heroin addiction, including withdrawal symptoms and potential treatment options.
10. Conduct a comparative analysis of morphine and heroin, taking into account their chemical structures, pharmacological actions, therapeutic uses, and potential risks. Discuss the implications of this analysis for clinical decision-making.

11. Explain the antipyretic and analgesic actions of salicylic acid derivatives, focusing on methyl salicylate. Discuss its common applications, including its use in topical formulations.
12. Provide an in-depth overview of the mechanism of action of aspirin, a salicylic acid derivative, highlighting its impact on prostaglandin synthesis. Discuss the therapeutic applications and potential side effects associated with aspirin use.
13. Discuss the pharmacokinetics of salicylic acid derivatives, considering factors such as absorption, distribution, metabolism, and elimination. Highlight any variations between methyl salicylate and aspirin in terms of these processes.
14. Define anti-inflammatory agents and explore their primary mechanisms of action. Discuss the various classes of anti-inflammatory agents beyond salicylic acid derivatives.
15. Compare the mechanisms of action of corticosteroids and nonsteroidal anti-inflammatory drugs (NSAIDs) as anti-inflammatory agents. Discuss the advantages and limitations of each class.
16. Discuss the potential side effects associated with the long-term use of anti-inflammatory agents, emphasizing considerations related to gastrointestinal health and cardiovascular effects.

17. Evaluate the dual role of aspirin as an antipyretic analgesic and anti-inflammatory agent. Discuss how these properties contribute to its broad therapeutic applications.
18. Explore the safety considerations and potential risks associated with the use of salicylic acid derivatives and anti-inflammatory agents, emphasizing patient populations that may be more susceptible to adverse effects.
19. Provide insights into the considerations for combining different antipyretic analgesics or anti-inflammatory agents in clinical practice. Discuss any potential synergies or risks associated with combination therapy.
20. Discuss the advancements and innovations in the development of novel antipyretic analgesics and anti-inflammatory agents, considering factors such as improved efficacy, reduced side effects, and new modes of administration.

UNIT-IV

1. What is the primary purpose of anesthetics in medical practice?
   a. Pain relief
   b. Antibacterial action
   c. Immune system enhancement
   d. Blood pressure regulation
2. How are anesthetics broadly classified based on their administration?
   a. Oral and intramuscular
   b. Topical and transdermal
   c. Local and general
   d. Intravenous and subcutaneous
3. Which of the following is a characteristic feature of local anesthetics?
   a. Inducing unconsciousness
   b. Affecting a specific region of the body
   c. Administered through inhalation
   d. Long-lasting effects
4. Which among the following is an example of a volatile general anesthetic?
   a. Lidocaine b. Nitrous oxide
   c. Halothane d. Procaine
5. What is the primary route of administration for volatile general anesthetics?
   a. Intravenous b. Inhalation
   c. Subcutaneous d. Intramuscular

6. Nitrous oxide is commonly used as a/an:
   a. Local anesthetic b. General anesthetic
   c. Topical anesthetic d. Regional anesthetic
7. Which early anesthetic gained popularity but was later largely replaced due to safety concerns?
   a. Nitrous oxide b. Ether
   c. Halothane d. Propofol
8. Chloroform, a historical anesthetic, is known for its:
   a. Rapid induction and short duration
   b. Pleasant odor and taste
   c. High volatility and flammability
   d. Toxic effects on the liver
9. How do general anesthetics primarily exert their effects on the central nervous system?
   a. Inhibiting neurotransmitter reuptake
   b. Enhancing synaptic transmission
   c. Binding to specific receptors
   d. Activating the immune system
10. What is a characteristic feature of local anesthetics in terms of nerve impulse transmission?
   a. Augmentation of impulses
   b. Prevention of impulses
   c. Irregular transmission pattern
   d. Prolonged duration of impulses
11. Thiopental sodium is primarily administered via which route?
   a. Inhalation b. Oral
   c. Intramuscular d. Intravenous

12. What class of anesthetic does thiopental sodium belong to?

a. Volatile b. Local

c. General d. Regional

13. What is the primary mechanism of action of thiopental sodium?

a. Stimulation of neurotransmitter release

b. Inhibition of prostaglandin synthesis

c. Enhancement of GABAergic transmission

d. Blockade of sodium channels

14. Cocaine is derived from which plant and was historically used for its local anesthetic properties?

a. Opium poppy b. Erythroxylum coca

c. Digitalis purpurea d. Cannabis sativa

15. What is the primary mode of action of local anesthetics like cocaine and benzocaine?

a. Inhibition of GABA receptors

b. Blockade of sodium channels

c. Enhancement of NMDA receptors

d. Stimulation of opioid receptors

16. Cocaine is known for its additional pharmacological effects, including:

a. Vasoconstriction

b. Hypotension

c. Platelet aggregation

d. Enhanced immune response

17. Which local anesthetic is commonly used in topical applications, such as in over-the-counter creams for pain relief?

a. Cocaine b. Lidocaine
c. Procaine d. Benzocaine

18. Which of the following anesthetics is classified as nonvolatile and is typically used for short-term anesthesia?

a. Halothane b. Nitrous oxide
c. Thiopental sodium d. Cocaine

19. Discuss a potential advantage of using local anesthetics like benzocaine over general anesthetics for certain medical procedures.

a. Rapid induction
b. Prolonged duration
c. Selective targeting
d. Inhalation administration

20. Explain the concept of "nonvolatile" in the context of anesthetics and how it differentiates from volatile anesthetics.

a. Resistance to vaporization
b. Readily evaporates at room temperature
c. Administered through intravenous injection
d. Low boiling point

21. Iron deficiency anemia is commonly treated with iron supplementation. What is the primary role of iron in the context of hemoglobin?

a. Enhances platelet function

b. Facilitates oxygen transport
c. Regulates blood clotting
d. Boosts red blood cell production

22. Which form of iron is typically administered orally as a supplement to treat iron deficiency anemia?
a. Ferric chloride b. Ferrous sulfate
c. Ferritin d. Ferric citrate

23. Iron is absorbed in the small intestine. What enhances the absorption of non-heme iron from plant-based sources?
a. Calcium b. Vitamin C
c. Fiber d. Oxalates

24. Vitamin B12 is essential for the synthesis of:
a. Hemoglobin b. Collagen
c. Myelin sheath d. DNA

25. What is the primary dietary source of vitamin B12?
a. Fruits b. Meat and dairy products
c. Leafy green vegetables d. Nuts and seeds

26. In pernicious anemia, there is a deficiency of intrinsic factor, leading to impaired absorption of vitamin B12. In which part of the digestive system does vitamin B12 absorption primarily occur?
a. Stomach b. Small intestine
c. Large intestine d. Liver

27. Folic acid plays a crucial role in the synthesis of:
a. Hemoglobin b. Thyroid hormones
c. Insulin d. Collagen

28. Which of the following conditions is associated with a deficiency of folic acid, leading to macrocytic anemia?
   a. Pellagra b. Rickets
   c. Scurvy d. Megaloblastic anemia
29. Folic acid is particularly important during:
   a. Pregnancy b. Adolescence
   c. Elderly age d. Infancy
30. What is the primary mode of action of vitamin B12 in the context of hemoglobin synthesis?
   a. Enhances iron absorption
   b. Facilitates DNA synthesis
   c. Promotes oxygen binding to hemoglobin
   d. Supports myelin sheath formation

ANSWERS:

1.a,2.c,3.b,4.c,5.b,6.b,7.b,8.d,9.c,10.b,11.d,12.c,13.c,14.b ,15.b,16.a,17.d,18.c,19.c,20.a,21.b,22.b,23.b,24.c,25.b, 26.b,27.a,28.d,29.a,30.b

5 MARKS

1. Define anesthetics and classify them into volatile and nonvolatile categories. Explain the primary differences between these two classifications. Discuss the properties of volatile anesthetics, with specific reference to nitrous oxide, ether, and chloroform. Highlight their uses and disadvantages in medical practice.
2. Explore the historical significance of ether and chloroform as volatile anesthetics. Discuss their

development, initial applications, and subsequent replacement by safer alternatives. Elaborate on the advantages and disadvantages associated with the use of these historical anesthetics.

3. Discuss the unique characteristics of nitrous oxide as a volatile anesthetic. Explain its mode of administration, primary uses, and any limitations or disadvantages in clinical settings.

4. Define nonvolatile anesthetics and focus on intravenous agents, specifically thiopental sodium. Explain the mode of action of thiopental sodium, its classification, and the primary uses in anesthesia. Discuss any potential disadvantages or side effects associated with its administration.

5. Define local anesthetics and discuss their specific application in medical practice. Explore the historical use of cocaine as a local anesthetic and its eventual replacement. Elaborate on the pharmacological actions, uses, and potential disadvantages of cocaine.

