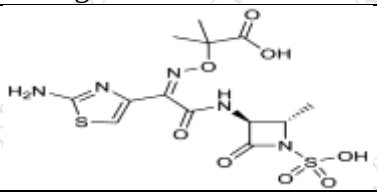
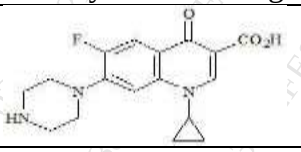
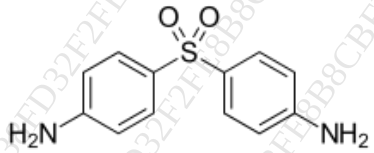
Time: 3 Hrs **Marks: 75**

Q.I Answer the following Multiple Choice Questions. Select the most appropriate option for each statement. **20M**

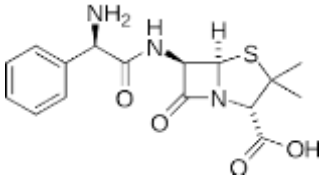
Sr No	Questions		Options
1	What crucial feature of a penicillin is involved in its mechanism of action?	a	Carboxylic acid
		b	β-lactam ring
		c	Acyl side chain
		d	Thiazolidine ring
2	Which of the following is not the degradation product of penicillin?	a	Penillic acid
		b	Penicilloic acid
		c	Penicillin V
		d	Penicillamine
3	Identify the target for clavulanic acid?	a	The transpeptidase enzyme
		b	L-ala racemase
		c	β-lactamase
		d	Penicillin acylase
4	In tetracycline, the pka value of conjugated trione system is in the range of	a	7.2-7.8
		b	9.1-9.7
		c	2.8-3.3
		d	6.4-6.8
5	To which class does the following drug belong	a	Cephalosporins
		b	Aminoglycoside
		c	Tetracycline
		d	Monobactams
6	Endoperoxide 1, 2, 4-trioxane ring is responsible for the antimalarial action of	a	Artemether
		b	Primaquine
		c	Pyrimethamine
		d	Quinacrine
7	Identify the following structure	a	Ciprofloxacin
		b	Nalidixic Acid
		c	Lomefloxacin
		d	Ofloxacin
8	Two pharmacologically active agents coupled together are called as	a	Mutual prodrug
		b	Bioprecursor

		c	Polymeric prodrug
		d	Biotransformation
9	Identify the enantiomer of ethambutol which shows selective & powerful antitubercular activity	a	S, R (+) enantiomer
		b	R, S (+) enantiomer
		c	S, S (+) enantiomer
		d	R, R (-) enantiomer
10	N-acetyl isoniazid is the major metabolite of isoniazid produced by acetylation by	a	Amidase
		b	N-acetyl transferase
		c	Esterase
		d	Hydrolysis
11	……..antibiotic was obtained by fermentation from cultures of *Streptomyces mediterranei*	a	Rifabutin
		b	Cycloserine
		c	Isoniazid
		d	Rifampicin
12	Which one of the following antiviral agent exhibits the greatest selective toxicity for the invading virus?	a	Amantadine
		b	Acyclovir
		c	Rimantadine
		d	Zidovudine
13	Identify an inhibitor of viral protease	a	Saquinavir
		b	Acyclovir
		c	Zalcitabine
		d	Lamivudine
14	Identify antifungal antibiotic with heterocyclic benzofuran moiety	a	Amphotericin-B
		b	Nystatin
		c	Natamycin
		d	Griseofulvin
15	Drug of choice for the treatment of filariasis is	a	Diethyl carbamazine(DEC)
		b	Praziquantel
		c	Niclosamide
		d	Mebendazole
16	Identify the given drug	a	Dapsone
		b	Sulfanilamide
		c	Sulfamethoxazole
		d	sulfone
17	Sulfonamide used for burn therapy	a	Sulfamethoxazole
		b	Sulfacetamide
		c	Silver sulfadiazine
		d	Sulfasalazine

18	The term used for drug discovered by accident or conventional approach	a	Drug discovery by serendipity
		b	Rational drug design
		c	HTS
		d	CADD
19	Lipinki's rule of 5 is used for	a	Docking
		b	Drug likenees
		c	Dynamic simulation
		d	Similarity search
20	Identify the QSAR parameter, which is a measure of electron withdrawing or electron donating ability of a substituent.	**a**	Hammett constant
		b	Taft constant
		c	Molar refractivity
		d	Partition coefficient

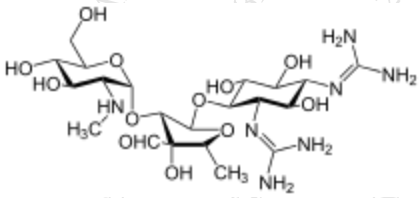
Q.II Attempt <u>ANY TWO</u> of the following. Draw structures wherever required. 20M

Q1. a. Identify following drug and explain acid stability in detail of the same. **4M**



b. Identify the class of following antibiotic and write three structural features for the same.

4M

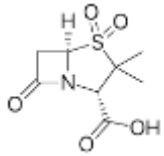


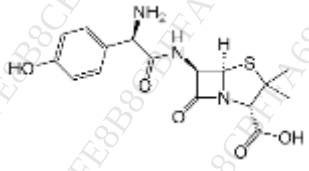
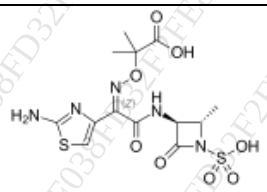
c. Explain two structural features of macrolide antibiotic and write names of two antibiotics from this class. **2M**

Q2.

a. Discuss classification of cefalosporins with examples for each. Write appropriate structures wherever needed. **4M**

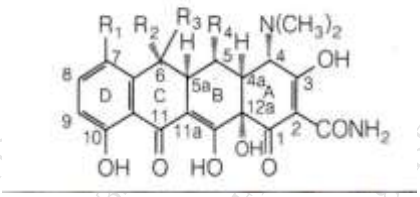
b. Match the following pairs **4M**

Sr No.	**Name**	**Structure**	**Mechanism of action**
1	a. Aztreonam	i. 	x. Inhibition of mucopeptide synthesis

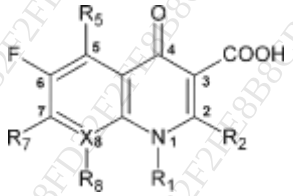
2	b. Sulbactam	ii. 	y. Inhibition of β-lactamase
		iii. 	z. Inhibition of transpeptidase

c. Explain any one DHFR inhibitor with structure and mechanism of action. **2M**

Q. 3. a. Write degradation reaction and products for following scaffold in acidic as well as basic medium . **4M**



b. With reference to the following scaffold, answer the following questions: **4M**



By substituting appropriate groups at positions R_7 and R_1 explain effects on antibacterial activityin detail along with respective structure. (**One for each**.)

c. Explain importance of Prodrugs in biological activity of the drugs. Write example of carrier linked prodrug with it's use. **2M**

Q III Answer <u>Any 7</u> of the following questions: (35 M)

Q1. Match the following. **(5M)**

Generic name	Chemical class	Mechanism of action
Ethionamide	an aminoglycoside antibiotic	blocking the ability of 30S ribosomal subunits to make proteins
PAS	An antibiotic	Competitive inhibitor of PABA
Pyrazinamide	Salicylic acid derivative	D-alanyl- ligase inhibitor
Streptomycin	Thioamide analogue of isoniazid	Mycolic acid synthesis inhibitor
Cycloserine	Pyrazine derivative	FASI (Fatty acid synthase inhibitor)

Q2.A. Give the synthetic scheme for synthesis of Ciprofloxacin. **(4M)**

B. Write name and structure of fluoroquinolone that reduces phototoxicity. (**1M)**

Q3.A. Give the synthetic scheme for acyclovir mentioning reagents & reaction conditions. **(4M)**

B. Write MOA of Ribavirin. (**1M)**

Q4. Classify antifungal agents given below based on chemistry, explain MOA in brief with structure(any two): Griseofulvin, Clotrimazole, Tolnaftate **(5M)**

Q5.A. Give the synthetic scheme for Dapsone mentioning reagents & reaction conditions. **(3M)**

B. Name the target for sulphonamides drugs. Write the structure of sulphonamides used for ulcerative colitis. **(2M)**

Q6. Write class. Structure, and mechanism for the following.(Any Two) **(5M)**

i. Sulphamethoxazole
ii. Diloxanide
iii. Mebendazole

Q7. A. Indicate to which mechanistic & therapeutic class the following drugs belongs to (Structures to be written) **(5M)**

a) Chloramphenicol
b) Diethyl carbamazine citrate

Q8. Enlist Physicochemical parameters used in QSAR? Explain application of any two parameters. **(5M)**

Q9. Define combinatorial chemistry & write its applications.Explain solution phase synthesis. **(5M)**

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Duration: 3hrs **Total Marks: 75**

Note: All Questions are Compulsory.
Figures to the right indicate full marks.
Draw diagrams wherever required.
Use of Scientific calculator is permitted

