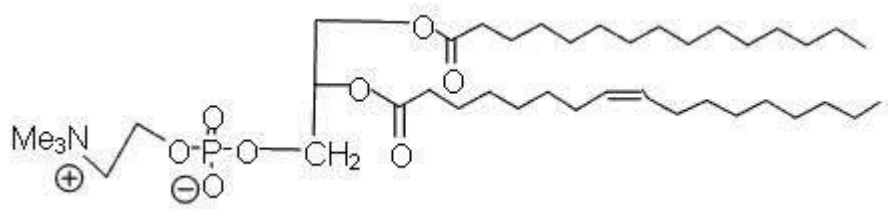
ORIENTAL COLLEGE OF PHARMACY

Sem VI, Pharmaceutical Chemistry I (CBCGS) Question Bank (Answers marked in bold) (Total 100 MCQ's), Prepared by: Dr. Nutan Rao

1) What type of molecule is the following structure?

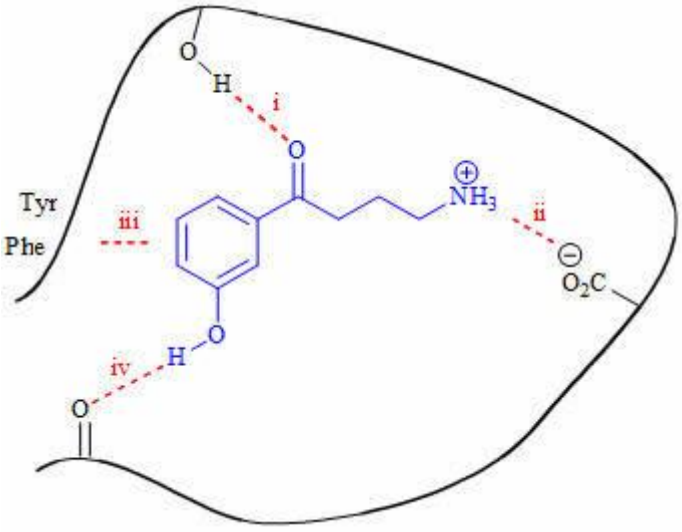


a) A protein
b) A nucleic acid
c) A phospholipid
d) A carbohydrate

2) What is meant by a binding site?

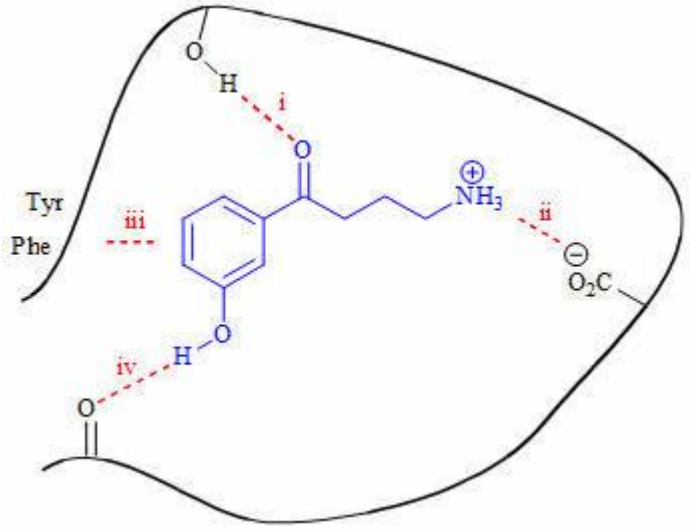
a) The area of a macromolecular target that is occupied by a drug when it binds.
b) The portion of the drug to which a drug target binds.
c) The functional groups used by a drug in binding to a drug target.
d) The bonds involved in binding a drug to its target.

3) Consider the molecule in blue bound to a binding site. Identify the binding interactions taking place at i and iv shown in red.