6. Examine the characteristics of benzocaine as a local anesthetic. Discuss its mode of action, routes of administration, and common medical applications. Highlight any advantages or disadvantages associated with the use of benzocaine.

7. Conduct a comparative analysis between volatile and nonvolatile anesthetics, considering factors such as administration routes, mechanisms of action, and advantages/disadvantages. Provide insights into the

scenarios where one type may be preferred over the other in clinical practice.

8. Compare the advantages and disadvantages of using intravenous anesthesia with thiopental sodium to those of volatile anesthesia with nitrous oxide, ether, or chloroform. Discuss the factors that influence the choice between these two approaches in various medical situations.

10-MARKS

1. Define anesthetics and elaborate on the fundamental goals of anesthesia. Classify anesthetics into local and general categories. Discuss the primary differences between local and general anesthesia, highlighting the key characteristics of each.

2. Explain the classification of volatile anesthetics and provide an in-depth discussion on nitrous oxide, ether, and chloroform. Outline their mechanisms of action, routes of administration, and primary medical uses. Discuss any disadvantages or safety concerns associated with their use.

3. Explore the historical significance of ether and chloroform as volatile anesthetics. Discuss their development, initial applications, and the reasons for their eventual replacement. Evaluate the advantages and disadvantages of nitrous oxide, ether, and chloroform in modern anesthesia practice.

4. Define nonvolatile anesthetics and focus on intravenous agents, specifically thiopental sodium. Discuss the pharmacokinetics and mechanism of action of thiopental sodium. Evaluate its primary uses in anesthesia and critical care settings. Discuss any potential disadvantages or side effects associated with its administration.

5. Define local anesthetics and provide an overview of their mechanism of action. Discuss the historical use of cocaine as a local anesthetic and its subsequent limitations. Elaborate on the pharmacological actions, medical applications, and potential disadvantages of cocaine.

6. Discuss the characteristics of benzocaine as a local anesthetic. Examine its mechanism of action, routes of administration, and common medical applications. Highlight any advantages or disadvantages associated with the use of benzocaine compared to other local anesthetics.

7. Conduct a comparative analysis between volatile and nonvolatile anesthetics, considering factors such as administration routes, mechanisms of action, onset and duration of action, and safety profiles. Provide insights into the scenarios where one type may be preferred over the other in clinical practice.

8. Compare the advantages and disadvantages of using intravenous anesthesia with thiopental sodium to those of volatile anesthesia with nitrous oxide, ether, or chloroform. Discuss the factors that influence the choice

between these two approaches in various medical situations.

9. Define anemia and outline the key causes of different types of anemia. Discuss the common symptoms associated with anemia and how it impacts overall health.

10. Explain the role of iron in the body, particularly in the context of hemoglobin synthesis. Discuss the causes of iron deficiency anemia and how iron supplementation addresses this condition. Elaborate on the mechanisms of iron absorption and regulation in the body.

11. Discuss the mode of action of iron supplementation as an antianaemic drug. Highlight the differences between heme and non-heme iron sources and their significance in treating iron deficiency anemia.

12. Define pernicious anemia and discuss the role of vitamin B12 in preventing this condition. Explain the sources of vitamin B12 and the consequences of its deficiency. Describe the absorption process of vitamin B12 and the role of intrinsic factor.

13. Elaborate on the mode of action of vitamin B12 in the synthesis of hemoglobin. Discuss the therapeutic uses of vitamin B12 in the treatment of various types of anemia and its importance in neurological function.

14. Explain the role of folic acid in the synthesis of DNA and cell division. Discuss the sources of folic acid and the consequences of its deficiency, particularly in the context of megaloblastic anemia.

15. Discuss the mode of action of folic acid supplementation as an antianaemic drug. Explore its applications beyond anemia treatment and its significance in preventing neural tube defects during pregnancy.

16. Conduct a comparative analysis between iron, vitamin B12, and folic acid as antianaemic drugs. Highlight the specific types of anemia each addresses, their mechanisms of action, and any potential interactions or contraindications.

17. Discuss the clinical considerations for prescribing antianaemic drugs, considering factors such as patient demographics, underlying health conditions, and potential side effects. Address the importance of proper diagnosis and monitoring during treatment.

18. Examine the challenges associated with long-term antianaemic drug therapy. Discuss patient adherence, potential complications, and strategies for managing adverse effects. Explore the role of healthcare professionals in optimizing the efficacy and safety of antianaemic drug regimens.

UNIT-V

1. What is the primary mechanism of action of sulphonylureas in the treatment of diabetes?
   a. Increasing insulin sensitivity
   b. Enhancing insulin secretion
   c. Inhibiting gluconeogenesis
   d. Facilitating glucose uptake in cells
2. Which of the following is a common side effect associated with sulphonylurea use?
   a. Hypertension b. Weight gain
   c. Hypoglycemia d. Hyperglycemia
3. Which of the following is a representative sulphonylurea commonly used in diabetes management?
   a. Metformin b. Glipizide
   c. Acarbose d. Rosiglitazone
4. What is the primary mechanism of action of biguanides in diabetes treatment?
   a. Stimulating insulin secretion
   b. Inhibiting gluconeogenesis
   c. Enhancing alpha-glucosidase activity
   d. Blocking insulin receptors
5. Which organ is primarily targeted by biguanides to exert their glucose-lowering effects?
   a. Liver b. Pancreas
   c. Adipose tissue d. Skeletal muscles
6. Which of the following is a commonly prescribed biguanide for the treatment of diabetes?

a. Gliclazide b. Pioglitazone
c. Metformin d. Repaglinide

7. When comparing sulphonylureas and biguanides, which class of drugs is more likely to cause weight gain in diabetic patients?

a. Sulphonylureas b. Biguanides
c. Both equally d. Neither

8. In terms of their primary mode of action, how do sulphonylureas and biguanides differ in addressing hyperglycemia?

a. Both enhance insulin secretion
b. Both inhibit gluconeogenesis
c. Sulphonylureas enhance insulin secretion, while biguanides inhibit gluconeogenesis
d. Sulphonylureas inhibit gluconeogenesis, while biguanides enhance insulin secretion

9. Which of the following patient populations may be more prone to experiencing hypoglycemia when treated with sulphonylureas?

a. Young adults b. Elderly individuals
c. Pregnant women d. Athletes

10. Considering potential side effects, why might a healthcare provider choose to prescribe metformin (a biguanide) over a sulphonylurea for a diabetic patient?

a. To promote weight gain
b. To reduce the risk of hypoglycemia
c. To enhance insulin secretion
d. To decrease glucose uptake in cells

11. What is the primary causative agent responsible for AIDS?

a. Hepatitis B virus
b. Human Immunodeficiency Virus (HIV)
c. Influenza virus
d. Tuberculosis bacteria

12. Which of the following is a key method for preventing the transmission of HIV?

a. Antibiotic therapy b. Handwashing
c. Condom use d. Vaccination

13. In the context of AIDS, what does the term "CD4 count" refer to?

a. Red blood cell count b. White blood cell count
c. T-helper cell count d. Platelet count

14. Which plant-derived compound is a common source of cardiac glycosides used in cardiovascular medicine?

a. Digitalis purpurea b. Ephedra sinica
c. Ginkgo biloba d. Aloe vera

15. What is the primary therapeutic effect of cardiac glycosides in the treatment of heart conditions?

a. Vasodilation b. Increased heart rate
c. Positive inotropic effect d. Blood clot prevention

16. Which of the following is a class I antiarrhythmic drug commonly used to treat ventricular arrhythmias?

a. Amiodarone b. Lidocaine
c. Propranolol d. Adenosine

17. What is the primary mechanism of action of class II antiarrhythmic drugs?

a. Sodium channel blockade
b. Beta-adrenergic receptor blockade
c. Calcium channel blockade
d. Potassium channel activation

18. In the context of AIDS, how does antiretroviral therapy contribute to the prevention and control of the disease?

a. By directly killing the HIV virus
b. By boosting the immune system
c. By preventing the transmission of HIV
d. By inhibiting viral replication

19. Compare the mechanisms of action of cardiac glycosides and antiarrhythmic drugs. How do these drug classes differ in their effects on cardiac function?

a. Both increase heart rate
b. Both have a vasodilatory effect
c. Cardiac glycosides have a positive inotropic effect, while antiarrhythmic drugs stabilize heart rhythm
d. Both primarily act by blocking sodium channels

20. Considering the potential side effects of antiarrhythmic drugs, which aspect of patient history is particularly important for healthcare providers to assess before prescribing these medications?

a. Dietary preferences b. Previous viral infections
c. History of heart failure d. Allergies to antibiotics

21. Tulasi, also known as Holy Basil, is traditionally used in Ayurveda. What is a primary therapeutic property attributed to tulasi?