Q. 1 Choose the appropriate option for following multiple choice based questions. **20**

1 The use of pharmacokinetic principles in optimising the drug dosage to suit individual patient needs and achieving maximum therapeutic utility is called as _____ 1

a clinical pharmacokinetics.
b dosage regimen
c individualization
d population pharmacokinetics

2 Select a passive absorption process 1
a pore transport
b active transport
c pinocytosis
d phagocytosis

3 poorly developed BBB is observed in 1
a infants
b adults of age more than 20 years
c elderly
d children at puberty

4 Unit of perfusion rate is 1
a min/ml/ml
b ml/lit
c ml/min/ml
d mg.hr/lit

5 Carrier mediated absorption process can be described by 1
a Fick's first law of diffusion
b Michaelis-Menten equation
c Noyes Whitney's equation
d Nernst and Bruner equation

6	Probenecid act as uricosuric agent as it	1
a	inhibits glomerular filtration of uric acid	
b	competitively inhibit active secretion of uric acid	
c	has structural similarity with uric acid	
d	competitively inhibit active reabsorption of uric acid	
7	Hepatic clearance is said to be perfusion rate limited, if	1
a	it undergoes high metabolism	
b	it escapes metabolism	
c	it is metabolized to poor extent	
d	it shows intermediate metabolism rate	
8	Select the dissolution apparatus working on sink condition	1
a	paddle type	
b	basket type	
c	flow through cell	
d	paddle over disk	
9	BCS class III drugs have	1
a	high solubility, high permeability	
b	high solubility, low permeability	
c	low solubility, high permeability	
d	low solubility, low permeability	
10	_____ form of drug will be comparatively more soluble.	1
a	crystalline	
b	amorphous	
c	hydrate	
d	solvate	
11	Select the Pharmacodynamic method of studying bioavailability	1
a	acute pharmacologic response	
b	plasma-level time studies	
c	urinary excretion studies	
d	stool excretion studies	
12	What is the equation of bioavailable fraction	1
a	bioavailable dose/Administered dose	
b	1/Administered dose	
c	1/Bioavailable dose	
d	administered dose/Bioavailable dose	

13	Elimination half-life is time taken for half of the amount of drug to get eliminated from	1
a	body	
b	liver	
c	kidney	
d	organ	
14	Name the model in which compartments are joined in series	1
a	mammillary model	
b	distributed parameter model	
c	physiologic model	
d	catenary model	
15	In case of multiple IV injections, the ratio of steady state concentration to initial concentration is called as	1
a	absorption factor	
b	maxima	
c	minima	
d	accumulation factor	
16	Select the cause for nonlinearity in drug distribution	1
a	saturation of binding sites on plasma proteins	
b	when a presystemic gut wall or hepatic metabolism attains saturation	
c	when absorption involves carrier-mediated transport systems	
d	when absorption is solubility or dissolution rate-limited	
17	Induction of drug metabolism leads to _____ in half-life of drug	1
a	unpredictable	
b	increase	
c	decrease	
d	remain constant	
18	While designing dosage regimen for narrow therapeutic index drug, the preferred method is	1
a	administered twice a day	
b	small doses administered at frequent intervals	
c	larger doses administered at relatively longer intervals	
d	small doses administered at longer interval	

19	The word "open" in the one compartment open model means	1
a	the input and output are unidirectional	
b	not applicable for administration of a single dose of a drug	
c	drug concentration in plasma is equal to that in other body tissues	
d	easy absorption	
20	Mechanism of drug absorption in rectal route is	1
a	passive diffusion	
b	pore transport	
c	endocytosis	
d	carrier mediated transport	

Q.II a	**Attempt any 2**	**2x10**
1	A drug following one compartment kinetics, after IV bolus administration of 250mg gave instantaneous plasma concentration of 34 mg/L. If half life of drug is 3.5 hrs, calculate,	
	i) Elimination rate constant and apparent volume of distribution	2
	ii) Total systemic clearance and AUC (Zero to infinity)	2
	iii) Plasma concentration after 1.5 hrs of administration.	2
	iv) Time required to eliminate 45% of dose	2
	v) What would be the new Co achieved if dose is changed to 400mg	2
2	Write a note on the concept of loading dose and maintenance dose.	10
3	Explain Carrier mediated absorption mechanism.	10

Q.II b	**Attempt any 7**	**7x5**
1	Write a note on gastric emptying.	5
2	Write assumptions of one compartment open model.	5
3	Explain the effect of active tubular reabsorption on the excretion of drugs with a suitable example.	5
4	Explain effect of compression force and method of granulation on drug absorption.	5
5	Discuss displacement interaction with any one suitable example.	5
6	Enlist various methods of measurement of bioavailability, discuss any one in detail.	5
7	Explain enzyme inhibition.	5
8	Explain how different parameters affect dissolution with the help of Noyes Whitney's equation.	5
9	Explain absorption and metabolism related causes for nonlinearity in pharmacokinetics.	5

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Time: 3 Hours **Total Marks: (75)**

Q I. Choose the ONE best answer and write it down **20 Marks**

1. Montelukast inhibits _____ receptors.
A. Histamine
B. Leukotriene
C. PAF
D. Bradykinin

2. The first choice drug for nonsteroidal antiinflammatory drug-induced gastric ulcer is:
A. Ranitidine
B. Omeprazole
C. Sucralfate
D. Misoprostol

3. Which of the following is an example of Osmotic Purgative?
A. Psyllium
B. Phenolphathalein
C. Lactulose
D. Ispaghula

4. The following 5HT3 antagonist is used as anti-emetic?
A. Hyoscine
B. Ondansetrone
C. Haloperidol
D. Chlorpromazine

5 Cotrimoxazole is a combination of:
A. Sulphadoxine + Trimethoprim
B. Sulphamethoxazole + Pyrimethamine
C. Sulphamethoxazole + Trimethoprim
D. Sulphamethoxazole + Ictaprim

6. Which of the following antibiotic may cause tooth discoloration as a side effect?
A. Tetracycline
B. Penicillin
C. Sulphonamides
D. Macrolides

7. Which of the following drugs is penicillinase resistant:
A. Oxacillin
B. Amoxicillin
C. Bicillin-5
D. Penicillin G

8. Cephalosporins are drugs of choice for treatment of:

A. Gram-positive microorganism infections
B. Gram-negative microorganism infections
C. Gram-negative and gram-positive microorganism infections, if penicillins have no effect
D. Only bacteroide infections

9. The anthelmintic drug piperazine:

A. Inhibits tubulin polymerization
B. Acts as a GABA agonist to paralyze the worms
C. Inhibits glucose uptake
D. Uncouples oxidative phosphorylation

10. A side effect of ethambutol is

A. Neurotoxicity
B. Nausea, vomiting and diarrhea
C. Hypersensitivity and urticarial
D. Loss of color vision due to optic neuritis

11. Which of the following is Phenazine derivative used for the treatment of leprosy?:

A. Clofazimine
B. Dapsone
C. Ethionamide
D. Rifamycin

12. Nevirapine belongs to _____:

A. Non-Nucleoside reverse transcriptase inhibitor
B. Nucleoside reverse transcriptase inhibitor
C. Protease Inhibitor
D. Non-selective antiviral drug

13. The antineoplastic agent that is classified as an alkylating agent is:

A. Vincristine
B. Tamoxifen
C. Bleomycin
D. Busulfan

14. Sirolimus is inhibitor of _____:

A. Calcineurin
B. Choline Esterase
C. m-TOR
D. Protease

15. Which of the following antineoplastic drug is a mitotic inhibitor and causes metaphase arrest?

A. Busulfan
B. Vincristine
C. Cytarabine
D. Procarbazine

16. The BCG vaccine contains:

A. Attenuated culture of *Mycobacterium tuberculosis*
B. Live culture of *Mycobacterium leprae*
C. Attenuated culture of *Mycobactwerium bovis*
D. Killed culture of *Mycobacterium tuberculosis*

17. A drug used for the treatment of organophosphorus poisoning is:

A. Parathion
B. Malathion
C. Pralidoxime
D. Phenytoin

18. Melatonin plays a role in:

A. Sleep cycle
B. Hunger
C. Digestion
D. Growth

19. Which of the following toxicity can occur due to single exposure?

A. Acute toxicity
B. Sub-acute toxicity
C. Sub-Chronic toxicity
D. Chronic toxicity

20. A selective antidote for organophosphate poisoning is

A. Fentanyl
B. Pralidoxime
C. Codeine
D. Methadone

Q.II Answer ANY TWO of the following 20 M

1. Classify anti-ulcer drugs with examples. Explain the detailed pharmacology of proton pump inhibitors.
2. Classify penicillins with examples. Explain the mechanism of action of beta lactam antibiotics and add a short note on resistance development against beta lactam antibiotics.
3. Write a short note on treatment of amoebiasis.