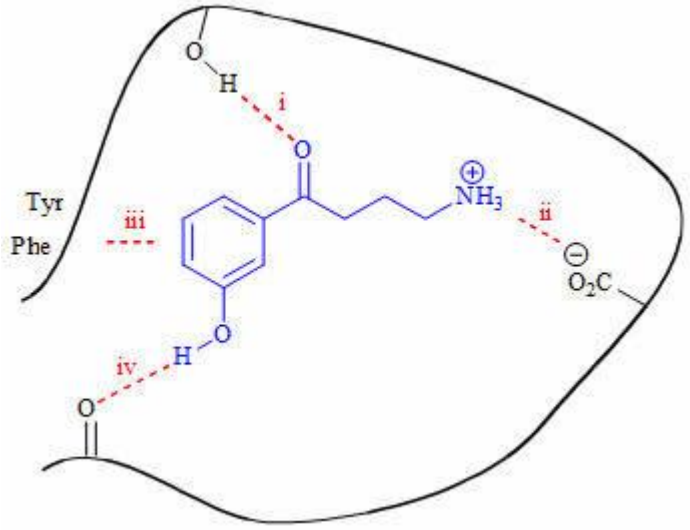
a) hydrogen bonds
b) ionic bonds
c) van der Waals interactions
d) dipole-dipole interactions

4) Consider the molecule in blue bound to a binding site. Identify the binding interactions taking place at iii shown in red.



a) hydrogen bonds
b) ionic bonds
c) van der Waals interactions

5) Consider the molecule in blue bound to a binding site. Identify the binding interactions taking place at ii shown in red.



a) hydrogen bonds
b) ionic bonds
c) van der Waals interactions
d) covalent bond

6) Which of the following functional groups is most likely to participate in a dipole-dipole interaction?
a) Aromatic ring
b) Ketone
c) Alcohol
d) Alkene

7) Which of the following statements is untrue about protein secondary structure?
a) The alpha helix, beta pleated sheet and beta turns are examples of protein secondary structure.
b) The ability of peptide bonds to form intramolecular hydrogen bonds is important to secondary structure.
c) The steric influence of amino acid residues is important to secondary structure.
d) The hydrophilic/hydrophobic character of amino acid residues is important to secondary structure.

8) Identify which of the following terms refers to the arrangement of different protein subunits in a multiprotein complex.
a) primary structure
b) secondary structure
c) tertiary structure
d) quaternary structure

9) Which of the following statements is not true about receptors?
a) Most receptors are proteins situated in the cell membrane.
b) Receptors contain a hollow or cleft on their surface which is known as a binding site.
c) Receptors bind chemical messengers such as neurotransmitters or hormones.
d) Receptors catalyse reactions on chemical messengers.

10) Which of the following is not a neurotransmitter?
a) acetylcholine
b) cyclic AMP
c) noradrenaline
d) dopamine

11) Which of the following statements is not true about a ligand-gated ion channel receptor?
a) Ligand-gated ion channel receptors are present in the cell membrane.
b) Neurotransmitters can act as the chemical messengers for ligand-gated ion channels.
c) Ligand-gated ion channels consist of five glycoproteins.
d) Differences in membrane potential affect whether ligand-gated ion channel receptors open or close.

12) Which of the following is not a G-protein coupled receptor?
a) the muscarinic receptor
b) the glycine receptor
c) the adrenergic receptor
d) the glutamate receptor

13) Which of the following pairs of receptors are likely to show the greatest structural similarity?
a) the dopamine receptor subtypes D_3 and D_5
b) the M_2 muscarinic receptor and the β_2-adrenergic receptor
c) the H_2 histamine receptor and the α_1-adrenoceptor
d) the H_1 histamine receptor and the β_2 adrenoceptor