a. Antiseptic b. Analgesic
c. Antioxidant d. Antipyretic

22. In traditional medicine, how is tulasi commonly used for respiratory ailments?
a. As an expectorant b. As a bronchodilator
c. As an antihistamine d. As a decongestant

23. Kilanelli, also known as Phyllanthus amarus, is used in traditional medicine. What is a common application of kilanelli?
a. Liver disorders b. Cardiovascular diseases
c. Respiratory infections d. Skin conditions

24. Which part of the kilanelli plant is typically used for medicinal purposes?
a. Leaves b. Roots
c. Flowers d. Seeds

25. In traditional medicine, what part of the mango plant is commonly used for its medicinal properties?
a. Fruit b. Leaves
c. Bark d. Seeds

26. What health benefit is often associated with the consumption of mango leaves in traditional medicine?
a. Blood pressure regulation
b. Diabetes management
c. Immune system enhancement
d. Pain relief

27. Semparuthi, or Hibiscus rosa-sinensis, is known for its medicinal properties. What is a common application of semparuthi in traditional medicine?

a. Respiratory disorders b. Skin conditions
c. Gastrointestinal issues d. Cardiovascular diseases

28. Which part of the semparuthi plant is often used for medicinal purposes?
a. Flowers b. Leaves
c. Roots d. Seeds

29. Adadodai (Adhatoda vasica) and Thoothuvalai (Solanum trilobatum) are commonly used in traditional medicine. What is a shared characteristic of their medicinal uses?
a. Anti-inflammatory b. Respiratory support
c. Digestive aid d. Immune system booster

30. Which respiratory condition is often addressed by the traditional use of Adadodai and Thoothuvalai?
a. Asthma b. Tuberculosis
c. Bronchitis d. Allergies

ANSWERS:

1.b,2,c,3.b,4.b,5.a,6.c,7.a,8.c,9.b,10.b,11.b,12.c,13.c,14.a ,15.c,16.b,17.b,18.d,19.c,20.c,21.c,22.a,23.a,24.a,25.b,26 .b,27.b,28.a,29.b,30.c

5-MARKS

1. Explain the mechanism of action of sulphonylureas in the treatment of diabetes. Highlight the specific phase of insulin secretion affected and how this contributes to blood glucose regulation. Discuss any potential side effects associated with sulphonylurea use.

2. Outline the primary mechanism of action of biguanides in the context of diabetes management. Discuss how biguanides affect glucose metabolism and the liver. Compare the mode of action of biguanides with that of sulphonylureas.
3. Conduct a comparative analysis of sulphonylureas and biguanides, considering factors such as mode of action, side effects, and patient populations for which each class may be more suitable. Discuss scenarios in which one class might be preferred over the other.
4. Describe the causative agent of AIDS and its mode of transmission. Discuss how HIV (Human Immunodeficiency Virus) specifically targets the immune system and leads to the development of AIDS.
5. Outline primary strategies for preventing the transmission of HIV and the development of AIDS. Discuss the importance of education, safe practices, and early detection in preventing the spread of the virus.
6. Discuss the measures taken at a public health level to control the prevalence of AIDS. Highlight the role of awareness campaigns, testing, and antiretroviral therapy in controlling the impact of HIV on individuals and communities.
7. Explore the similarities and differences between the management strategies of AIDS and diabetes. Discuss how prevention, early detection, and adherence to treatment play crucial roles in both cases.

8. Analyze the global impact of AIDS, considering prevalence rates, affected populations, and socio-economic implications. Discuss the importance of international collaboration in addressing the AIDS pandemic.
9. Discuss the ethical considerations involved in AIDS prevention and control, especially concerning issues such as stigma, discrimination, and patient confidentiality. Highlight the importance of an ethical framework in public health interventions.
10. Explore potential future directions in AIDS research, prevention, and treatment. Discuss emerging technologies or strategies that could contribute to a more effective response to the AIDS epidemic.
11. Explain the mechanism of action of cardiac glycosides and their therapeutic uses in cardiovascular medicine. Discuss how these drugs impact cardiac function and address specific cardiac conditions.
12. Classify antiarrhythmic drugs and discuss their mechanisms of action. Focus on one specific class and provide details on its preparation, dosage considerations, and therapeutic uses in managing arrhythmias.
13. Explore the medicinal properties of tulasi (Holy Basil) in traditional medicine. Discuss its applications in preventing and managing various health conditions. Highlight any specific preparations or formulations used with tulasi.

14. Investigate the traditional uses of kilanelli (Phyllanthus amarus) in the treatment of liver disorders. Discuss its mechanisms of action and any specific methods of preparation or dosage recommendations for addressing liver-related ailments.
15. Conduct a comparative analysis of the medicinal properties and uses of mango leaves, semparuthi flowers, adadodai, and thoothuvalai in traditional medicine. Highlight the diversity of applications and unique characteristics of each plant.
16. Discuss potential scenarios where the use of cardiovascular drugs like cardiac glycosides and antiarrhythmics may overlap with or complement the medicinal properties of Indian plants such as tulasi, kilanelli, mango, semparuthi, adadodai, and thoothuvalai. Explore the integrated approach to cardiovascular health incorporating both pharmaceutical and traditional remedies.

10-MARKS

1. Explain the mechanism of action of sulphonylureas in the treatment of diabetes. Discuss their impact on insulin secretion and the physiological processes involved. Evaluate the role of sulphonylureas in managing hyperglycemia and their potential side effects.
2. Discuss the mechanism of action of biguanides and how they contribute to glycemic control in diabetic patients. Compare the therapeutic effects of biguanides with those

of sulphonylureas. Highlight the role of biguanides in preventing and managing complications associated with diabetes.

3. Conduct a comparative analysis between sulphonylureas and biguanides. Compare their mechanisms of action, indications, contraindications, and side effects. Discuss the considerations for selecting one class over the other in diabetes management.

4. Explain the causative factors of AIDS, focusing on the Human Immunodeficiency Virus (HIV). Discuss the modes of transmission and factors contributing to the spread of HIV. Evaluate the impact of HIV on the immune system.

5. Outline primary strategies for preventing the transmission of HIV and the development of AIDS. Discuss the importance of education, safe practices, and early detection in preventing the spread of the virus. Evaluate the effectiveness of preventive measures on a global scale.

6. Discuss the measures taken at a public health level to control the prevalence of AIDS. Highlight the role of awareness campaigns, testing, and antiretroviral therapy in controlling the impact of HIV on individuals and communities.

7. Explain the mechanism of action of cardiac glycosides and their therapeutic uses in cardiovascular medicine. Discuss their effects on cardiac contractility and rhythm.

Evaluate the role of cardiac glycosides in treating specific cardiovascular conditions.

8. Classify antiarrhythmic drugs and discuss their mechanisms of action. Focus on one specific class and provide details on its preparation, dosage considerations, and therapeutic uses in managing arrhythmias.

9. Explore the medicinal properties and traditional uses of Indian plants such as tulasi, kilanelli, mango, semparuthi, adadodai, and thoothuvalai. Discuss their applications in preventing and managing various health conditions, along with any specific preparations or formulations used.

10. Discuss potential scenarios where the integrated use of hypoglycemic agents, AIDS prevention strategies, cardiovascular drugs, and medicinal plants can contribute to a holistic approach to health. Explore the interconnectedness of these areas and the potential benefits of combining pharmaceutical and traditional remedies.

11. Provide an overview of the significance of medicinal plants in traditional medicine. Discuss the cultural and historical context of using plants like tulasi, kilanelli, mango, semparuthi, adadodai, and thoothuvalai in traditional healing practices.

12. Explore the medicinal properties of tulasi. Discuss its traditional uses and applications in treating specific health conditions. Highlight any cultural or religious significance associated with tulasi.

13. Investigate the traditional uses of kilanelli. Discuss its applications in managing health issues, particularly its role in liver disorders. Highlight any specific methods of preparation or dosage recommendations associated with kilanelli.

14. Examine the medicinal properties of mango, particularly focusing on the leaves. Discuss how mango leaves are traditionally used and their applications in preventing and managing health conditions.

15. Explore the traditional uses of semparuthi, also known as Hibiscus rosa-sinensis. Discuss its medicinal properties, focusing on its applications in traditional medicine, especially in addressing skin conditions.

16. Investigate the traditional uses of adadodai and thoothuvalai. Discuss their respective applications in traditional medicine, emphasizing any unique characteristics or specific health issues they are known to address.

17. Conduct a comparative analysis of the medicinal properties of tulasi, kilanelli, mango, semparuthi, adadodai, and thoothuvalai. Discuss similarities and differences in their applications and therapeutic effects.

18. Explore the potential integration of traditional medicinal plant knowledge with modern medicine. Discuss how scientific research and traditional practices can work together to enhance healthcare outcomes.

19. Discuss the economic significance of cultivating and utilizing medicinal plants like tulasi, kilanelli, mango, semparuthi, adadodai, and thoothuvalai. Analyze their impact on local economies and livelihoods.