Q.III Answer ANY SEVEN of the following 35 M

1. Explain any two classes of drugs used in the treatment of inflammatory bowel disease
2. Write a short note on bulk laxatives.
3. Write a short note on the mechanism of action and adverse effects of sulphonamides.
4. Write a note on the mechanism of action, adverse effects and uses of 4-aminoquinoline drugs.
5. Write a note on the mechanism of action, adverse effects and uses of rifampin.
6. Classify anticancer agents with two examples of each class.
7. Write a note on Calcineurin inhibitors.
8. Write a short note on genotoxicity.
9. Describe the symptoms and management of lead poisoning.

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Time:3Hours **Marks:75**

N.B: 1. All questions are compulsory
2. Figures to right indicate full marks
3. Draw structure where ever necessary

Q1. Answer the Following 20X1=20 M

1.Crop planning ensures
a. Regular supply to industry
b. Regular Pricing
c. Organic crop
d.Standardised crop

2.A method of agricultural production which avoids the use of synthetic products is called
a. Mass farming
b. Biological farming
c. Organic farming
d. Agro farming

3. Which of the following physician developed Homeopathy
a. Hippocrates
b. Galen
c. Dhanvantari
d. Samuel Hanneman

4. The wild growth of optunia is checked with Cochineal insect is _____ type of pest control
a. Physical
b. Chemical
c. Biological
d.Genetic

5. Which of the following is not true for Bhasma
a. It is obtained completely by drug incineration
b. it is amorphous smooth powder
c. it can be standardised
d. Bhasmas are Homeopathic preparations.

6. *Trigonella foenum graceum* and *Momordica charantia* are recommended as nutraceuticals for
a. Cardio vascular diseases
b. Irritable bowel syndrome
c. Diabetes
d. Hepatoprotective

7. Hypericum reacts with warfarin & produces
a. Decrease in anticoagulant effect
b. Increase in anticoagulant effect
c. Increase in RBC
d.Decrease of Platelets

8. Which of these is not commonly used as Nutraceutical?
a. Aloe
b. Vinca
c. Liquorice
d. Alfalfa

9. Stievia is an example of
   a. Natural Colour
   b. Natural Sweetner
   c. Natural binder
   d. viscocity building agent

10. Which of the following enzyme inhibitor is responsible for fairness activity of skin?
   a. Tyrosinase
   b. Amylase
   c. Lipase
   d. Protease

11. Abrasive effect of meswak is due to presence of
   a. Silica
   b. Tannins
   c. Saponins
   d. Resins

12. A natural surfactant which is also used as a skin softener is
   a. Coco Betaine
   b. Lawsone
   c. Kava Kava
   d. Amla

13. Which of the following is a Novel drug dosage form
   a. Herbal sprinkles
   b. Herbal Syrups
   c. Phytosomes
   d. Herbal Lozenges

14. The microbial toxin evaluation as per WHO guidelines includes
   a. Mycotoxins
   b. Endotoxins
   c. Mycotoxins & Endotoxins
   d. Microbial bioburden

15. Accelerated Stability testing is done to determine
   a. Stability of the Herbal product
   b. Stability of Active constituent in the product
   c. The stress degradation pathway
   d. Amount of excipients added to product

16. Biopiracy means
   a. Unethical exploitation of Natural resourses
   b. Ethical exploitation of Natural resourses
   c. Experimentation
   d.Innovation & discovery

17. Oranges from Nagpur represent ----- type of IPR
   a. Geographical Indication
   b. Trade mark
   c. Patent
   d. Copyright

18. Schedule I refers to
   a. List of reference books
   b. Poisonous plants
   c. Labelling conditions
   d. Expiry date

19. …….. Sq ft area is required for Quality control of Herbal product manufacturing
   a. 600
   b. 1000
   c.500
   d. 150

20. GMP for Indian system of Medicine is mentioned in
   a. Schedule Z
   b. Schedule T
   c. Schedule A
   d. Schedule M

Q.II Answer any Two of the following: 2X10=20M

1. Discuss different Colourants & Viscosity builders as raw materials used in herbal cosmetics.
2. Classify Nutraceuticals with suitable examples.
3. Explain Pest Management in Medicinal Plants.

Q.III Answer any seven of the Following 7X5=35M

1. What is Good agricultural Practices. How is Herb drug authentication achieved?
2. Explain preparation of Bhasma & Churna with suitable example.
3. Write a note on any two drugs used as nutraceuticals for Cancer.
4. Explain possible herbal-drug and herb food interaction with suitable example.
5. Write a short note on Ephedra & Ginseng.
6. Give sources & use of fixed oils & antioxidants in herbal cosmetics.
7. Define phytosome. Write a note on preparation and evaluation of phytosome .
8. Outline the different infrastructure requirements for Herbal drug manufacturing.
9. Write a note on geographical indications and Discuss the Patent case study of Curcuma.

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Duration: 3 Hrs **Total marks: 75**

N.B.: 1. All questions are compulsory
2. Figures to right indicate full marks

Q. I Choose appropriate option for the following multiple choice-based questions. 20

1 Good Manufacturing Practice is a part of ICH ____ guidelines.
- a. Quality
- b. Safety
- c. Efficacy
- d. Multidisciplinary

2 Air pressure differentials in a clean room should be checked _____.
- a. Daily
- b. Yearly
- c. Biannually
- d. Weekly

3 _____ used to help to determine whether there is a correlation between two factors.
- a. Fishbone diagram
- b. Control charts
- c. Scatter graphs
- d. Check sheets

4 The _____ is responsible for the conduct of a nonclinical laboratory study.
- a. Laboratory Technician
- b. Scientist
- c. Study Director
- d. Quality Assurance Unit

5 The dispensing of raw materials from Stores must follow the principle of _____.
- a. First Out Then In
- b. Fast Out Fast In
- c. Fast In Fast Out
- d. First In First Out

6 Prospective validation is performed on at least _____ successive batches.
- a. Ten
- b. Three
- c. Five
- d. Two

7 _____ is the key element responsible for the organizational growth and outcomes.

a. Personnel
b. Equipment
c. Premises
d. Layout

8 Complaint investigation is the responsibility of _____.

a. Quality Control department
b. Production department
c. Quality Assurance department
d. Marketing department

9 IS0 14001 is for _____ management.

a. Quality
b. Environmental
c. Resource
d. Organization

10 Service bay is maintained at _____

a. Class 1000
b. Class 20
c. Class 10
d. Class 50

11 Grammage is used to determine the physical dimensions of the _____ material.

a. Thermosetting plastic
b. Metal
c. Glass
d. Paper and paperboard

12 A _____ container is closed by fusion of the material of the container.

a. Sealed
b. Light- resistant
c. Hermetically sealed
d. Well closed

13 In _____ purchasing, different departments purchase their requirement separately.

a. Closed
b. Centralized
c. Decentralized
d. Limited

14 Folding endurance is performed for _____
- a. Carton
- b. Closure
- c. Carton
- d. Paperboard

15 Calibration of an equipment should be performed using _____.
- a. Test sample
- b. Certified Standards
- c. Inhouse standards
- d. Reference sample

16 Which of the following is an example of secondary packaging?
- a. Bottles
- b. Barrel
- c. Blister
- d. Cartons

17 In the test for volatile sulphides in rubber closure, _____ paper is used.
- a. Litmus paper
- b. Lead acetate paper
- c. Starch paper
- d. Mercuric chloride

18 _____ is at the apex of Quality Management System.
- a. Quality Records
- b. Quality procedures
- c. Quality Manual
- d. Working instructions

19 Cleaning of the equipment is a part of _____.
- a. Predictive maintenance
- b. Corrective maintenance
- c. Curative maintenance
- d. Periodic maintenance

20 The vital link between all elements of TQM is _____
- a. Leadership
- b. Communication
- c. Training
- d. Recognition

Q. II Answer any two questions. (Any 2) **20**

1	Define QbD. Elaborate on tools of QbD. Give the difference between QC and QA.	**10**
2	Discuss quality control tests for plastic containers and rubber closure.	**10**
3	Enlist the types of documents maintained in pharmaceutical company. Write in brief about master formula record.	**10**

Q. III Answer any seven questions (Any Seven) **35**

1	What is Quality management System? Give the role of Quality Control and Quality Assurance departments in a Pharmaceutical Industry	**5**
2	Write in brief about disqualification of testing facilities.	**5**
3	Define and differentiate between Quality audit and Quality Review.	**5**
4	Enlist the benefits of ISO and explain the process of ISO registration.	**5**
5	Discuss the training and personal records with reference to GMP in a pharmaceutical industry	**5**
6	Define calibration. Elaborate on the process for calibration of the pH meter.	**5**
7	Discuss the steps involved in handling of complaints in a pharmaceutical company.	**5**
8	Explain the process of equipment selection and maintenance in the pharmaceutical manufacturing unit.	**5**
9	State the importance of inventory management. Discuss the Good warehousing practices in detail.	**5**

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Time: 3 Hrs **Marks: 75**

N.B. : 1. All questions are compulsory
2. Figures to right indicate full marks

Q. 1 MCQ 20 M

1) Vector is required in rDNA technology to
a) amplify the foreign gene
b) transfer a gene from animal to another
c) isolate the foreign gene
d) join the foreign gene