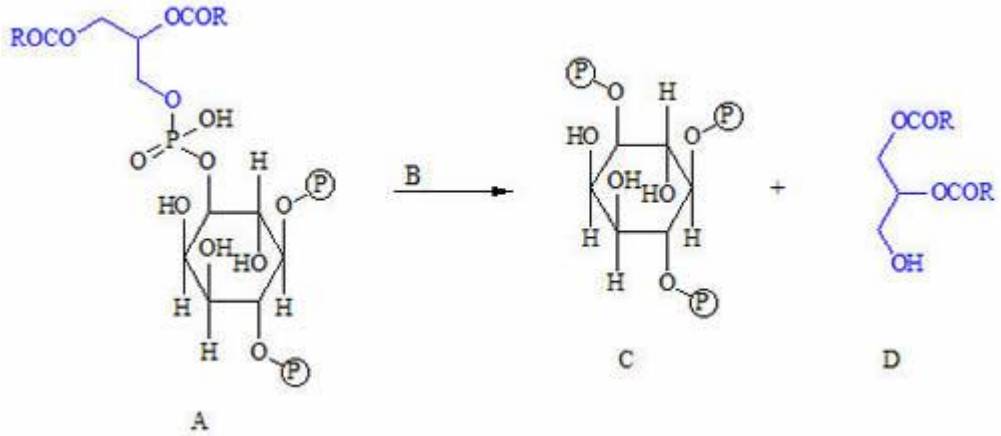
14) Which of the following reactions is catalysed by a protein kinase?
a) the phosphorylation of alcohol groups in protein substrates
b) the hydrolysis of phosphate groups in protein substrates
c) the phosphorylation of alcohol groups in carbohydrates
d) the hydrolysis of phosphate groups in ATP and GTP

15) Which of the following is not a typical messenger for a tyrosine kinase linked receptor?
a) insulin
b) acetylcholine
c) growth factors
d) cytokines

16) Which of the following statements is true regarding the DNA binding region of intracellular receptors?
a) It contains five cysteine residues.
b) Four cysteine residues are involved in binding two zinc ions.
c) It identifies particular nucleotide sequences in DNA.
d) The DNA binding region is known as having 'thiol fingers'.

17) Which of the following reactions is catalyzed by the enzyme adenylate cyclase?
a) the conversion of ATP to cyclic AMP
b) the conversion of cyclic AMP to AMP
c) the conversion of cyclic AMP to ATP
d) the conversion of AMP to cyclic AMP

18) What is the product, indicated by the letter C in the following diagram?



a) inositol triphosphate
b) diacylglycerol
c) inositol diphosphate
d) phosphatidylinositol diphosphate

19) Which of the following is true when a G-protein interacts with a receptor?

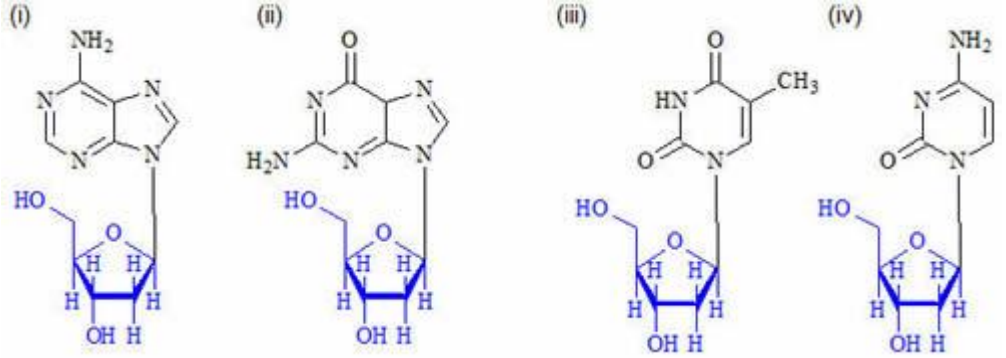
a) The G-protein is split into a γ-subunit and an α,β-dimer

b) The G-protein is split into a β-subunit and an α,γ-dimer

c) The G-protein is split into an α-subunit and a β,γ-dimer

d) The G-protein is split into its component protein subunits

20) What type of structures are the compounds (i) - (iv)?



a) nucleic acids
b) nucleotides
c) nucleosides
d) deoxyriboses

21) To which of the following does guanine form hydrogen bonds in DNA?
a) adenine
b) thymine
c) cytosine
d) guanine