20. Highlight the importance of preserving traditional knowledge related to medicinal plants. Discuss how the conservation of biodiversity and indigenous practices contribute to cultural heritage and sustainable healthcare.

UNIT I

1-MARKS

1. What defines the nanoscale?
   a. Micrometers b. Millimeters
   c. Nanometers d. Centimeters
2. Which term refers to structures with dimensions in the range of 1-100 nanometers?
   a. Macro b. Micro
   c. Nano d. Pico
3. At the nanoscale, materials often exhibit unique properties due to:
   a. Decreased surface area
   b. Increased volume
   c. Quantum effects
   d. Simplified atomic structure
4. Ionic Bonding involves the transfer of:
   a. Protons b. Electrons
   c. Neutrons d. Positrons
5. What type of bond results from the sharing of electron pairs between atoms?
   a. Ionic bond b. Covalent bond
   c. Metallic bond d. Hydrogen bond
6. In a Metallic Bond, electrons are:
   a. Shared between two atoms
   b. Transferred from one atom to another
   c. Delocalized and shared among many atoms
   d. Completely localized to one atom

7. Dispersion forces are also known as:
   a. Ionic forces b. Covalent forces
   c. London forces d. Metallic forces
8. Dipole bonds result from the interaction between:
   a. Two positive ions b. Two negative ions
   c. Two nonpolar molecules d. Two polar molecules
9. Hydrogen bonds typically involve hydrogen bonding with:
   a. A metal
   b. A halogen
   c. A highly electronegative atom
   d. A noble gas
10. Which type of bond is characterized by the complete transfer of electrons from one atom to another?
   a. Covalent bond b. Metallic bond
   c. Ionic bond d. Dipole bond
11. In which type of bond do electrons move freely throughout the structure, providing electrical conductivity?
   a. Covalent bond b. Metallic bond
   c. Hydrogen bond d. Dispersion bond
12. Which force is responsible for the temporary attractions between nonpolar molecules?
   a. Covalent forces b. Ionic forces
   c. London forces d. Dipole forces
13. What distinguishes hydrogen bonding from other types of intermolecular forces?
   a. Involves sharing of electrons

b. Occurs between charged ions

c. Involves a hydrogen atom bonded to a highly electronegative atom

d. Occurs in metallic structures

14. Which bonding type contributes significantly to the high thermal and electrical conductivity of metals?

a. Covalent bond b. Ionic bond

c. Metallic bond d. Dispersion bond

15. What property of nanoscale materials makes them of particular interest in various scientific and technological applications?

a. Increased weight

b. Quantum effects

c. Simplified atomic structure

d. Decreased surface area

16. Which type of bond is prevalent in molecules with uneven distribution of electron density, creating partial positive and negative charges?

a. Covalent bond b. Ionic bond

c. Dipole bond d. Dispersion bond

17. What characteristic of nanoscale materials contributes to their enhanced reactivity and surface-to-volume ratio?

a. Macroscopic size

b. Microscopic size

c. Quantum effects

d. Simplified atomic structure

18. Which type of bond is formed between atoms of significantly different electronegativities, leading to a transfer of electrons?

a. Covalent bond b. Metallic bond
c. Ionic bond d. Dispersion bond

19. In a metallic structure, what property allows electrons to move freely, contributing to electrical conductivity?

a. Electron localization b. Delocalization
c. Ionization d. Polarization

20. Which intermolecular force is involved in the temporary attractions between induced dipoles in nonpolar molecules?

a. Ionic forces b. Covalent forces
c. London forces d. Dipole forces

21. When did the field of nanotechnology begin to emerge?

a. 19th century b. Early 20th century
c. Mid-20th century d. Late 20th century

22. Which scientist is often credited with sparking interest in nanotechnology through his famous lecture "There's Plenty of Room at the Bottom" in 1959?

a. Albert Einstein b. Richard Feynman
c. Marie Curie d. Max Planck

23.How are zero-dimensional nanostructures characterized?

a. Nanowires b. Nanotubes
c. Nanoparticles d. Nanosheets

24. Which term is used to describe one-dimensional nanostructures with elongated shapes, such as cylindrical structures?

a. Nanoparticles b. Nanotubes

c. Nanosheets d. Nanocomposites

25. What distinguishes two-dimensional nanostructures?

a. Sheet-like structures b. Spherical structures

c. Cylindrical structures d. Rod-like structures

26. Which type of nanostructure exhibits three-dimensional characteristics and can include complex shapes like cubes and spheres?

a. Nanocomposites b. Nanocrystals

c. Quantum dots d. Nanohybrids

27. As the size of nanoparticles decreases, what happens to their surface area-to-volume ratio?

a. Increases b. Decreases

c. Remains constant d. Fluctuates

28. What is the primary factor that leads to size-dependent properties in nanostructures?

a. Chemical composition b. Temperature

c. Quantum effects d. Pressure

29. Which term describes carbon-based nanomaterials with a cylindrical structure, such as single-walled and multi-walled varieties?

a. Nanocomposites b. Nanotubes

c. Quantum dots d. Nanohybrids

30. What are inorganic nanoparticles composed of and what is their characteristic size range?

a. Carbon, 1-10 nm
b. Metals or metal oxides, 1-100 nm
c. Polymers, 10-1000 nm
d. Silicon, 100-1000 nm

31. Which nanomaterial category refers to semiconductor particles with unique optical and electronic properties due to quantum confinement?
a. Nanocomposites b. Nanocrystals
c. Quantum dots d. Nano hybrids

32. What term is used for materials composed of two or more different nanomaterials, combined to achieve enhanced properties?
a. Nanocomposites b. Nanocrystals
c. Quantum dots d. Nano hybrids

33. In the context of nanomaterials, what does "nano hybrid" imply?
a. A mixture of nanomaterials
b. A combination of nanoscale and macroscopic materials
c. A hybrid of organic and inorganic materials
d. A structure with three-dimensional nanoscale features

34. Which historical event marked the beginning of the nanotechnology era?
a. The discovery of the electron
b. The invention of the microscope
c. The development of quantum mechanics

d. The famous "There's Plenty of Room at the Bottom" lecture

35. Why does the size of nanoparticles lead to different and often enhanced properties compared to bulk materials?

a. Decreased reactivity
b. Increased surface area-to-volume ratio
c. Limited quantum effects
d. Simplified atomic structure

36. Which of the following is an example of a one-dimensional nanostructure?

a. Nanoparticles b. Nanotubes
c. Nanosheets d. Nanocrystals

37. What role do quantum effects play in the properties of nanomaterials?

a. Decrease reactivity
b. Increase brittleness
c. Contribute to unique properties
d. Limit conductivity

38. Which type of nanostructure is characterized by sheet-like structures with significant surface area?

a. Nanotubes b. Nanosheets
c. Nanocomposites d. Nano hybrids

39. What distinguishes zero-dimensional nanostructures from others?

a. Spherical shape
b. Elongated shape
c. Sheet-like structure

d. Complex shapes like cubes and spheres

40. In nanotechnology, what term describes the combination of organic and inorganic materials in a single structure?

a. Nanocomposites b. Nanocrystals
c. Quantum dots d. Nano hybrids

ANSWERS:

1.c,2.c,3.c,4.b,5.b,6.c,7.c,8.d,9.c,10.c,11.b,12.c,13.c,14.c, 15.b,16.c,17.c,18.c,19.b,20.c,21.d,22.b,23.c,24.b,25.a,26. b,27.a,28.c,29.b,30.b,31.c,32.a,33.c,34.d,35.b,36.b,37.c, 38.b,39.a,40.b

5-MARKS

1. Describe the concept of nanoscale materials. How is the nanoscale defined, and what distinguishes materials at this scale? Discuss the significance of nanoscale materials in various scientific and technological applications.

2. Explain the differences between atomic size, molecular size, and nanoscale size. How does the behavior of materials change as they transition from the macroscopic to the nanoscale? Provide examples to illustrate these size-dependent effects.

3. Compare and contrast the three main types of chemical bonds: ionic, covalent, and metallic. Discuss the fundamental principles behind each type of bond, including the sharing or transfer of electrons. Provide

examples of materials where each type of bond is prevalent.

4. Elaborate on the characteristics of ionic bonds. How do ions form, and what types of materials typically exhibit ionic bonding? Discuss the role of electrostatic forces in maintaining the structure of ionic compounds.

5. Explore the nature of covalent bonds. How do atoms share electrons in a covalent bond, and what determines the strength of the bond? Provide examples of covalent compounds and discuss their properties in relation to the nature of covalent bonding.

6. Investigate the properties of metallic bonds. How do electrons contribute to the structure and properties of metals? Discuss the factors that influence the conductivity and malleability of materials with metallic bonding.