2) Salk polio vaccine is type of
a) Inactivated vaccine
b) Live attenuated vaccine
c) Recombinant DNA vaccine
d) Toxoid vaccine

3) Which of the following hypersensitivity occurs via IgE antibody?
a) Type I
b) Type II
c) Type III
d) Type IV

4) Restriction enzymes are used for
a) Cutting DNA
b) Joining genes
c) Isolation of proteins
d) Isolation of enzymes

5) Which of the following role is performed by a bacteriophage in transduction?
a) vector
b) donor
c) recipient
d) Eepisome

6) Enzyme immobilization is done
a) to reduce the activity of the enzyme
b) to protect the enzyme
c) to degrade the enzyme at a faster rate
d) to deactivate the enzyme

7) The extension temperature in the PCR is
a) 25^0c
b) 44^0c
c) 65^0c
d) 72^0c

8) In a Biosensor the bioreceptor cannot be _____
a) enzyme
b) cell
c) antigen
d) a non biochemical substance

9) Air-lift is a _____ type of fermentor.
a) Mechanically stirred
b) Forced conviction
c) Pneumatic
d) Tray

10) Which of the following is not correct sentence about protein engineering
a) It is the study of structure of proteins
b) It is the study of amino acid sequence
c) It is the study of nucleotide sequence
d) It is the study of function of proteins

11) Function of MHC molecule is
a) to kill the antigen.
b) to produce antibodies against antigen.
c) to present the antigenic determinant peptide to immunological cells.
d) to neutralize the antigenic material

12) Active immunity is induced by

a) Infection
c) injection of antibodies
b) Placental transfer of antibodies
d) Injection of gamma- globulins

13) Sera are_____ types of Immunity

a) Naturally acquired active
b) Naturally acquired passive
c) Artificially acquired active
d) Artificially stimulated passive

14) Applications of southern blotting include

a) RFLP and DNA Fingerprinting
c) Separation of amino-acids
b) Identification of proteins
d) Isolation of proteins

15) _____ mutants show a change in the surface structure and composition of the microbial cell.

a) Metabolic mutants
c) Regulatory mutant
b) Antigenic mutants
d) Cryptic mutant

16) While naming the RE the first letter use of _____ name

a) strain
c) Species
b) Genus
d) Scientist

17) Shelf life of Whole human blood is _____

a) 3 days
c) 3 months
b) 5 years
d) 21 days

18) Microorganism used for the production of Vitamin B12 by fermentation method is

a) Penicillium chrysogenum
c) Pseudomonas denitrificans
b) Aspergillus niger
d) Saccharomyces cerevisiae

19) _____ is used as a monitoring device in the fermenter to measure agitator speed.

a) Flow meter
c) Pressure gauze
b) Rota meter
d) Tachometer

20) _____ prevents vortex formation in fermenter

a) Baffles
c) Propeller
b) Impellers
d) Shaft

Q.2 Answer any two of the following (10X2 =20 M)

1) Enlist and explain methods of Enzyme immobilization with suitable diagrams and examples.
2) Explain the detail process of insulin production by recombinant DNA technology
3) Define fermentation, draw a neat labeled diagram of the ideal fermentor and write a short note on Penicillin production by fermentation.

Q.3) Answer any seven out of nine of the following (7X5=35 M)

1) Explain the method of production of Monoclonal antibodies and write its applications.
2) Explain in detail any one method of DNA sequencing
3) Write a note on transgenic plants
4) Draw and explain structure of MHC class-I and Class-II molecules.
5) What do you mean by Plasma Substitutes? enlist their properties.
6) Enlist the types of mutation and explain any one in detail.
7) Explain the process of production of Sera.
8) Differentiate between Humoral and Cellular immunity.
9) Define Biotransformation and Explain types of microbial biotransformation with suitable examples.

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University of Mumbai

T.Y.B. Pharm (sem 6)

Biopharmaceutics and Pharmacokinetics

Duration: 3hrs **Total Marks: 80**

Note: All Questions are Compulsory.
Figures to the right indicate full marks.
Draw diagrams wherever required.
Use of Scientific calculator is permitted

Question no		Marks
Q.I	**Choose the appropriate option for following multiple choice-based questions.**	**20*1**
1	The bioavailability of a drug from various dosage forms decreases in the following order:	1
a	Tablets > Coated Tablets > Sustained Release Products >Enteric Coated Tablets	
b	Tablets > Coated Tablets > Enteric Coated Tablets > Sustained Release Products.	
c	Tablets >Enteric Coated Tablets > Coated Tablets > Sustained Release Products.	
d	Enteric Coated Tablets >Tablets > Coated Tablets > Sustained Release Products.	
2	Amorphous form of Novobiocin is	1
a	10 times more soluble than crystalline form	
b	10 times less soluble than crystalline form	
c	Physical form does not affect solubility	
d	Novobiocin solubility is not affected by its physical form	
3	Clearance is	1
a	Hypothetical volume of body fluids containing drug from which the drug is completely removed in a specified period of time.	
b	Time period in which drug is completely removed from body.	
c	Amount of drug that is completely removed from body in specified period of time.	
d	Fraction of drug that is completely removed from body in specified period of time.	

4	Which statement about the Biopharmaceutical Classification System is true?	1
a	Class II- Low solubility, High permeability, Class III- High solubility, Low permeability	
b	Class II- High solubility, High permeability, Class III- High solubility, High permeability	
c	Class II- Low solubility, Low permeability, Class III- Low solubility, Low permeability	
d	Class II- High solubility, Low permeability, Class III- Low solubility, High permeability	
5	PEG 6000 is deleterious binder for phenobarbitone because	1
a	It forms poorly absorbable complex with drug	
b	It has no binding action	
c	It shows formulation defects	
d	It affects stability	
6	Flow Through Cell is official	1
a	USP Dissolution Test Apparatus II	
b	USP Dissolution Test Apparatus III	
c	USP Dissolution Test Apparatus IV	
d	USP Dissolution Test Apparatus V	
7	Area under curve represents	1
a	Rate of drug absorption	
b	Extent of drug absorption	
c	Duration of action	
d	Therapeutic index	
8	Paracellular transport means	1
a	Passage of drugs across GI membrane	
b	Transport of drugs through the junctions between the GI epithelial cells.	
c	It is not a mode of transport of drugs	
d	The permeation of drugs through temporary openings of two neighbouring epithelial cells into the lumen.	
9	The order of dissolution of different solid forms of drugs is	1
a	Amorphous > Metastable >Stable	
b	Amorphous > Stable > Metastable	
c	Stable > amorphous > Metastable	
d	Metastable > amorphous >Stable	
10	The inhibitory effect of various acids on gastric emptying decreases inn following order	1
a	HCl > acetic > lactic > tartaric > citric	
b	Citric > tartaric > HCl > acetic > lactic	
c	Lactic> HCl > acetic > tartaric > citric	

d	Acetic > HCl > lactic > tartaric > citric	
11	In presence of food, absorption of griseofulvin is	1
a	Delayed	
b	Decreased	
c	Increased	
d	Unaffected	
12	Which of the following statement is true?	1
a	Drugs with high protein binding have low apparent volume of distribution	
b	Drugs with low protein binding have low apparent volume of distribution	
c	Drugs with high protein binding have high apparent volume of distribution	
d	Drugs with low protein binding have low apparent volume of distribution	
13	Which of the following statements is true?	1
a	Rate of excretion = Rate of filtration - Rate of Secretion - Rate of reabsorption	
b	Rate of excretion = Rate of filtration -Rate of Secretion + Rate of reabsorption	
c	Rate of excretion = Rate of filtration +Rate of Secretion - Rate of reabsorption	
d	Rate of excretion = Rate of filtration +Rate of Secretion + Rate of reabsorption	
14	As per mammillary model, the number of rate constants that will appear in a particular compartment model (for intravenous administration) is given by	1
a	R= 2n – 1	
b	R= 2n	
c	R= 2n +1	
d	R= 2n -2	
15	Model independent approach is also termed as	1
a	Non-compartmental approach	
b	Compartment model	
c	Physiological model	
d	Distributed parameter model	
16	Select the equation that gives the rate of drug dissolution from a tablet	1
a	Fick’s law	
b	Handerson Hasselbatch equation	
c	Noyes Whitney equation	
d	Michelis Menten equation	
17	Favourable pH range for absorption through small intestine is	1
a	1 to 2.5	
b	4 to 4.5	

c	5 to 7.5	
d	10- 12.5	
18	Disposition of a drug following one compartment kinetics, IV bolus administration is,	1
a	$X = X_o e^{-K_E T}$	
b	$X = X_o e^{-Cl.T}$	
c	$X = X\ e^{-K_E T}$	
d	$X = X_{.} e^{-CL.T}$	
19	Extraction ratio is related to oral availability of drug by following expression:	1
a	F= 1 – ER	
b	ER= 1- F	
c	F= 100- ER	
d	ER= 100- F	
20	Most abundant abundant plasma protein with large drug binding capacity is	1
a	Human serum albumin (HSA)	
b	1-Acid Glycoprotein	
c	Orosomucoid	
d	Lipoproteins	
Q.IIa	Attempt any **one**	12
1a	Describe method of residuals for determination of absorption rate constant.	8
1b	Describe the assumptions of one compartment open model.	4
2a	After an intravenous bolus injection of 250 mg of a drug following one compartment kinetics. The plasma concentration time profile is represented by – $C = 160e^{-0.17t}$ Calculate a) Elimination half-life and AUC. b) Volume of distribution and clearance. c) Plasma concentration after 2 hours. d) Amount eliminated after 5 hours.	 2 2 2 2
2b	Define clearance. Derive mathematical expression for the total body clearance.	4
Q.IIb	Attempt any **four**	12x4
3a	Explain the physicochemical factors influencing the distribution of drugs.	8
3b	Describe absorption processes that may cause non-linearity in pharmacokinetics.	4
4a	Explain the pH Partition Hypothesis in drug absorption in GIT.	8
4b	Describe transcellular route of drug absorption.	4

