

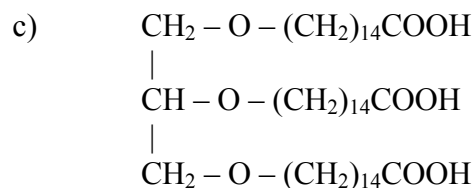
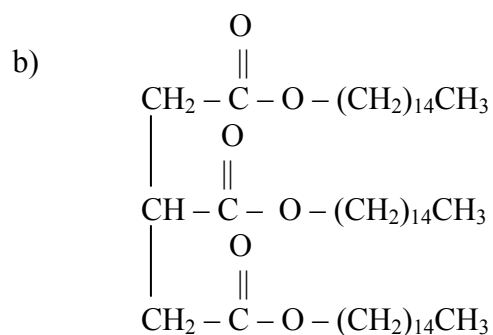
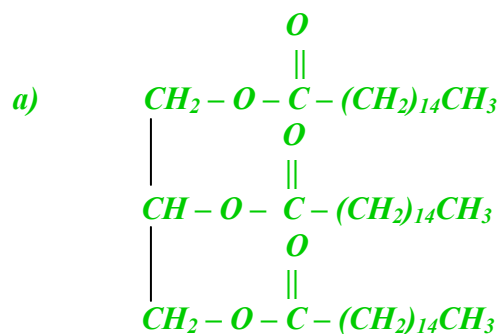
Question with Answers- Lipids

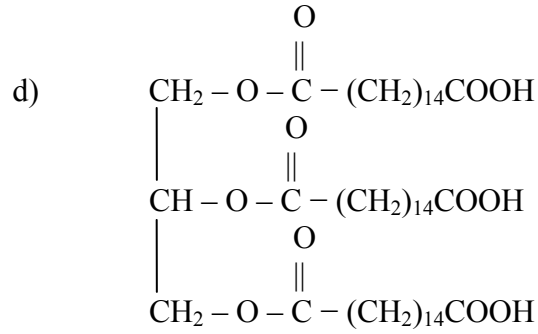
A. The structures of different types of lipids are studied and compared. (Questions 1-8)

1. _____ Which of the following molecules is a typical fatty acid?
- A molecule that has an even number of carbon atoms in a branched chain.
 - An amphipathic dicarboxylic acid with unconjugated double bonds.
 - A molecule that has one cis double bond in a linear carbon chain.**
 - A polar hydrocarbon with that reacts with NaOH to form a salt.

2. _____ Which of the following structures is a 20:2 ($\Delta^{4,9}$) fatty acid?
- $CH_3(CH_2)_9CH = CH(CH_2)_3CH = CH(CH_2)_2COOH$**
 - $CH_3(CH_2)_2CH = CH(CH_2)_3CH = CH(CH_2)_9COOH$
 - $CH_3(CH_2)_{10}CH = CH(CH_2)_3CH = CHCH_2COOH$
 - $CH_3CH_2CH = CH(CH_2)_3CH = CH(CH_2)_{10}COOH$

3. _____ Which of the following structures is a triglyceride?





4. _____ Which of the following is a characteristic of both triacylglycerols and glycerophospholipids?

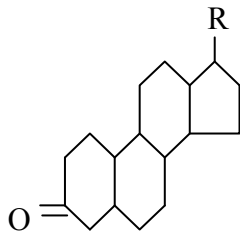
- a) Both contain carboxyl groups and are amphipathic
- b) Both contain fatty acids and are saponifiable.**
- c) Both contain glycerol and ether bonds.
- d) Both can be negatively charged at cellular pH.

5. _____ Which of the following is a characteristic of both waxes and terpenes?

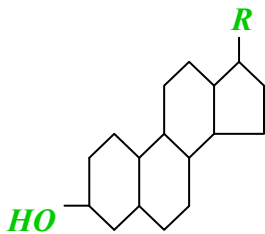
- a) Both can contain an amino alcohol.
- b) Both can contain a fatty acid.
- c) Both can be non-saponifiable.
- d) Both can contain oxygen.**

6. _____ Which of the following structures is a sterol?