7. Examine the various types of intermolecular bonds: dispersion bonds, dipole bonds, and hydrogen bonds. Provide examples of substances where each type of intermolecular bond is significant. Discuss the impact of

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of substances exhibit dipole bonds? Provide examples of dipole-dipole interactions in real-world applications.

10. Explore the characteristics of hydrogen bonding. What distinguishes hydrogen bonds from other types of intermolecular bonds? Discuss the significance of hydrogen bonding in biological molecules and its influence on the properties of materials.

11. Provide a historical overview of the development of nanotechnology. Highlight key milestones and events that contributed to the emergence of nanoparticles as a field of study. Discuss the significance of Richard Feynman's 1959 lecture in this context.

12. Examine the role of the late 20th century in the evolution of nanotechnology. How did technological advancements during this period pave the way for the exploration of nanoparticles? Discuss any breakthroughs or discoveries that marked the beginning of the nanotechnology era.

13. Define and distinguish between zero, one, two, and
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15. Investigate the concept of size dependency in nanostructures. How does the size of nanoparticles influence their physical and chemical properties? Discuss any size-related phenomena and provide examples to illustrate the effects of size on nanomaterial behavior.

16. Explain the role of quantum effects in nanoscale materials. How do these effects become pronounced as the size of nanostructures decreases? Discuss any quantum phenomena that are particularly relevant to nanoparticles.

17. Provide a comprehensive definition and description of carbon nanomaterials. Discuss the structural characteristics of carbon nanotubes and graphene, highlighting their unique properties and potential applications.

18. Examine inorganic nanoparticles. What are they composed of, and what size range characterizes these nanoparticles? Discuss examples of metals or metal oxides that fall into the category of inorganic nanoparticles.

19. Define and describe nanocrystals. What are the key features of nanocrystals, and how do they exhibit size-dependent properties? Discuss any notable applications of nanocrystals in various fields.

10. Explore the concept of nano composites and nano hybrid nanomaterials. What distinguishes these materials, and how do they combine the characteristics of different nanomaterials? Provide examples of nano composites and nano hybrids, and discuss their potential advantages.

10-MARKS

1. Explain the concept of nanoscale materials, emphasizing the significance of the nano scale, atomic, and molecular sizes. Discuss how nanoscale materials differ from macroscopic materials and their relevance in various applications. Additionally, elaborate on the types of chemical bonds found in solids, including ionic, covalent, and metallic bonds.
2. Provide a detailed account of the characteristics and properties of ionic bonds. Discuss the process of ion formation and the resulting properties of ionic compounds. Explain the role of electrostatic forces in stabilizing ionic structures. Compare and contrast ionic bonding with other types of chemical bonds.
3. Trace the historical development of nanotechnology from its early stages to the present day. Highlight key events, discoveries, and advancements that contributed to the field. Discuss the pivotal role of Richard Feynman's 1959 lecture and its impact on the trajectory of nanotechnology.
4. Explore the classification of nanostructures, covering zero, one, two, and three-dimensional nanostructures. Provide examples of each type and discuss their properties and applications. Explain how dimensionality affects the behavior and applications of nanostructures.
5. Investigate the concept of size dependency in nanostructures. Explain how the size of nanoparticles influences their physical and chemical properties. Discuss

any quantum effects that become prominent at the nanoscale and their implications. Provide examples to illustrate size-dependent phenomena.

6. Define and describe nanomaterials such as carbon nanomaterials, inorganic nanoparticles, nanocrystals, quantum dots, nano composites, and nano hybrid nanomaterials. Discuss the unique properties and potential applications of each type of nanomaterial. Compare and contrast their characteristics.

7. Evaluate the role of intermolecular bonds, including dispersion bonds, dipole bonds, and hydrogen bonds. Discuss how these bonds contribute to the properties of materials at the nanoscale. Provide examples to illustrate the significance of intermolecular forces in nanomaterials.

8. Synthesize the information from the historical perspective, classification of nanostructures, size dependency in nanostructures, and the definition of nanomaterials. Discuss how advancements in nanotechnology have impacted various fields and industries. Consider potential future developments and challenges in the nanotechnology landscape.

UNIT-II

1-MARKS

1. What is the key characteristic of the top-down approach in nanomaterial synthesis?
   a. Building from molecular components
   b. Breaking down larger structures
   c. Self-assembly of nanoparticles
   d. Nucleation and growth process
2. Which approach involves the assembly of nanoparticles to create larger structures?
   a. Top-down approach b. Bottom-up approach
   c. Both approaches d. Neither approach
3. What is the primary process involved in the nucleation and growth method of nanosystem preparation?
   a. Breaking down larger structures
   b. Self-assembly of nanoparticles
   c. Controlled aggregation of atoms or molecules
   d. Sputtering technique
4. Which method relies on the spontaneous organization of components into a desired structure without external guidance?
   a. Mechanical milling b. Sputtering
   c. Self-assembly d. Hydrothermal synthesis
5. What is the primary action involved in mechanical milling for nanomaterial synthesis?
   a. Controlled heating of materials
   b. High-energy collisions and grinding

c. Plasma generation
d. Micelle formation

6. Which method involves the physical ejection of atoms or molecules from a target material to create nanoscale structures?

a. Nucleation and growth b. Microwave plasma
c. Hydrothermal synthesis d. Micelle formation

7. In hydrothermal synthesis, what is the primary environmental factor that influences nanomaterial formation?

a. Mechanical pressure
b. Microwave radiation
c. Temperature and pressure in water-based solutions
d. Magnetic fields

8.What is the primary function of micelles in nanomaterial preparation?

a. Breaking down larger structures
b. Controlled aggregation of atoms
c. Acting as templates for nanoparticle formation
d. Inducing nucleation and growth

9. Which method involves the gelation of a solution to form a network structure, leading to the synthesis of nanomaterials?

a. Sol-gel processes b. Sputtering
c. Mechanical milling d. Self-assembly

10. Which of the following methods is commonly associated with the creation of thin films through the deposition of atoms or molecules on a substrate?

a. Sol-gel processes b. Sputtering
c. Mechanical milling d. Microwave plasma

11. In chemical vapor deposition (CVD), what is the primary mechanism for the deposition of thin films?
a. Physical evaporation
b. Chemical reaction at the substrate surface
c. Mechanical milling
d. Electroplating

12. Which of the following is a common application of chemical vapor deposition (CVD)?
a. Microwave heating
b. Semiconductor device fabrication
c. UV-VIS-NIR spectroscopy
d. Scanning electron microscopy

13. Microwave radiation is a form of:
a. Mechanical energy b. Electromagnetic energy
c. Chemical energy d. Nuclear energy

14. In microwave applications, which property of certain materials is exploited for heating?
a. Conductivity b. Refractive index
c. Magnetic susceptibility d. Density

15. UV-VIS-NIR spectroscopy is primarily used for:
a. Imaging biological specimens
b. Analyzing crystal structures
c. Studying electronic transitions in molecules
d. Measuring surface roughness

16. Which microscopy technique provides detailed three-dimensional images of a sample's surface by scanning a sharp probe over the specimen?

a. Transmission electron microscopy (TEM)
b. Scanning electron microscopy (SEM)
c. Atomic force microscopy (AFM)
d. X-ray diffraction microscopy

17. X-ray diffraction is a powerful technique for determining:

a. Chemical composition b. Optical properties
c. Crystal structure d. Surface morphology

18. Cyclic voltammetry is a method used to study:

a. Surface roughness b. Chemical composition
c. Electrochemical reactions d. Molecular vibrations

19. Which technique provides information about the elemental composition and spatial distribution in a sample?

a. UV-VIS-NIR spectroscopy
b. Scanning electron microscopy
c. X-ray diffraction
d. Cyclic voltammetry

20. What type of information is obtained from UV-VIS-NIR spectroscopy?

a. Elemental composition b. Molecular vibrations
c. Crystal structure d. Electronic transitions

ANSWERS:

1.b,2.b,3.c,4.c,5.b,6.b,7.c,8.c,9.a,10.b,11.b,12.b,13.b,14.a ,15.c,16.c,17.c18.c,19.b,20.d

5-MARKS

1. Explain the concept of top-down and bottom-up approaches in nanomaterial synthesis. Provide examples of each approach and discuss their advantages and limitations.
2. Compare and contrast the top-down and bottom-up approaches, highlighting situations where each approach is most suitable. Discuss the importance of these approaches in nanotechnology.
3. Define and discuss the process of nucleation and growth in the preparation of nanosystems. Provide examples of nanomaterials synthesized using nucleation and growth methods and their applications.
4. Examine the concept of self-assembly in nanomaterial preparation. Describe the underlying principles and provide examples of self-assembled nanomaterials. Discuss the significance of self-assembly in creating complex nanostructures.
5. Discuss the role of mechanical milling in nanomaterial synthesis. Explain the principles behind mechanical milling and provide examples of nanomaterials prepared using this technique. Evaluate the advantages and limitations of mechanical milling.
6. Explore the process of sputtering for nanomaterial preparation. Discuss the principles and applications of sputtering, and compare it with other methods of nanomaterial synthesis.