22) Which of the following terms is used to describe a drug that has the same effect on a receptor as the endogenous chemical messenger?
a) agonist
b) antagonist
c) partial agonist
d) inverse agonist

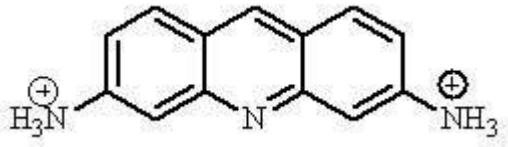
23) Which of the following terms is used to describe a drug that binds to a receptor, and activates it, but to a lesser extent than the endogenous chemical messenger?
a) agonist
b) antagonist
c) partial agonist
d) inverse agonist

24) Which of the following terms is used to describe a drug that binds to a receptor, fails to activate it and leads to a drop in inherent biological activity?
a) agonist
b) antagonist
c) partial agonist
d) inverse agonist

25) Which of the following terms applies to the maximum biological effect resulting from a drug binding to its target?
a) affinity
b) efficacy
c) potency
d) stability

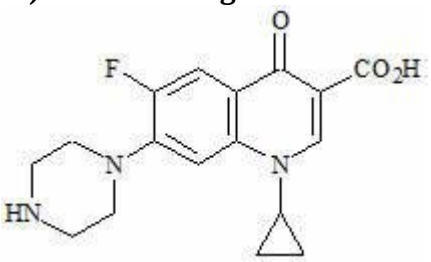
26) Which of the following terms is the measure of how strongly a drug binds to a receptor?
a) affinity
b) efficacy
c) potency
d) stability

27) The following antibacterial agent was used in the Second World War.



What is the name of the structure?
a) Erythromycin
b) Proflavine
c) Chloramphenicol
d) Rifampicin

28) The following structure is a synthetic antibacterial agent called ciprofloxacin.



What is its mechanism of action?
a) Topoisomerase poison
b) Metallating agent
c) Chain terminator
d) Antisense agent

29) Which of the following statements is the closest description of Phase I metabolism?
a) Reactions which add a polar molecule to a functional group already present on a drug or one of its metabolites.
b) Reactions which occur in the blood supply.
c) Reactions which add a polar functional group to a drug.
d) Reactions which occur in the gut wall.

30) Which of the following statements is the closest description of Phase II metabolism?
a) Reactions which add a polar molecule to a functional group already present on a drug or one of its metabolites.
b) Reactions which occur in the blood supply.
c) Reactions which add a polar functional group to a drug.
d) Reactions which occur in the gut wall.

31) Which of the following enzymes is not involved in catalysing a Phase I metabolic reaction?
a) flavin-containing monooxygenases
b) monoamine oxidases

c) glucuronyltransferase
d) esterases

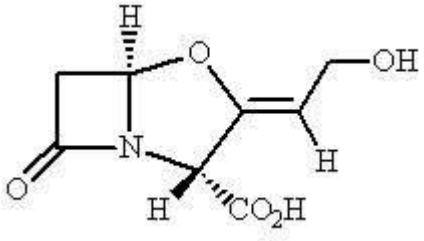
32) Which of the following reactions is not a Phase I metabolic transformation?
a) reduction of ketones
b) conjugation to alcohols
c) oxidation of alkyl groups
d) ester hydrolysis

33) Some drugs containing an ester group are inactive *in vitro*, but are active once the drug has been absorbed *in vivo*. What term is used for such drugs?
a) predrugs
b) metabolites
c) prodrugs
d) predrugs

34) Some peptides and proteins have been used as drugs. Which of the following statements is untrue?
a) Protein drugs suffer a disadvantage in that they could produce an immune response.
b) Peptides and proteins generally show poor bioavailability.
c) Peptide drugs are susceptible to peptidase enzymes.
d) Peptide drugs are susceptible to metabolic enzymes but not to digestive enzymes.