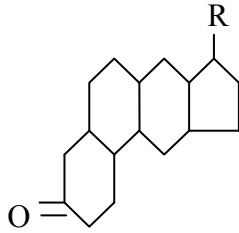
a)



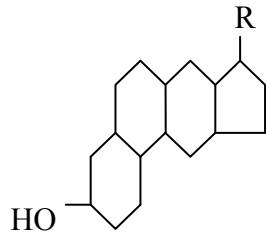
b)



c)



d)



7. _____

Which is a characteristic of sphingolipids?

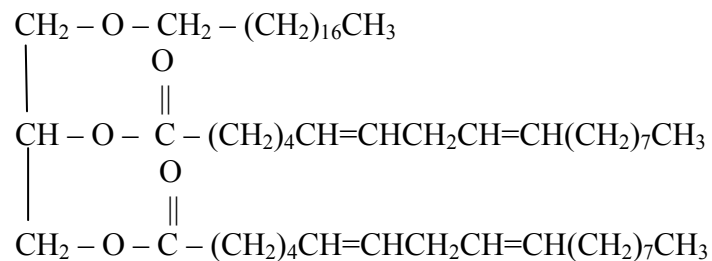
- a) They all contain a fatty acid joined to glycerol.
- b) They all contain a long-chain alcohol joined to isoprene.
- c) They all contain ceramide joined to a polar group.**
- d) They all contain a carbohydrate joined to a phosphate group.

8. _____

Which is a property of eicosanoids?

- a) All eicosanoids contain three conjugated double bonds.
- b) All eicosanoids contain arachidonic acid and sphingosine.
- c) Prostaglandins and leukotrienes both contain a ring structure.
- d) Thromboxanes and prostaglandins both contain a carboxyl group.**

B. A lipid has the following structure:



(Questions 9-15)

9. _____ Which is a characteristic of all the fatty acid components in this lipid?
- a) **They all contain an unbranched carbon chain.**
 - b) They all contain unconjugated cis double bonds.
 - c) They all are joined to glycerol through an ester bond.
 - d) They all are hydrophilic because they contain oxygen.
10. _____ What is the proper designation for the unsaturated fatty acids in this lipid?
- a) 18:2 ($\Delta^{9,12}$)
 - b) **18:2 ($\Delta^{6,9}$)**
 - c) 17:2 ($\Delta^{9,12}$)
 - d) 17:2 ($\Delta^{5,8}$)
11. _____ Which property does this lipid share with a typical triacylglycerol?
- a) Both contain an ether bond.
 - b) Both contain a long-chain alcohol.
 - c) Both are amphipathic.
 - d) **Both are saponifiable.**
12. _____ Which characteristic does this lipid share with a wax?
- a) Both contain a polar head.
 - b) Both contain three fatty acids.
 - c) **Both contain one or more ester bonds.**
 - d) Both contain one or more carboxyl groups.
13. _____ Which characteristic is shared by this lipid and an eicosanoid?
- a) **This lipid and a leukotriene are both polyunsaturated molecules.**
 - b) This lipid and a thromboxane can both be hydrolyzed in base to produce soaps.
 - c) This lipid and a prostaglandin can both be hydrolyzed in acid to create fatty acids.
 - d) This lipid and an arachidonic acid both contain glycerol and hydrocarbon chains.
14. _____ Which property can be shared by this lipid and a terpene?
- a) Both can contain isoprene.
 - b) Both can form micelles.
 - c) Both can contain a saturated fatty acid.
 - d) **Both can be very hydrophobic molecules.**
15. _____ Based on its structural similarity to other lipids, this lipid most likely functions as
- a) a membrane component.
 - b) **an energy storage molecule.**
 - c) a sex hormone.
 - d) a vitamin required for vision.
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C. The structure of an animal cell membrane is analyzed. (Questions 16-23)