7. Explain the principles of microwave plasma in nanomaterial synthesis. Discuss the advantages and challenges associated with microwave plasma methods and provide examples of nanomaterials prepared using this technique.
8. Discuss the hydrothermal method for nanomaterial preparation. Explain the conditions required for hydrothermal synthesis and provide examples of nanomaterials synthesized using this method.
9. Define and describe the role of micelles in nanomaterial preparation. Discuss how micelles contribute to the synthesis of nanomaterials and provide examples of applications.
10. Explain the principles of sol-gel processes for nanomaterial preparation. Discuss the steps involved and provide examples of nanomaterials synthesized using sol-gel processes. Compare sol-gel processes with other methods of nanomaterial synthesis.
11. Explain the principles of UV-VIS-NIR spectroscopy. How does this technique provide information about the electronic transitions in molecules? Provide examples of applications in different fields.
12. Discuss the advantages and limitations of UV-VIS-NIR spectroscopy. Explain how the technique is used to determine the concentration of a sample and identify the types of materials for which it is most suitable.
13. Define the principles of Scanning Electron Microscopy (SEM). How does SEM differ from other

microscopy techniques, and what information does it provide about sample surfaces? Provide examples of applications in material science.

14. Discuss the role of SEM in nanomaterial characterization. Explain how SEM images are generated, and highlight the importance of resolution in studying nanostructures.

15. Explain the principles of Atomic Force Microscopy (AFM). How does AFM provide three-dimensional imaging at the nanoscale? Provide examples of applications in biological and material sciences.

16. Discuss the advantages of AFM over other microscopy techniques. Highlight the specific features that make AFM a valuable tool for studying surfaces and interactions at the atomic level.

17. Define the principles of X-ray diffraction. How does this technique reveal information about the crystal structure of materials? Provide examples of materials where X-ray diffraction is particularly useful.

18. Discuss the importance of X-ray diffraction in determining the crystallographic arrangement of atoms. Explain how it contributes to understanding material properties and behaviors.

19. Explain the principles of Cyclic Voltammetry. How does this electrochemical technique provide information about redox reactions and electron transfer processes? Provide examples of applications in analytical chemistry.

20. Discuss the advantages and limitations of Cyclic Voltammetry. Explain how this technique can be used to study the electrochemical behavior of materials and its significance in various scientific disciplines.

10-MARKS

1. Explain the top-down and bottom-up approaches in nanomaterial synthesis. Provide detailed examples of each approach, highlighting their applications and challenges.
2. Compare and contrast the advantages and limitations of the top-down and bottom-up approaches in nanomaterial synthesis. Discuss specific scenarios where one approach might be preferred over the other.
3. Discuss the principles of nucleation and growth in the preparation of nanosystems. Provide examples of nanomaterials synthesized using nucleation and growth methods and elaborate on their applications in various fields.
4. Examine the role of self-assembly in nanomaterial preparation. Explain the underlying principles and provide examples of self-assembled nanomaterials. Discuss the significance of self-assembly in creating complex nanostructures.
5. Evaluate the importance of mechanical milling in nanomaterial synthesis. Explain the principles behind mechanical milling, provide examples of nanomaterials

prepared using this technique, and discuss the potential applications.

6. Discuss the principles of microwave plasma in nanomaterial synthesis. Highlight the advantages and challenges associated with microwave plasma methods and provide examples of nanomaterials prepared using this technique.

7. Explain the principles of UV-VIS-NIR spectroscopy. Discuss its applications in material science, chemistry, and biology. Provide examples of how UV-VIS-NIR spectroscopy contributes to nanomaterial characterization.

8. Discuss the principles and applications of Scanning Electron Microscopy (SEM) in nanotechnology. Highlight the role of SEM in characterizing nanomaterials and its contributions to understanding surface properties.

9. Examine the principles of Atomic Force Microscopy (AFM). How does AFM provide three-dimensional imaging at the nanoscale? Provide examples of applications in biological and material sciences.

10. Discuss the principles of X-ray diffraction and Cyclic Voltammetry. Explain how these techniques contribute to the analysis and characterization of nanomaterials. Provide examples of applications in various scientific fields.

UNIT –III

1-MARKS

1. What is a key characteristic of nanomaterials that distinguishes them from bulk materials?
   a. Lower reactivity b. Larger surface area
   c. Reduced strength d. Higher melting point
2. Which of the following is a physical property enhanced in nanomaterials?
   a. Increased brittleness b. Lower melting point
   c. Reduced surface area d. Lower conductivity
3. How do nanomaterials influence mechanical properties compared to bulk materials?
   a. Decreased hardness b. Increased ductility
   c. Enhanced strength d. Reduced elasticity
4. The optical properties of nanomaterials are primarily influenced by:
   a. Increased particle size b. Quantum effects
   c. Lower refractive index d. Reduced transparency
5. What role do chemical properties play in the behavior of nanomaterials?
   a. Decreased reactivity b. Enhanced stability
   c. Unaffected solubility d. Reduced bonding capability
6. Which property is crucial for the application of nanomaterials in drug delivery systems?
   a. Mechanical strength b. Surface area
   c. Electrical conductivity d. Optical transparency

7. What role does the electronic property of nanomaterials play in electronic devices?

a. Reduced conductivity
b. Increased resistivity
c. Enhanced conductivity
d. Unchanged electrical behaviour

8. Which property of nanomaterials is essential for applications in catalysis and sensors?

a. Surface area b. Mechanical strength
c. Optical transparency d. Chemical stability

9. In nanomaterials, how does the manipulation of surface properties impact their applications?

a. Decreased reactivity
b. Increased chemical stability
c. Enhanced catalytic activity
d. Reduced optical transparency

10. What is a common application of nanomaterials based on their unique optical properties?

a. Decreased visibility
b. Enhanced drug delivery
c. Lower thermal conductivity
d. Reduced electrical conductivity

11. Which property of nanomaterials is crucial for their use in the development of lightweight yet strong materials?

a. Optical transparency b. Mechanical strength
c. Surface area d. Chemical stability

12. How do nanomaterials exhibit unique behavior in terms of electrical conductivity compared to bulk materials?

a. Increased resistivity b. Enhanced conductivity
c. Lower melting point d. Reduced surface area

13. The applications of nanomaterials in electronics are primarily attributed to their:

a. Increased size
b. Reduced surface area
c. Enhanced mechanical properties
d. Unique electronic properties

14. Which property of nanomaterials is exploited for their application in solar cells and photodetectors?

a. Surface area
b. Optical transparency
c. Enhanced catalytic activity
d. Quantum effects

15. In nanomaterials, the manipulation of chemical properties is crucial for enhancing their:

a. Surface area b. Mechanical strength
c. Chemical stability d. Reduced reactivity

16. What is one significant application of nanomaterials in drug delivery?

a. Decreased efficacy b. Increased toxicity
c. Enhanced targeting d. Reduced stability

17. In cosmetics, nanomaterials are commonly used for their:

a. Larger particle size b. Reduced stability

c. Improved UV protection d. Lower reactivity

18. How do nanomaterials contribute to advancements in electronics?

a. Lower conductivity
b. Enhanced durability
c. Increased transparency
d. Reduced mechanical strength

19. The commercial use of nanomaterials in energy harvesting is primarily driven by their:

a. Lower efficiency
b. Enhanced catalytic activity
c. Reduced surface area
d. Unique electronic properties

20. What role do nanomaterials play in environmental remediation?

a. Increased pollution
b. Enhanced degradation of pollutants
c. Lower stability
d. Reduced reactivity

21. In drug delivery, nanomaterials are designed to:

a. Decrease specificity b. Increase side effects
c. Enhance bioavailability d. Reduce stability

22. What is a crucial advantage of using nanomaterials in cosmetics?

a. Decreased shelf life b. Enhanced skin irritation
c. Improved penetration d. Reduced UV protection

23. How do nanomaterials contribute to improved energy efficiency in electronics?

a. Reduced conductivity
b. Enhanced heat dissipation
c. Increased power consumption
d. Lower transparency

24. The toxicity of nanomaterials is often associated with their:
a. Larger size
b. Reduced reactivity
c. Increased biocompatibility
d. Surface properties

25. What is a potential concern regarding the use of nanomaterials in drug delivery?
a. Increased targeting b. Lower toxicity
c. Unintended side effects d. Reduced stability

26. Which factor is critical in determining the toxicity of nanomaterials in the environment?
a. Increased stability b. Particle size and shape
c. Lower reactivity d. Decreased persistence

27. The potential toxicity of nanomaterials is influenced by their:
a. Increased biocompatibility b. Surface chemistry
c. Enhanced stability d. Reduced specificity

28. What is a common challenge in assessing the toxicity of nanomaterials?
a. Decreased potential for harm
b. Lack of reactivity
c. Complexity of interactions
d. Lower stability

29. In the context of toxicity, the biodistribution of nanomaterials refers to their:

a. Decreased accumulation in tissues

b. Distribution within the body

c. Lower biocompatibility

d. Reduced persistence

30. Which statement accurately reflects the relationship between nanomaterials and toxicity?

a. Nanomaterials are inherently non-toxic.

b. Nanomaterials always exhibit predictable toxicity.

c. The toxicity of nanomaterials is context-dependent.

d. Nanomaterials have reduced toxicity compared to bulk materials.