5a	Discuss the effect of distribution and binding characteristics of the drug, drug interactions on renal excretion of drugs.	
5b	What are various levels in *in vitro-in vivo* correlations?	4
6a	What are various approaches aimed at enhancing bioavailability of drugs from its dosage form? Explain any four**.**	8
6b	Define apparent volume of distribution. Why cannot the volume of distribution of a drug have a true physiologic meaning?	4
7a	Draw a typical plasma drug concentration- time profile. Label and define all pharmacokinetic and pharmacodynamics parameters.	8
7b	Describe the characteristics of microsomal enzymes.	4

University of Mumbai
SEMESTER THEORY EXAMINATION
May-2022
Subject: Herbal Drug Technology
Subject code: BP603T
Third Year B. Pharm, Sem. VI, R-CBCS-2019

Q.1 Solve the following. **20M**

1. Herbal Crude drug means _____part of plant.
    a. Stem
    b. Leaves
    c. Fruit
    d. Any
2. The process includes removing dirt, discarding damaged part, trimming and remove seed from fruits is known as_____.
    a. Garbling
    b. Bleaching
    c. Drying
    d. Washing
3. _____ is a liquid obtained by boiling the herbal materials with water.
    a. Infusion
    b. Decoction
    c. Tinctures
    d. Powder extract
4. _____ is an undesired plant, it can produce losses more than any other pests or disease.
    a. Fungi
    b. Viruses
    c. Weeds
    d. Azatobacter
5. Leha is _____dosage Form
    a. Solid
    b. Liquid
    c. Powder
    d. Semisolid
6. Aflatoxin is one type of _____ .
    a. Fungus
    b. Virus
    c. bacteria
    d. Algae
7. Which should be not patented from following
    a. Traditional knowledge of plant
    b. Isolation of phytoconstituents

c. New uses of Phytoconstituents
d. New variety of plants

8. Name the institute which has filled reexamination of patent for curcumin.
    a. CSIR
    b. RRL
    c. AYUSH
    d. ICMR
9. Which regulatory body as per Drug & cosmetic act for ASU drugs under section 33 D?
    a. DCC ASU
    b. DTAB ASU
    c. CSIR
    d. ICMR
10. Which Schedule is proposed for clinical study of ASU drugs?
    a. Schedule Z
    b. Schedule T
    c. Schedule M
    d. Schedule Y
11. Name the machinary which is specifically required for Bhasma preparation.
    a. Muffle furnace
    b. Grinder
    c. Ball mill
    d. Disintigrator
12. Name the research institite which is funded by Government
    a. RRL Jammu
    b. Yucca
    c. Dabur
    d. Charak
13. Following drug can be used for Diabetes.
    a. Momordica
    b. Honey
    c. Ashwagandha
    d. Spirulina
14. Following is sulphur containing Nutraceutical drug
    a. Garlic
    b. Ashwagandha
    c. Chicory
    d. Spirulina
15. Garlic shows interaction with
    a. Chloroxazone
    b. PPIs
    c. Paracetamol
    d. Anti-cancer
16. Benzyl benzamide is found in
    a. Neem

b. Meswak
c. Clove
d. Reetha

17. Skin care constituent of Almond oil is
    a. Oleic acid
    b. Caprylic acid
    c. Acemannan
    d. Citric acid
18. Color of Henna is due to
    a. Plumbagin
    b. Crocin
    c. Aloin
    d. Lawsone
19. Linalool is used as
    a. Bleaching agent
    b. Perfuming agent
    c. Colorant
    d. Antiseptic
20. Which is NOT the method of phytosome preparation?
    a. Solvent evaporation
    b. Cosolvency
    c. Salting out
    d. Extrusion

Q.II .Answer any one of the following: **12M**

A. i. Define herb. Write about modified methods of authentication. **6M**
ii. Write a note on herbal cosmetics used in hair care. **6M**

B. i. Write a note on General aspects, Market, growth, scope of Nutraceuticals. **6M**
ii. Write down objective of WHO guide line and explain any two parameters in detail for safety of herbal drugs. **6M**

Q.III Answer any four **48M**

A. i. What will be the significance of organic farming over conventional farming in India . **6M**
ii. Explain the term of biopiracy and bioprospecting and discuss case study of Neem . **6M**

B. i. Write a note on Garlic & Ginger as health food. **6M**
ii. Discuss current & future prospects of herbal drug industry and give the name of herbal industry involve in isolation of phytoconstituents**.** **6M**

C. i. Write about classification mechanism and uses of any one biopesticide. **6M**
ii Write a note on Herbal colorants & sweeteners. **6M**

D. i. Write a note on herb drug interaction of Pepper & Ginseng. **6M**

ii. Give the full form of ASU DTAB and ASU DCC and explain any one in detail. **6M**

E. i. Define phytosome. Write a note on preparation and evaluation of phytosome . **6M**

ii. Outline the componant of shedule T and its objective. **6M**

Subject: Pharmaceutical Quality Assurance (BP 606T)
Year and Sem: T. Y. B. Pharm. (Sem VI)
Duration: 3 Hrs **Total marks: 80**

N.B.: 1. All questions are compulsory
2. Figures to right indicate full marks

Q. I Choose appropriate option for following multiple choice-based questions. 20

1 Bracketing design for stability testing includes _____.
   a. Testing samples of all design factors at all time points
   b. Testing samples of extreme design factors at all time points
   c. Testing samples of all design factors at half time points
   d. Testing samples of extreme design factors at half time points

2 The dispensing of raw materials from Stores must follow the principle of _____.
   a. First Out Then In
   b. Fast Out Fast In
   c. Fast In Fast Out
   d. First In First Out

3 Investigation deviations in the manufacturing process is the responsibility of _____ department.
   a. Stores
   b. Quality Assurance
   c. Production
   d. Quality Control

4 Neutral glass is also called as _____.
   a. Type I glass
   b. Type II glass
   c. Type III glass
   d. NP glass

5 NABL is an autonomous body established under the aegis of _____.
   a. Department of Health & allied sciences
   b. Department of Science & Technology
   c. Department of Food & Drug testing
   d. Department of Pharmaceutical Sciences

6 Approval of release of finished product is the responsibility of ____.
   a. Head of Stores
   b. Head of Quality Control
   c. Head of Quality Assurance
   d. Head of Production

7 As per USFDA GLP guidelines, Subpart F is _____.

a. Facilities
b. Equipment
c. Records and Reports
d. Test and Control Articles

8 Tear strength measures the _____.

a. Energy required to make puncture in the paper
b. Force that a paper withstands before breaking
c. Degree of resistance offered by paper when it is folded
d. Force required to tear an initial cut in the paper

9 Microbial contamination of non-injectable product results in _____.

a. Class I recall
b. Class II recall
c. Class III recall
d. No recall

10 _____ is a subset of Quality Assurance.

a. Quality Control
b. Quality Management System
c. Quality Policy
d. Quality Framework

11 The following is verified during operational qualification of an equipment.

a. Equipment is installed and calibrated
b. Equipment operates consistently within operational limit
c. Equipment shows satisfactory performance over long period.
d. Equipment is installed and connected to utilities

12 Changes in an approved protocol for conduct of nonclinical laboratory study are signed by _____.

a. Sponsor
b. Scientist
c. Quality Assurance Personnel
d. Study Director

13 _____ is the closeness of agreement between a series of measurement obtained from multiple sampling of same homogenous sample.

a. Accuracy
b. Precision
c. LOD
d. Linearity

14 Service bay is maintained at _____.

a. Class 10
b. Class 20
c. Class 50
d. Class 1000

15 Self sealability test is intended for _____.

a. Rubber closures of single dose container
b. Rubber closures of multi dose containers
c. Plastic closures of single dose containers
d. Plastic closures of multidose containers

16 The SOP's are reviewed after _____.

a. One year
b. Two years
c. Three years
d. Five years

17 In the qualification of UV-visible spectrophotometer, photometric accuracy is determined using _____.

a. Potassium dichromate
b. Holmium perchlorate
c. Sodium iodide
d. Potassium chloride

18 The principles of GLP applies to _____.

a. Conduct of clinical studies
b. Conduct of nonclinical studies
c. Conduct of analytical studies
d. Conduct of microbiological studies