35) What crucial feature of a penicillin is involved in its mechanism of action?
a) Carboxylic acid
b) β-lactam ring
c) Acyl side chain
d) Thiazolidine ring

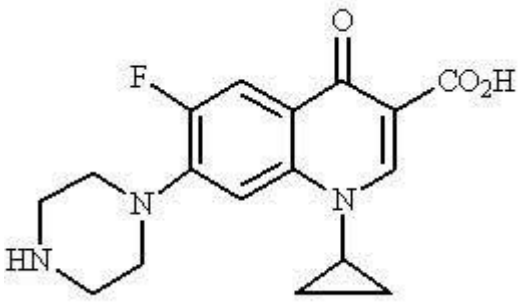
36) What is the target for clavulanic acid?



a) The transpeptidase enzyme
b) L-ala racemase
c) β-lactamase
d) Penicillin acylase

37) Which of the following antibiotics is a macrolide?
a) Chloramphenicol
b) Doxycycline
c) Erythromycin
d) Streptomycin

38) The following structure is a synthetic antibacterial agent.



To which group of compounds does the structure belong?
a) Aminoacridines
b) Aminoglycosides
c) Fluoroquinolones
d) Tetracyclines

39) What sort of receptor is the nicotinic receptor?
a) A G-protein coupled receptor
b) A kinase linked receptor
c) An intracellular receptor
d) An ion channel

40) What sort of receptor is the muscarinic receptor?
a) A G-protein coupled receptor
b) A kinase linked receptor
c) An intracellular receptor
d) An ion channel

41) Which of the following is a natural chemical messenger for the adrenergic receptor?
a) Acetylcholine
b) Dopamine
c) Serotonin
d) Nor-adrenaline

42) Which of the following is a β-lactam antibiotic?
(a) Penicillin + cephalosporin
(b) Streptomycin + gentamycin
(c) Minocyclin + doxycycline
(d) Chloramphenicol

43) 2,6-Dimethoxy phenyl penicillin is IUPAC of
(a) Methicillin
(b) Ampicillin
(c) Amoxicillin
(d) Carbencillin

44) Peptidoglacan is made up of _____ amino sugar part.
(a) N-acetyl glucosamine+N-acetyl muramic acid
(b) N-acetyl biosamine+N-acetyl muramic acid
(c) N-acetyl glucosamine+ N-acetyl glucosamine

(d) N-acetyl muramic acid+ N-acetyl muramic acid

45) Which floro quinolone does not contain cyclopropane ring at N-1 position
(a) Gatifloxacin
(b) Ciprofloxacin
(c) Sparfloxacin
(d) Ofloxacin

46) Which of the following is not present in macrolide?
(a) A large lactone ring
(b) A glycosidically linked amino sugar
(c) A spiroketal group
(d) A ketone group

47) Which of the following is not a synthetic drug?
(a) Isoniazide
(b) Rifampin
(c) Pyrazinamide
(d) Ethionamide

48) Which enzyme combination is involved in ergosterol biosynthesis?

A) Lanosterol 14alpha demethylase and Squalene epoxidase
B) Lanosterol epoxidase and Squalene16alpha demethylase
C) Lanosterol epoxidase and Squalene14alpha demethylase
D) Lanosterol 16alpha demethylase and Squalene epoxidase

49) Which of these is not a Polyene?
A) Terbinafine
B) Nystatin
C) Amphotericin B
D) None

50) What is an Allylamines mode of action?
A) Inhibit ergosterol synthesis via Lanosterol epoxidase
B) Inhibit ergosterol synthesis via Squalene 14alpha demethylase
C) Inhibit ergosterol synthesis via Squalene epoxidase
D) Inhibit ergosterol synthesis via Lanosterol 14alpha demethylase

51) The drug used for malaria chemoprophylaxis and treatment:
a) Chloroquine
b) Quinidine
c) Quinine
d) Sulfonamides

52) Which of the following antimicrohials has antipseudomonal action:
a. Cefpodoxime.
b. Ceforanide.
c. Cefotetan.

d. Cefoperazone.

53) Which of the following agent has trioxane ring?
(a) Artemether
(b) Metronidazole
(c) Halofantrine
(d) Prongunil