31. What is a key consideration in designing nanomaterials to minimize toxicity?

a. Decreasing surface area

b. Reducing stability

c. Enhancing reactivity

d. Modifying surface properties

32. The potential adverse effects of nanomaterials may be influenced by their:

a. Decreased persistence

b. Biodegradability

c. Reduced surface area

d. Physicochemical properties

33. In drug delivery, efforts to reduce the toxicity of nanomaterials often involve:

a. Increasing targeting specificity

b. Lowering bioavailability
c. Reducing drug loading
d. Enhancing stability

34. The interaction of nanomaterials with biological systems is influenced by their:
a. Decreased biocompatibility b. Surface properties
c. Unaltered reactivity d. Lower particle size

35. What is a potential consequence of the persistence of nanomaterials in the environment?
a. Increased biodegradability
b. Higher biocompatibility
c. Enhanced ecological impact
d. Decreased toxicity

ANSWERS:

1.b,2,b,3.c,4.b,5.b,6.b,7.c,8.a,9.c,10.b,11.b,12.b,13.d,14. d,15.c,16.c,17.c,18.c,19.b,20.b,21.c,22.c,23.b,24.d,25.c, 26.b,27.b,28.c,29.b,30.c,31.d,32.d,33.a,34.b,35.c

5-MARKS

1. Explain how the physical properties of nanomaterials, such as size and surface area, differ from those of bulk materials. Provide examples of applications where these differences are advantageous.
2. Discuss the role of chemical properties in determining the behavior of nanomaterials. How do surface chemistry and reactivity contribute to the unique characteristics of

nanomaterials? Provide examples. Discussion on Properties and Applications of Nanomaterials:

3. Describe the significance of surface properties in nanomaterials and their applications. How do modifications at the nanoscale impact surface interactions and functionalities? Provide examples from different fields.

4. Examine the mechanical properties of nanomaterials and their applications. Discuss how enhancements in strength and flexibility contribute to advancements in materials science and engineering.

5. Explore the optical properties of nanomaterials, including quantum effects. How do these properties make nanomaterials suitable for applications in optics, imaging, and sensing? Provide specific examples.

6. Discuss the electrical properties of nanomaterials and their significance in electronic devices. How do nanomaterials contribute to advancements in conductivity, resistivity, and electronic functionality? Provide real-world examples.

7. Examine the role of nanomaterials in electronic applications. Discuss how their electronic properties are harnessed for the development of advanced electronic devices. Provide examples from the field of nanoelectronics.

8. Describe the chemical properties of nanomaterials and their applications in various industries. How do nanomaterials contribute to catalysis, drug delivery, and

environmental remediation based on their chemical characteristics? Provide examples.

9. Explain how nanomaterials exhibit unique behavior in terms of chemical reactivity compared to bulk materials. Discuss the implications of this behavior in pharmaceuticals, catalysis, and other chemical applications.

10. Discuss the integration of nanomaterials in energy-related applications. How do their optical, electrical, and chemical properties contribute to advancements in energy harvesting and storage? Provide examples from the field.

11. Explain how nanomaterials are utilized in drug delivery and medications. Discuss the advantages and challenges associated with incorporating nanomaterials in pharmaceutical applications.

12. Discuss the role of nanomaterials in cosmetics. How are nanomaterials employed in cosmetic products, and what benefits do they offer in terms of performance and safety? Provide specific examples.

13. Explore the applications of nanomaterials in electronics. How do nanomaterials contribute to advancements in electronic devices and technologies? Provide examples of electronic applications utilizing nanomaterials.

14. Examine the role of nanomaterials in energy harvesting. Discuss specific applications where nanomaterials are used to enhance energy conversion and storage.

15. Discuss how nanomaterials are employed in environmental remediation. Provide examples of how nanomaterials contribute to mitigating environmental pollution and improving sustainability.
16. Explain the concept of toxicity in nanomaterials. How do the unique properties of nanomaterials contribute to their potential toxicity? Discuss factors that influence the toxicological behavior of nanomaterials.
17. Discuss the challenges associated with assessing the toxicity of nanomaterials. What factors make the evaluation of nanomaterial toxicity complex, and how can these challenges be addressed in research and development?
18. Examine the potential adverse effects of nanomaterials in drug delivery. How can the toxicity of nanomaterials impact their applications in medicine, and what strategies are employed to minimize adverse effects?
19. Discuss the considerations and challenges related to the toxicity of nanomaterials in cosmetics. How can the safety of nanomaterials in cosmetic products be ensured, and what regulatory aspects need to be addressed?
20. Explore the environmental implications of nanomaterial toxicity. Discuss how the potential environmental impact of nanomaterials is evaluated and managed in the context of their use in various applications.

10-MARKS

1. Discuss the role of physical properties in defining the unique characteristics of nanomaterials. Provide examples to illustrate how size, shape, and surface area influence the physical properties of nanomaterials.
2. Examine the significance of chemical properties in nanomaterials. How do the chemical properties at the nanoscale contribute to the behavior of nanomaterials, and what applications benefit from these properties? Provide detailed examples.
3. Explore the surface properties of nanomaterials and their impact on applications. Discuss how modifications at the nanoscale affect surface interactions and functionalities, providing real-world applications as examples.
4. Examine the mechanical properties of nanomaterials and their applications in various industries. Discuss how enhancements in strength, flexibility, and durability contribute to advancements in materials science and engineering.
5. Discuss the optical properties of nanomaterials, emphasizing quantum effects. How are these optical properties harnessed in applications such as optics, imaging, and sensing? Provide specific examples.
6. Examine the electrical properties of nanomaterials and their importance in electronic applications. Discuss advancements in conductivity, resistivity, and electronic

functionality at the nanoscale, providing real-world examples.

7. Provide a comprehensive discussion on the commercial utilization of nanomaterials in drug delivery and medications. Explore how nanomaterials enhance drug delivery, improve efficacy, and address challenges in pharmaceutical applications.

8. Discuss the role of nanomaterials in cosmetics. How are nanomaterials applied in cosmetic products, and what benefits do they offer in terms of performance and safety? Provide specific examples and address regulatory considerations.

9. Examine the applications of nanomaterials in electronics. Discuss how nanomaterials contribute to advancements in electronic devices and technologies, highlighting key applications and future trends.

10. Provide a detailed examination of the toxicity of nanomaterials. Discuss factors contributing to the potential toxicity of nanomaterials, challenges in assessing toxicity, and strategies to mitigate adverse effects in various applications.

UNIT-IV

1-MARKS

1. What is the primary goal of Green Chemistry?
   a. Maximizing chemical waste
   b. Minimizing environmental impact
   c. Increasing energy consumption
   d. Promoting hazardous materials
2. Why is Green Chemistry essential?
   a. To increase pollution
   b. To promote resource depletion
   c. To minimize the negative impact on human health and the environment
   d. To increase the use of harmful reagents
3. How many basic principles are outlined in the Twelve Principles of Green Chemistry?
   a. Six b. Eight
   c. Ten d. Twelve
4. In Green Chemistry, what is the significance of selecting starting materials?
   a. To maximize waste production
   b. To minimize efficiency
   c. To increase environmental impact
   d. To reduce the generation of hazardous substances
5. Which of the following is a key consideration in Green Chemistry for selecting reagents?
   a. High toxicity
   b. Low toxicity

c. High waste production
d. Complex synthesis routes

6. What is the primary focus of Green Chemistry in terms of environmental impact?
a. Maximizing pollution
b. Minimizing waste
c. Promoting resource depletion
d. Ignoring sustainability

7.Which of the following best describes the role of catalysts in Green Chemistry?
a. Increasing waste production
b. Reducing reaction efficiency
c. Enhancing reaction selectivity and efficiency
d. Contributing to environmental harm

8. What does the term "green solvent" refer to in Green Chemistry?
a. Solvents with high toxicity
b. Solvents with low availability
c. Solvents with environmental friendliness
d. Complex solvents

9. In the context of Green Chemistry, what is minimized in the selection of starting materials?
a. Toxicity b. Efficiency
c. Waste d. Renewable nature

