

## **UNIT NO. 4: Natural Products**

**(A) Choose the correct alternative for each of the following and rewrite the sentence:**

(a) Herzig-Meyer's (b) Zerewitinoff's  
**(c) Hoffmann's** (d) Zeisel's

17. Estimation of alkoxy group of alkaloid is done by ..... method.  
(a) Zerewitinoff's (b) **Hoffmann's**  
(c) Zeisel's (d) Herzig-Meyer's

18. Which of the following is NOT an example of a primary metabolite?  
A) Amino acids B) DNA **C) Terpenoids** D) Vitamins

19. Which classification of natural products is based on the biosynthetic pathway?  
A) Type 1 **B) Type 2** C) Type 3 D) Organic natural products

20. What is the basic building block of terpenoids?  
**A) Isoprene** B) Ethylene C) Propylene D) Butadiene

21. Which method is widely used for the isolation of mono and sesquiterpenoids?  
A) Extraction with fat and lard **B) Steam distillation** C) Solvent extraction D) Expression

22. Which class of terpenoids is derived from four isoprene units?  
A) Monoterpenoids B) Sesquiterpenoids **C) Diterpenoids** D) Triterpenoids

23. What is the term used for the link between isoprene units in terpenoids?  
A) Head-to-head link B) Tail-to-tail link **C) Head-to-tail link** D) Isoprene bond

24. Which analytical method is used to measure the specific rotation of optically active terpenoids?  
A) Mass spectrometry B) Refractive index measurement **C) Polarimetry** D) X-ray analysis

25. Which reaction helps in locating the position of double bonds in a terpenoid molecule?  
A) Epoxidation **B) Ozonolysis** C) Hydrogenation D) Dehydration

26. Which terpenoid is used as an aroma compound in perfumery and flavoring agent?  
A) Squalene B) Phytol **C) Geraniol** D) Polyterpenoids

27. What is the major component of citrus fruit peel oil, providing a lemon-like odor?  
**A) Citral** B) Geraniol C) Squalene D) Myrcene

28. How many isoprene units are present in sesterterpenoids?  
a) Four **b) Five** c) Six d) Eight

29. What is the general method used for the determination of molecular formula of terpenoids?  
a) Infrared spectroscopy b) Mass spectrometry **c) Elemental analysis** d) X-ray analysis

30. What is the name of the aldehyde-containing acyclic monoterpenoid made up of two isoprene units?  
a) Geraniol **b) Citral** c) Linalool d) Limonene

31. Which spectroscopic method is frequently used for elucidating the structure of terpenoids?  
a) Infrared spectroscopy **b) Ultraviolet spectroscopy**

c) Nuclear magnetic resonance spectroscopy      d) Mass spectroscopy

32. Which technique is NOT commonly used for the structure determination of terpenoids?  
a) Chemical methods    b) Physical methods    c) **Synthesis**    d) Spectroscopic methods

33. What is the main structural feature of nicotine?  
a) It contains a pyrrole ring.      b) **It contains a pyridine ring.**  
c) It contains an indole ring.      d) It contains a tropane ring.

34. What chemical method is used to detect the presence of a hydroxyl group in alkaloids?  
a) **Zeisel method**      b) Emde's degradation  
c) Hoffmann's exhaustive methylation method      d) Von-Braun's method

35. The molecular formula of isoprene unit is.....  
A)  $C_{10}H_8$       B)  $C_5H_8$       C)  $C_{10}H_{18}$       D)  $C_5H_{10}$

**(D) Long Answer Type Questions :**

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(a) How will you establish the structure of citral on the basis of analytical and synthetic evidences ?

(b) How will you establish the structure of nicotine on the basis of analytical and synthetic evidences ?

(c) Give the synthesis of : (i) Citral, (ii) Nicotine.