19 Airlock doors should be equipped with systems that_____.

a. Prevent simultaneous opening of both the doors
b. Allow simultaneous opening of both the doors
c. Prevent simultaneous opening of doors by unauthorized persons
d. Allow simultaneous opening of both the doors by authorized persons

20 Personal records are records of _____ in an organization.

a. Employer
b. Employees
c. Visitors
d. Auditors

Q. II Answer any one question. (Any 1) **12**

1 a. Enlist the participants of ICH. Write in brief about photostability testing of drug products. **6**

b. Enlist the quality control tests for glass containers. Discuss in brief the hydrolytic resistance test. **6**

2 a. What is Quality management System? Give the role of Quality Control and Quality Assurance departments in a Pharmaceutical Industry **6**

b. Define SOP. Explain the general format of SOP and its implementation. **6**

Q. III Answer any four questions (Any four) **48**

3 a. Define validation. Explain in brief the types of process validation. **6**

b. Explain in brief the objectives and elements of material management. **6**

4 a. Explain the design and construction of building for a pharmaceutical manufacturing unit. **6**

b. Discuss the process of equipment selection and its maintenance. **6**

5 a. Define GLP. Discuss in brief the protocol for conduct of nonclinical study. **6**

b. Discuss the quality control tests for plastic containers. **6**

6 a. What is recall? Explain in detail the process for handling of complaints. **6**

b. State the purpose of distribution records. Write a note on Master Formula Record. **6**

7 a. Discuss the key elements of QbD. What is ISO? Discuss its benefits and the process of ISO registration. **6**

b. What is NABL accreditation and its benefits? State the role of TQM in pharmaceutical industry and discuss its philosophy. **6**

Subject: Medicinal Chemistry III

Year and Sem: Third Year B.Pharm Semester VI

Duration: (3 hours)

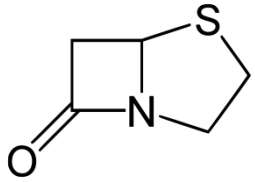
Total Marks: 80

N.B: 1. All questions are Compulsory.

2. Figures to right indicate full marks.

Q I Answer the following Multiple Choice Questions. Select the most appropriate option for each statement. (20 M)

1. Identify the following structure



a) β-lactam
b) Penam
c) Thiazolidine-5-one
d) Thiazepine-5-one

2. To obtain penicillinase resistant penicillins, strategy used is introduction of _____ on acyl amino side chain
a) bulky groups with electron withdrawing substitutents
b) bulky groups with electron donating substitutents
c) hydrophilic group like amino group
d) hydrophobic group like amino group

3. Example of a β-lactamase inhibitor is
a) Cloxacillin
b) Methicillin
c) Dicloxacillin
d) Clavulanic acid

4. In tetracycline, the pka value of conjugated trione system is in the range of
a) 7.2-7.8
b) 9.1-9.7
c) 2.8-3.3
d) 6.4-6.8

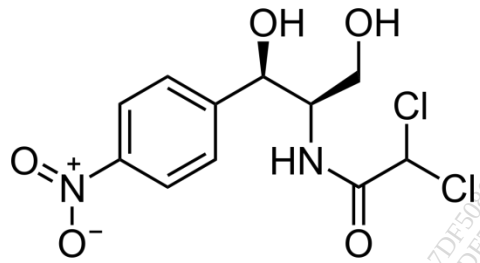
5. Starting materials for synthesis of Pamaquine are
a) 4-methoxy 2-nitrobenzenamine and glycerol
b) 3-chloroaniline and diethyl ethoxymethylenemalonate
c) 2,4-dichloro-5-fluoro-benzoyl chloride and diethyl malonate
d) 2-(4-chlorabenzoyl)-benzoic acid and ethylene diamine

6. Pivampicillin is example of
a) Bipartite prodrug

b) Tripartite prodrug
c) Bioprecursor
d) Mutual prodrug

7. Azithromycin consists of
a) 14 membered macrocyclic lactone ring
b) 14 membered macrocyclic lactam ring
c) 15 membered macrocyclic lactone ring
d) 15 membered macrocyclic lactam ring

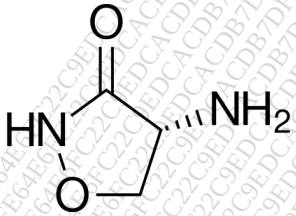
8. Identify the following drug



a) Chloramphenicol
b) Cefotaxime
c) Clindamycin
d) Clarithromycin

9. Ethambutol is marketed for antitubercular activity as
a) S, R (+) enantiomer
b) R, S (+) enantiomer
c) S, S (+) enantiomer
d) R, R (-) enantiomer

10. Identify the following drug



a) cycloserine
b) clindamycin
c) chloramphenicol
d) Capreomycin

11. Gatifloxacin exhibits its antibacterial activity by binding to the
a) DNA polymerase
b) DNA dependent RNA polymerase
c) 50S ribosomal subunit
d) DNA gyrase and Topoisomerase

12. Purine dideoxynucleoside analog of inosine is
a) Zalcitabine

b) Didanosine
c) Lamivudine
d) Idoxuridine

13. Ribavirin consists of following heterocyclic ring
a) 1,2,4-triazole
b) 1,2,3-triazole
c) Tetrazole
d) Imidazole

14. Itraconazole is a
a) 1,2,4-Triazole antifungal agent
b) Imidazole antifungal agent
c) Benzimidazole antifungal agent
d) 1,2,3-Triazole antifungal agent

15. Drug of choice for treatment of river blindness is
a) Ivermectin
b) Praziquantel
c) Eflornithine
d) Diethylcarbamazine

16. Prontosil on metabolic activation leads to formation of
a) Sulfacetamide
b) Sulfanilamide
c) Sulfadiazine
d) Sulfapyridine

17. Starting material and reagent used for the synthesis of Dapsone are
a) 1-chloro-4-nitro benzene and sodium sulfite
b) 2-nitro aniline and sodium sulfite
c) 1-chloro-4-nitro benzene and sodium sulfide
d) 2-nitro aniline and sodium sulfide

18. Electronic parameter used in QSAR is
a) Hammett constant
b) Taft constant
c) Dipole moment
d) Verloop parameter

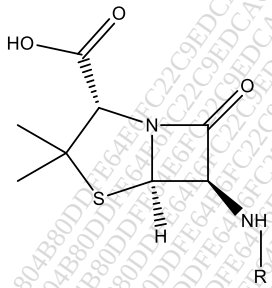
19. Structure Based Drug Design approach used in drug design is
a) 2D-QSAR
b) Molecular Docking
c) Pharmacophore modeling
d) 3D-QSAR

20. Wang resin used in combinatorial chemistry has the following linker
a) p-benzyloxybenzyl chloride

b) p-benzyloxybenzyl alcohol
c) p-benzyloxybenzoic acid
d) p-benzyloxybenzamide

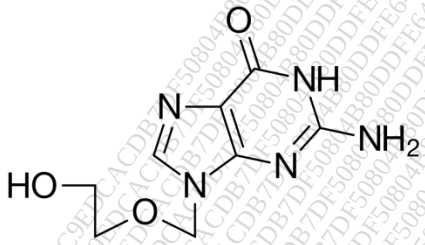
Q.II Attempt any ONE question from following questions. 12M

Q.1. A. Answer the following questions with reference to the structure of the compound given below **(4M)**

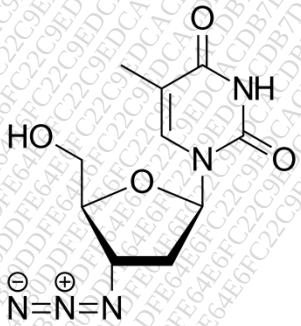


a) Identify the compound when R=H. How can it be synthesized using Penicillin G?
b) How many stereoisomers are possible for the compound?
c) Name the scaffold.
d) Give examples of two broad spectrum antibiotics containing the above scaffold.

B. With respect to the structures below, answer the following questions: **(4M)**



(i)

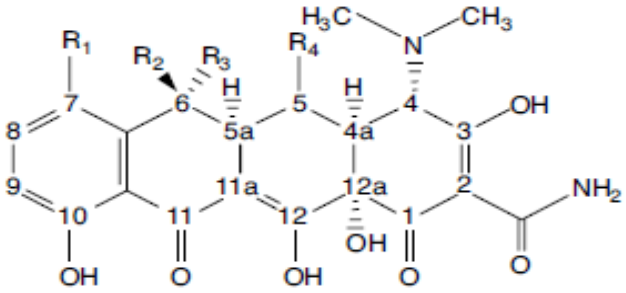


(ii)

a) Identify the drug (i) and its target.
b) Identify the drug (ii) and its target.
c) Name the drug which is hydroxymethyl derivative of structure (i)
d) Explain the metabolic activation of structure (ii).