10. Which of the following is an example of an environmentally friendly catalyst in Green Chemistry?
a. Heavy metals b. Non-renewable catalysts
c. Bio-based catalysts d. Highly toxic catalysts

11. Why is water considered a green solvent in chemical synthesis?

a. Due to its high toxicity
b. Due to its low availability
c. Due to its non-renewable nature
d. Due to its environmental friendliness

12. Which type of reactions occur in ionic liquids in the context of Green Chemistry?

a. Highly polluting reactions
b. Non-selective reactions
c. Environmentally benign reactions
d. Hazardous reactions

13. What is a characteristic feature of synthesis in ionic liquids?

a. High waste generation
b. High energy consumption
c. Low environmental impact
d. Increased toxicity

14. What is minimized when selecting reagents in Green Chemistry?

a. Toxicity b. Efficiency
c. Waste d. Complexity

15. Which of the following is an example of a green solvent in chemical synthesis?

a. Dichloromethane b. Benzene
c. Water d. Toluene

16. What is the need for Green Chemistry?

a. To maximize pollution

b. To promote resource depletion

c. To minimize the negative impact on human health and the environment

d. To increase the use of harmful reagents

17. What is the significance of the Twelve Principles of Green Chemistry?

a. To maximize environmental impact

b. To minimize waste production

c. To promote the use of hazardous materials

d. To increase energy consumption

18. What is the primary focus of Green Chemistry in terms of environmental impact?

a. Maximizing pollution

b. Minimizing waste

c. Promoting resource depletion

d. Ignoring sustainability

19. What is the role of catalysts in Green Chemistry?

a. Increasing waste production

b. Reducing reaction efficiency

c. Enhancing reaction selectivity and efficiency

d. Contributing to environmental harm

20. What is a key consideration for selecting reagents in Green Chemistry?

a. High toxicity b. Low toxicity

c. High waste production d. Complexity

21. What is the primary goal of synthesis based on the basic principles of green chemistry?

a. Maximizing waste production

b. Minimizing environmental impact
c. Increasing energy consumption
d. Promoting hazardous substances

22. Which of the following is an example of a synthesis involving basic principles of green chemistry?
a. Maximizing the use of toxic reagents
b. Synthesis of methyl methacrylate
c. Increasing waste production
d. Promoting complex synthesis routes

23. Why is the synthesis of methyl methacrylate considered green?
a. High toxicity
b. Low environmental impact
c. High waste production
d. Complexity in synthesis

24. In green chemistry synthesis, what is the role of water as a solvent?
a. Increasing toxicity
b. Maximizing waste production
c. Reducing environmental impact
d. Enhancing complexity

25. What characteristic makes water a green solvent in chemical reactions?
a. High toxicity b. Low availability
c. Non-renewable nature d. Environmental friendliness

26. Which type of reactions occur in ionic liquids in the context of green chemistry?
a. Highly polluting reactions

b. Non-selective reactions
c. Environmentally benign reactions
d. Hazardous reactions

27. What is a characteristic feature of synthesis in ionic liquids?
a. High waste generation
b. High energy consumption
c. Low environmental impact
d. Increased toxicity

28. What is minimized when utilizing water as a green solvent in chemical reactions?
a. Toxicity b. Efficiency
c. Waste d. Complexity

29. What is a key consideration in selecting solvents for green chemistry reactions?
a. High toxicity
b. Low environmental impact
c. Maximizing waste production
d. Complexity in synthesis

30. Why is the synthesis of paracetamol considered in line with green chemistry principles?
a. High waste production
b. Non-selective reactions
c. Low environmental impact
d. Increased energy consumption

31. What is a benefit of utilizing ionic liquids in green chemistry reactions?
a. Increased waste production

b. High energy consumption
c. Low environmental impact
d. Enhanced toxicity

32. How does the selection of starting materials align with green chemistry principles in the synthesis of methyl methacrylate?
a. Maximizing waste production
b. Minimizing environmental impact
c. Promoting hazardous substances
d. Increasing energy consumption

33. What is a crucial consideration for green chemistry synthesis routes?
a. Complexity
b. Maximizing waste production
c. High energy consumption
d. Minimizing environmental impact

34. What is the role of water in green chemistry reactions?
a. Maximizing waste production
b. Reducing environmental impact
c. Promoting hazardous substances
d. Enhancing complexity

35. What is the significance of selecting solvents like water in green chemistry reactions?
a. Increasing toxicity
b. Reducing waste production
c. Enhancing complexity
d. Promoting resource depletion

ANSWERS:

1.b,2,c,3.d,4.d,5.b,6.b,7.c,8.c,9.c,10.c,11.d,12.c,13.c,14.c ,15.c,16.c,17.b,18.b,19.c,20.b,21.b,22.b,23.b,24.c,25.d, 26.c,27.c,28.c,29.b,30.c,31.c,32.b,33.d,34.b,35.b

5-MARKS

1. Define Green Chemistry and discuss its significance in the field of chemical science.
2. Explain the need for Green Chemistry. How does it address environmental and health concerns in the synthesis of chemicals?
3. Elaborate on the Twelve Basic Principles of Green Chemistry. Provide examples illustrating how these principles can be applied in chemical synthesis.
4. Discuss the importance of selecting starting materials in Green Chemistry. Provide examples of environmentally friendly starting materials and their impact on the overall synthesis process.
5. Examine the role of reagents in the context of Green Chemistry. How does the selection of reagents align with the principles of sustainability and environmental responsibility?
6. Explore the significance of catalysts in Green Chemistry. Provide examples of green catalysts and explain how they contribute to more sustainable chemical processes.
7. Analyze the role of solvents in Green Chemistry, with a focus on the use of water as a green solvent. Discuss the

advantages and challenges associated with utilizing water in chemical reactions.

8. Discuss the synthesis of methyl methacrylate in the context of Green Chemistry. Highlight the key green principles involved in the synthesis and explain how these principles contribute to a more sustainable process.

9. Examine the synthesis of paracetamol as an example of Green Chemistry. Discuss the principles applied in this synthesis and how they contribute to minimizing the environmental impact.

10. Explore the role of ionic liquids in Green Chemistry reactions. Discuss their advantages and limitations in terms of environmental impact and sustainability. Provide examples of reactions where ionic liquids are employed.

10-MARKS

1. Define Green Chemistry and provide an in-depth discussion on the need and importance of adopting green principles in modern chemical processes. Support your answer with real-world examples.

2. Discuss each of the Twelve Basic Principles of Green Chemistry. Explain how adherence to these principles can lead to more sustainable and environmentally friendly chemical practices. Illustrate with relevant case studies.

3. Examine the role of starting materials in Green Chemistry. Elaborate on the criteria for selecting environmentally benign starting materials and how their

choice contributes to the overall greenness of a chemical process.

4. Explore the significance of reagents in Green Chemistry. Provide a detailed analysis of how the selection of reagents can impact the overall environmental sustainability of a chemical reaction. Include examples to support your discussion.

5. Analyze the role of catalysts in Green Chemistry. Discuss the types of green catalysts and their applications. Evaluate the advantages and challenges associated with the use of catalysts in sustainable chemical processes.

6. Discuss the principles of using water as a green solvent in chemical reactions. Explore the advantages and limitations of water as a solvent, and provide examples of reactions where water has been successfully employed in accordance with green principles.

7. Provide a detailed overview of the synthesis of methyl methacrylate following the basic principles of Green Chemistry. Highlight the green aspects of the synthesis, including the choice of starting materials, reagents, and any sustainable methodologies applied.

8. Examine the synthesis of paracetamol through the lens of Green Chemistry. Discuss the principles involved and how they contribute to a more sustainable and environmentally friendly process. Include comparisons with traditional synthesis methods.

9. Investigate the use of ionic liquids in Green Chemistry reactions. Discuss the principles guiding their selection

and application, as well as their advantages and challenges. Provide examples of reactions where ionic liquids have been successfully utilized.

10. Discuss the overall impact of Green Chemistry on the chemical industry. Evaluate the challenges faced in implementing green practices on a large scale and propose potential solutions for further advancing the field.

ABOUT THE AUTHOR

Mrs.C.MYTHILI was born in 1985 in Paramathi Velur (Namakkal Dt.), TamilNadu and she currently working as an Assistant Professor in the Department of Chemistry, St.Joseph's College of Arts and Science for Women, Hosur. She has completed her D.Pharm in Swamy Vivekanandha College of Pharmacy, Tiruchencode, M.Sc studied in Vivekanandha College of Arts and Science, Tiruchencode, M.Phil degree in Kandasamy Kandar's College, Paramathi-Velur, Namakkal District and B.Ed., in Ponkaliamman College of Education. She has published 2 National & International conference Proceedings. Her areas of interest include Inorganic Chemistry and Pharmaceutical Chemistry.

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