16. _____ Which is a characteristic of biological membranes?
a) *Membranes contain proteins and amphipathic lipids.*
b) Membranes have an asymmetrical micelle structure.
c) Membranes have hydrophobic groups on the surfaces.
d) Membranes contain lipids that polymerize into one large molecule.
17. _____ Which membrane lipid contains an amide bond?
a) cholesterol
b) phosphatidylserine
c) phosphatidic acid
d) *sphingomyelin*
18. _____ Which type of membrane lipid contains an acidic oligosaccharide?
a) phosphatidylinositol
b) cerebroside
c) *ganglioside*
d) globoside
19. _____ Which would be a property of all the major types of lipids in this membrane?
a) They would be saponifiable in base and hydrolyzed in acid.
b) *They would have polar heads and non-polar tails.*
c) They would be composed of five-carbon units.
d) They would be joined to each other through covalent bonds.
20. _____ Which is a characteristic of the lipids in a biological membrane?
a) Specific glycerophospholipids are distributed equally on the two membrane surfaces.
b) Lipid molecules are held in fixed positions by non-covalent bonds with proteins.
c) The fluidity of the membrane decreases with lower levels of saturated fatty acids.
d) *The fatty acids of lipid molecules are found in the interior of the membrane.*
21. _____ Which is a property of integral membrane proteins?
a) *All integral membrane proteins contain hydrophilic regions.*
b) All integral membrane proteins span the entire membrane.
c) All integral membrane proteins contain carbohydrate groups within the membrane.
d) All integral membrane proteins transport non-polar molecules through the membrane.

22. _____ Which property is shared by integral membrane proteins and peripheral membrane proteins?
- a) Both can contain an unusually high proportion of hydrophobic R-groups.
 - b) Both can contain regions of α -helices and β -pleated sheets.**
 - c) Both can flip between the two sides of the membrane.
 - d) Both can form hydrogen bonds with the hydrocarbons of lipids.
23. _____ Which characteristic is most likely shared by a cell membrane and a lipoprotein particle?
- a) Both are composed of a lipid bilayer.
 - b) Both contain a high amount of triacylglycerols.
 - c) Both contain hydroxyl groups on the surface.**
 - d) Both contain proteins in the interior.
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D. The structure and components of a cell membrane are studied. (Questions 24-31)

24. _____ Which is a general property of cell membranes?
- a) Membranes contain more lipid than protein.
 - b) Membrane proteins have a polar head and a non-polar tail.
 - c) Membrane lipids are amphipathic.**
 - d) Membranes contain covalent bonds between fatty acids.
25. _____ Which will be a characteristic of a steroid that is part of a cell membrane?
- a) It will contain a hydroxyl group.**
 - b) It will contain four aromatic rings.
 - c) It will contain choline.
 - d) It will contain an amide bond.
26. _____ Which component is found in all sphingolipids?
- a) a carbohydrate
 - b) a negative charge
 - c) a phosphate group
 - d) an amino alcohol**
27. _____ Which type of membrane lipid could contain serine?
- a) a globoside
 - b) a cerebroside
 - c) a glycerophospholipid**
 - d) a ganglioside

28. _____ Which is a property of lipids in cell membranes?
- a) The hydrophobic groups of lipid molecules are found on membrane surfaces.
 - b) *Some types of lipids are found preferentially in the outer membrane layer.***
 - c) Most of the lipids are hydrocarbons composed of five-carbon units.
 - d) Most of the lipids function in transporting biomolecules into the cell.
29. _____ Which is a characteristic of the components in cell membranes?
- a) A protein molecule in a membrane can move laterally and can also flip from one surface to the other.
 - b) *A lipid molecule in a membrane interacts with other membrane molecules through non-covalent forces.***
 - c) Increasing the proportion of protein in a membrane increases the amount of membrane symmetry.
 - d) Increasing the proportion of saturated fatty acids in a membrane increases membrane fluidity.
30. _____ Which is a difference between integral membrane proteins and peripheral membrane proteins?
- a) Integral membrane proteins contain mainly α -helices while peripheral membrane proteins contain mainly β -pleated sheets.
 - b) Integral membrane proteins often contain carbohydrates on the inner surface while peripheral membrane proteins often contain carbohydrates on the outer surface.
 - c) *Integral membrane proteins bind to the membrane using hydrophobic forces while peripheral membrane proteins bind to the membrane using hydrophilic forces.***
 - d) Integral membrane proteins always span the entire membrane while peripheral membrane proteins are always located on one side of the membrane.
31. _____ Which characteristic is shared by a cell membrane and a chylomicron?
- a) *Both contain specific proteins.***
 - b) Both have a bilayer structure.
 - c) Both contain a high proportion of triglycerides.
 - d) Both contain a high proportion of sterols.