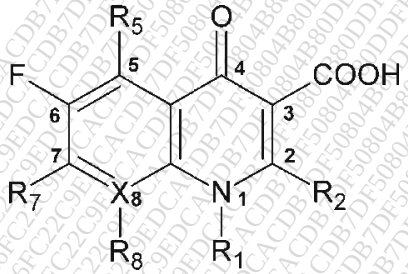
C. Answer the following questions **(4M)**
a) Give the reaction for metabolism of Proguanil? Comment on its activity.
b) Draw the structure of methyl ether of dihydroartemisinin. Comment on its solubility.

Q.2. A. Answer the following questions with reference to the structure given below (4M)



a) Give the generic name and structure of any drug containing above scaffold.
b) Replacement of amide group with nitrile or aldehyde group leads to _____ in activity of resulting compound.
c) Presence of hydroxyl group at position 6 leads to intramolecular nuclear reaction under alkaline condition to give _____ which is active/ inactive.
d) Give the reaction for hydrochloride salt formation of the compound.

B. With reference to the following scaffold, answer the following questions: (4 Marks)



a) Name the above scaffold, identify the target and mention the use.
b) Which is the predominant toxicity observed with presence of fluorine atoms at position 6 and 8? Name the drug.
c) Draw the structure of fluoroquinolone with N-cyclopropyl substitutent.
d) Presence of small alkyl group at position 1 dictates the spectrum of activity. State whether the statement is true or false. Justify.

C. Draw the structure and explain the stereochemistry of cinchona alkaloid useful as antimalarial agent. Explain its Mechanism of action. **(4M)**

Q. III Attempt any FOUR questions from following five questions. 48M

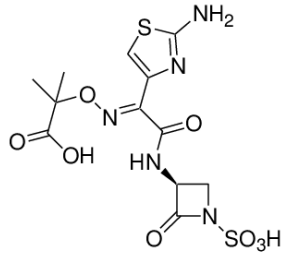
Q.1.A. Match the following: (4M)

Generic Name	Chemical Class	Mechanism of Action
Amphotericin	Allylamine	Lanosterol 14α-demethylase inhibitor
Fluconazole	Polyene antibiotic	Squalene epoxidase inhibitor
Naftifine	Naurally occurring spiro compound	Metabolic spindle poison
Griseofulvin	Azole antifungal	Binds to cell membrane ergosterol

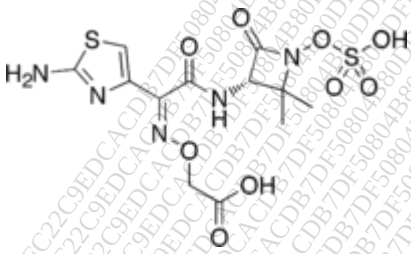
B. Explain briefly the structural features of macrolide antibiotics. What structural

modifications are made in macrolides to increase the acid stability? Give examples. **(4M)**

C. With respect to the following structures answer the following questions. **(4M)**



(i)

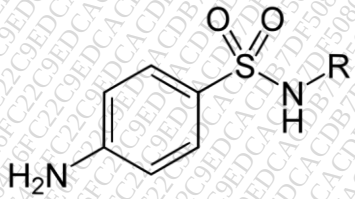


(ii)

a) Identify the chemical class of both the drugs.
b) Identify the generic names of the drugs. (i) and (ii)
c) Draw the structure of salt form of structure **(i)**
d) Comment on the spectrum of activity of the drugs (i) and (ii).

Q.2.A. Give the synthetic scheme for synthesis of Chloroquine. **(4M)**

B. Answer the following questions with reference to the following scaffold. **(4M)**



a) Name the class and use of drugs containing the above scaffold.
b) Comment on the pka and nature of the drugs.
c) Name the target of these drugs.
d) Give the structure of any prodrug belonging to the above class.

C. Justify the following statements. (Any 2) **(4M)**

a) Antitubercular drug, para amino salicylic acid increases the levels of Isoniazid on co-administration.
b) Pyrazinamide is a prodrug.
c) Antitubercular drugs are given in combination.

Q.3. A. Answer the following questions **(4M)**

(a) Explain the metabolism of Albendazole and identify the active metabolite.

(b) Explain the mechanism of action of Praziquantel.

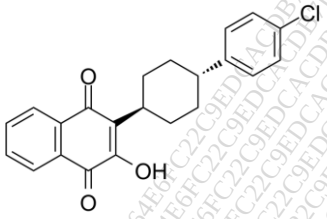
B. Give the synthetic scheme for the synthesis of Ciprofloxacin along with reagents and reaction conditions. **(4M)**

C. Classify prodrugs and explain two applications of prodrugs with suitable examples.

(4M)

Q.4. A. Write a short note on importance of (i) partition coefficient parameter and (ii) electronic parameter in QSAR studies. **(4M)**

B. Identify the following drug, its chemical class and explain the MOA of the drug **(4M)**



C. Explain the structural features of aminoglycosides. **(4M)**

Q.5. A. Write a short note on antiretroviral drug therapy. **(4M)**

B. Write a short note on solid phase synthesis in combinatorial chemistry. **(4M)**

C. With reference to the quinoline derivatives used as antimalarial drugs **(4M)**

a) Draw the structure of the first 8-amino quinoline introduced as antimalarial agent
b) Give example of drug of quinoline methanol class.
c) Mention the chemical class of Quinacrine.
d) For 4-amino quinolines, comment on the nature of substituent at 7^{th} position required for antimalarial activity.

Subject: PHARMACOGNOSY II **Year and Sem: T Y B PHARM SEM VI**

Duration: 3 Hours **Total marks: 80**

N.B. : 1. All questions are compulsory

2. Figures to right indicate full marks

Q. 1 **Choose appropriate option for following multiple choice-based questions. (20 x 1 = 20 Marks)**

1. Unintentional adulteration may be due following reason?

a Confusion in vernacular names between indigenous systems of medicine and local languages.

b Addition of synthetic principles

c Addition of toxic materials.

d Substitution using exhausted drugs.

2. Determination of moisture content by Dean–Stark method comes under which method of evaluation of drugs of natural origin?

a Biological evaluation

b Organoleptic evaluation

c Chemical evaluation

d Microscopic evaluation

3. For Supercritical fluid extraction which is the best suitable solvent?

a Chloroform

b Carbon dioxide

c Nitric oxide

d Alcohol

4. What is Menstruum?

a It is a solute used for extraction

b It is a Solvent Used for extraction

c It is a Solid residue obtained after extraction.

d It is a Solvent with active constituents.

5. Which method is used for extraction of volatile oil from petals of flowers?

a Sponge method

b Enfleurage

c Raspings process

d Mechanical process

6. Which drug contains hydrocarbon containing volatile oil?

a Clove

b Turpentine oil

c Peppermint oil

d Caraway

7. Dill water is prominently used in treatment of…….

a Febrifuge.

b Anthelmintic.

c Flatulence of infants.

d Cardiotonic

8. Which volatile oil is obtained from leaves and tops of Cymbopogon martini Stapf.

a Palmarosa oil

b Patchouli oil

c Primrose oil

d Tea Tree oil

9 The constituents responsible for flavour present in Ajowan is?

a Citral

b Eugenol

c Thymol

d Pulegone

10 Biosynthesis of Citral is carried out by which pathway?

a Acetate mevalonate pathway

b Acetate malonate pathway

c Shikimic acid pathway

d Amino acid pathway

11 Siam benzoin differ from Sumatra benzoin contains sufficient _ _ _ _ _ _ _ to give an odour of benzaldehyde.

a Benzoic acid

b Benzaldehyde

c Cinnamaldehyde

d Cinnamic acid

12. Asafoetida is an example of …….

a Gum resins

b Oleoresin

c Oleogum resin

d Balsams

13. Balsams are resinous substances which contain large proportions of

a Resins and volatile oils

b Gum, resin and volatile oil

c Glycosides and resins

d Benzoic acid, cinnamic acid and their esters

14 A diterpene lactone, andrographolide, is found in _____

a Kalmegh
b Piccrohiza
c Gentian
d Artemisia

15 Which chemical class does 'Vidang' belong to?

a Iridoids
b Benzoquinone
c Hydroquinone
d Pentacyclic triterpenoid

16 Pathological outgrowths found on the young twigs of Quercus Infectoria is…..

a Galls
b Catechu
c Amla
d Harda

17 Goldbeater skin test is used for identification of?

a Black catechu
b Pale catechu
c Green tea
d Pomegranate peel

18 Match stick test is used to distinguish between

a Pale catechu and black catechu
b Gallotannin and Ellagitannin
c Hydrolysable and condensed tannin
d True tannin and pseudotannin

19 Plant tissue culture has potential role in all except _____

a Secondary metabolite production
b Biotransformation
c Genetic mapping
d Micropropagation

20 Annatto is a natural colourant, belonging to which family?

a Marantaceae
b Compositae
c Bixaceae
d Iridaceae

Q. 2 A Answer any one question. (1 x 12= 12 Marks)

a With suitable examples, write an elaborate note on chemical methods of evaluation of crude Drugs

b Give source, chemistry, cultivation and collection of Cardamom. With the help of neat labelled diagrams, give morphological and microscopic differences between fennel and coriander.

