KATHMANDU UNIVERSITY
End Semester Examination
March/April, 2017

MAR 2 4 2017

Level : B.Tech.
Year : IV
Time : 2 hrs. 30 mins.

Course : BIOT 401
Semester: I
F. M. : 55

SECTION "C"

Attempt any *SIX* questions.

1. a) State the drug dose level effect for a diabetic patient taking aspiring and insulin together. [2]

   b) What is self-destruct drug? Why it is independent on metabolic enzyme of a patient? [3]

2. a) How do "search and destroy" drug helps to kill targeting tumor cells? [2]

   b) What is a prodrug? What points to be considered in designing this drug? [1+2=3]

3.a) Levodopa is recognized by carrier protein and carried out across the cell membrane despite its high polarity than dopamine, why? What are its uses? [3]

   b) Vancomycin can be used as effective antibiotic only to gram positive bacteria, why? [2]

4. a) How does the Abs1-Abs2 pair of protein regulatory system works in *S. coelicolor*? [3]

   b) How does *Erwinia carotovora* uses quorum sensing molecules for its protection? [2]

5. When do microbes make antibiotics and how do they manage self-protection? [5]

6. What are Aminoglycoside antibiotics? How they are used to treat against enterococcal infections? [3+2=5]

7. List the steps involved in soyo fermentation. What are the essential microorganisms associated with soyo fermentation. [2+3=5]

8. Explain briefly the various types of substrates that can be used as a source of carbon and nitrogen in industrial fermentation. [5]

SECTION "D"

Attempt any *FOUR* questions. Question No. 13 is compulsory.

9. Aspirin, pargylene and LDZ are used as prodrugs to mask drug toxicity and side effects. What are the drug compounds of these prodrugs and what happens if the drug is given without masking them? [6]

10. How the sulfamethoxazole in combination with trimethoprim block the steps in folic acid metabolism in bacterial system. Explain with a drawing. [6]

11. What are the four major classes of antibiotics that are grouped according to their targets at the bacterial cell surface or inside the cell? Explain with examples. [6]

12. Define solid state fermentation. Explain the various types of fermenter designs used for solid state fermentation. [6]

13. Write short notes on [2×3.5=7]
    a. Pinocytosis
    b. Sauerkraut fermentation

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Marks Scored:

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Exam Roll No. :

Time : 30 mins.

F. M. : 20

Registration No. :

Date : MAR 24 2017

SECTION "A"
[20 Q. × 0.75=15 marks]

I. Choose and tick (√) the most appropriate answer.

1. Lipophilic drugs taken up by fat tissue, polar drugs excreted by the kidneys, anionic drugs bound to plasma proteins and cationic drugs are bound to ----------
   a. Plasma proteins
   b. Nucleic acids
   c. Amino acids
   d. Blood vessels

2. The small subunit (30S) of ribosome contains about 20 proteins and ---------- ribosomal rRNA of about 1,500 ribonucleotides.
   a. 16S
   b. 23S
   c. 25S
   d. 5S

3. Serious toxic effects can arise if the antihistamine agent ---------- is taken with grapefruit juice.
   a. Terfenadine
   b. Cyclosporin
   c. Dihydropyridine
   d. Fexofenadine

4. Which of the followings is not a synthetic antibiotic?
   a. Ciprofloxcin
   b. Sulfamethoxazole
   c. Trimethoprim
   d. Tetracycline

5. Which of the followings is not an aminoglycoside?
   a. Tobramycin
   b. Gentamycin
   c. Amikacin
   d. Vancomycin

6. Penicillin inactivate the PG cross linking by forming ---------- isopeptide bond
   a. Ala-D-Ala
   b. Lys-D-Lys
   c. Lys-D-Ala
   d. Lys-D-Val

7. Antibiotic that targets the functioning of 50S subunit is ----------.
   a. Spectinomycin
   b. Kanamycin
   c. Tetracycline
   d. Chloramphenicol

8. Which of the followings is the erythromycin class of macrolide antibiotic?
   a. Thienamcyin
   b. Tylosin
   c. Teicoplanin
   d. Amoxicillin

9. An enzyme aminopeptidase hydrolyses off a non-toxic---------- moiety and the resulting amine spontaneously cyclizes to a diazepam.
a. Lysin b. Glycine c. Valine d. Uracil

10. Bacterial ribosomes are selectively blocked at the 30S subunits by----------
a. Aminoglycosides b. Macrolides c. Vancomycins d. Quinolone

11. ----------has been approved by FDA for killing *Bacillus anthracis* in anthrax infections.
a. Amikacin b. Piperacillin
c. Ciprofloxacin d. Gentamicin

12. Tylosin, a ----------macrolide, targets the 23S rRNA at essentially the same site as erythromycin.
a. 16-membered b. 19-membered
c. 12-membered d. 18membered

13. Oxytetracycline are generated from the bacteria ----------.
a. *S. aureofaciens* b. *S. rimosus* c. *S. erythraea* d. *S. aureus*

14. β-lactamase is an enzyme that ---------- β-lactam ring in penicillin classe of antibiotics.
a. Activates b. Dehydrates
c. Hydrolyzes d. Ring expands

15. The molecules that most likely serve as equivalent quorum sensors in gram-positive *streptomycete* bacteria are ----------
a. β-lactam b. γ-butyrolactones c. Cumarin d. Quinolones

16. ----------is used to minimize the tissue damage and pain on injection of Insulin.
a. Phenol b. Glycerol
c. NaCl d. Physiologic buffer

17. Aminoglycosides target accessible regions of polyanionic 16S rRNA on the 30S ribosome notably at ----------
a. A site b. P site c. E site d. fmet-site

18. Which one of the following *S. coelicolor* products of antibiotics is non-ribosomal peptide?
a. Actinorhodin b. Undecylprodigiosin
c. Methylenemycin d. CDA

19. Which of the followings is not a β-lactam antibiotic?
a. Penicillin b. Cephalosporin
c. Vancomycin d. Clavulanic acid

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20. Sauerkarut fermentation is initiated by the following LAB
a. Heterofermentative
b. Homofermentative
c. Thermophilic
d. Osmophilic

SECTION "B"
[10 Q. × 0.5 = 5]

II. Choose and tick (√) the most appropriate answer.

1. The PG with orthogonal glycan strand undergoes enzymatic cross linking of the glycan strands by ----------action.

2. Two glycopeptide antibiotics in the vancomycin family have been approved for human clinical use; vancomycin and ----------.

3. Antibiotic natural products are produced by both bacteria and fungi, with the major group of antibiotic producing bacteria being the ----------.

4. Aminoglycosides, also called ----------, has been widely used for decades in many clinical settings for antibacterial infections.

5. ---------- is often described as an opportunistic pathogen, causing disease in settings where the patient may have compromised immunity and /or some underlying disease such as cystic fibrosis.

6. ---------- containing aryl amines (sulfanilamide, sulfamethoxazole) were observed to be antibacterial that mimic PABA in enzymatic reaction in the dihydropteroate synthase active site.

7. Expression of the macrolide exporting transport proteins, powered by ATP hydrolysis known as ----------type proteins.

8. The production control of antibiotics are mediated by interaction of specific transcriptional repressor proteins with semi-permeable small ligands called -------.

9. Besides exoenzyme production, *Erwinia* also use the same signaling mechanism to coordinately up-regulate the genes for ----------biosynthesis.

10. ----------is an example of diazepam prodrug which avoids the drowsiness side-effects associated with diazepam.