Q. 2 B Answer any four questions (4 x 12 = 48 Marks)

a
i. Describe in detail Microwave assisted extraction with applications. (6)
ii. With suitable structures, illustrate Acetate mevalonate pathway . (6)

b
i. Give an account on green tea with reference to its biopotential. (6)
ii. What are edible vaccines? Give advantages of edible vaccines with examples. (6)

c
i. Enlist various solvents used for extraction of secondary metabolites. Explain, procedure and applications of Soxhlet extraction method (6)
ii. Give source, chemical constituents, chemical tests and uses for any one drug containing condensed tannins. (6)

d
i. Give an account on two Aldehyde containing volatile oil drugs. (6)
ii. Give a detailed account of Curcumin and Ginger (6)

e
i. Give the source, chemical constituents and uses of two drugs containing iridoids. (6)
ii. Write a note on natural Sweetener and Binders. (6)

Subject: Pharmaceutical Management **Year and Sem: T.Y. B. Pharm (Sem VI)**

Duration: 3 Hrs **Total marks: 80**

N.B. : 1. All questions are compulsory

2. Figures to right indicate full marks

Q. 1	**Choose appropriate option for following multiple choice based questions.**	**20/10**
1.	Which among following is highest level in Maslow's Need Theory-	
a	Physiological need	
b	Esteem need	
C	Safety need	
d	Self-actualization need	
2.	Mangoes grown in Kokan and supplied to different states of India, it is practicing _____ segmentation.	
a	Demographic	
b	Geographic	
C	Psychological	
d	Behavioural	
3.	ABC analysis is a technique of material control according to _____.	
a	Number	
b	Value	
C	Quality	
d	Time	
4.	Which of the following is a direct expense?	
a	Rent	
b	Advertisements	
C	Interest	
d	Raw material cost	
5.	Which of the following best describes a fixed cost? A cost which:	
a	Remains at the same level up to a particular level of output	
b	Remains at the same level when output increases	
C	Has a direct relationship with output	
d	Represents a fixed proportion of total costs	
6.	The second phase of the product life cycle includes	
a	Decline	
b	Introduction	
C	Maturity	
d	Growth	
7.	CRAMS stands for	
a	contract research manufacturing sell	
b	controlled research manufacturing services	
C	contract research manufacturing services	
d	contract recomendation manufacturing services	
8.	GDP is called as	
a	Gross domestic proposition	
b	Grant domestic promotion	
C	Gross domestic product	
d	Geographic and demographic promotion	
9.	Issue of shares falls under which type of source of?	

a	short term	
b	medium term	
C	long term	
d	Capital	
10.	_____is process of reviewing market segment and deciding which one to perceive.	
a	Targeting	
b	Positioning	
C	Financing	
d	Segmentation	
11.	…….. which one is intended to identify the goods or services from those of competitors	
a	brand plan	
b	Brand	
C	Copyright	
d	product design	
12.	Regulatory basis of process validation is available in:	
a	FDP	
b	IP	
C	BP	
d	USP	
13.	_____measures the extent to which these values are scattered around the centre mean.	
a	the range	
b	standard deviation	
C	Mean	
d	Average	
14.	When one company purchases most or all of another companys share to gain control of that company is calles as …….	
a	joint ventures	
b	Acquisition	
C	Merger	
d	Collaborations	
15.	NPPA comes under which ministry	
a	Ministry of commerce and industries	
b	Ministry of Science and technology	
C	Ministry of health and family welfare	
d	Ministry of chemicals and fertilisers	
16.	Which of the following can be a growth inhibitor in pharmaceutical industry?	
a	Less supply chain infrastructure	
b	API Import cost	
C	Less industry friendly labour law	
d	DPCO	
17.	What are well recognized elements of financial management except?	
a	Planning	
b	Organizing and directing	
C	Decision making	
d	Costing	
18.	Organization level of conflict means	
a	Within & between individual	

b	Within & between group		
C	Within & between organization		
d	Within organisation and group		
19.	According to Porter's Five Forces Chart which is excluded in consideration as threat to product		
a	Threat of new entrant		
b	Bargening power of customers		
C	Over uniqueness of product		
d	Threat of substitutes		
20.	Which is the best phase of business or product to invest		
a	Question Marks		
b	Stars		
C	Cash cows		
d	Dogs		
Q. 2 A	**Answer any one question.**		**12**
a	**i.**	"Do you think the government initiatives like Make in India, Aatmanirbhar Bharat has enhanced global image of Indian Pharmaceutical industry?" Elaborate.	**6**
	ii.	"Generic drugs will have vital contribution in survival of mankind" Justify.	**6**
b	i.	"Six sigma is a technique and tool for process improvement." Elaborate. Explain methodologies used in Six sigma.	**6**
	ii.	Differentiate between quality assurance and quality control. Explain QC standards for raw material.	**6**
Q. 2 B	**Answer any four questions**		**48**
a	i.	Explain Porters 5 Force model.	**6**
	ii.	Explain in detail different stages of product life cycle.	**6**
b	i.	Explain different types of leadership with suitable examples.	**6**
	ii.	How motivation plays an important role in achieving organizational goals, discuss.	**6**
c	i.	Discuss in brief about market segmentation.	**6**
	ii.	Explain Pharmaceutical packaging. Discuss how packaging can be a useful tool in marketing of the product.	**6**
d	i.	Explain the following terms- A. Production cost B. Selling cost C. Overhead cost.	**6**
	ii.	What is DPCO? Write a note on need of DPCO.	**6**
e	i.	Write a note on Human relation movement in industrial psychology.	**6**
	ii.	Considering work from home situation, how will you maintain work - life balance by applying principles of industrial psychology?	**6**

Subject: Biopharmaceutics and Pharmacokinetics **Duration: 3 hours**
Year and Sem: TY B Pharmacy (Sem-VI) (Choice based) **Total marks:80**

N.B. : 1. All questions are compulsory
2. Figures to right indicate full marks

Q. 1 **Choose appropriate option for following multiple choice based questions.** **20**

1. Class I features
   a) Low permeability High solubility
   b) High permeability High solubility
   c) Low permeability Low solubility
   d) High permeability low solubility

2. High circulating levels of active drug are seen for those drugs which have low rate is
   a) Drug absorption
   b) Clearance
   c) Extensive binding to plasma protein
   d) Distribution into total body water

3. _____is also called as convective transport, bulk flow or filtration
   a) Pore transport
   b) Binding of the drugs
   c) enzyme induction
   d) enzyme inhibition

4. The characteristics of continuous release systems
   a) Release the drug along the entire length of GIT
   b) Prolonged their residence in the GIT and release
   c) Release only at a specific drug
   d) Release as soon as comes in contact to the saliva

5. Enzymes in Microsomal drug metabolism are typically associated with
   a) smooth endoplasmic reticulum
   b) Rough endoplasmic reticulum
   c) endoplasmic reticulum
   d) Nucleus

6. renal clearance ratio is
   a) Renal clearance of creatinine / renal clearance of the drug
   b) 1/renal clearance of the drug
   c) Renal clearance of drug/ renal clearance of creatinine
   d) 1/renal clearance of creatinine

7. Noyes and Whitney described
   a) The quantitative analysis of the amount of drug dissolved from solid particles as a function off of time
   b) The qualitative analysis of the amount of drug dissolved from solid particles as a function of time
   c) The renal clearance of liquid dosage forms
   d) The hrepaticclerance of the amount of drug absorbed from solid particles as a function of time

8. organs associated with central compartment in a two-compartment model
   a) Muscles
   b) Skin

c) Adipose
d) Liver

9. Bioavailability fraction equation will be
a) 1/2 Bioavaliable dose
b) 1/Administered dose
c) Bioavailable dose/ Administered dose
d) Administered dose/ Bioavailable dose

10. To increase the time of gastric emptying
a) By drinking a lot of water
b) By taking a drug in empty stomach
c) By taking the drug after food
d) Cannot increase the time of gastric emptying at all

11. Once the drug diffuse through capillary to extracellular fluid
a) Its further entry in to cells of most tissue is more .
b) Its further entry in to cells of most tissue is limited.
c) Its further entry in to cells of most tissue is less.
d) Further distribution will not possible

12.Membrane is used in haemodialysis
a) Artificial Semipermeable membrane
b) Permeable membrane
c) Natural semipermeable membrane of the peritoneal cavity
d) Artificial permeable membrane

13. Phase II consists of
a) Drug bound by van der waals forces
b) Hydrogen bonding of polar groups molecules to render them water-soluble and allow renal or biliary excretion
c) covalent bonding of polar groups to nonpolar molecules to render them water-soluble and allow renal or biliary excretion
d) bonding of polar groups molecules

14. According to the USP, the axis of the stirring element should not deviate more than
a. 0.1 cm
b. 0.2 cm
c. 0.3 cm
d. 0.5 cm

15. In pharmacokinetics, the term rate refers to a change in which of the following measurements over time.
a) drug dose
b) drug elimination
c) concentration of drug in plasma
d) drug absorption

16.A prodrug is a chemical derivative of a main drug, use to enhance
a) Bioavailability of drug to convert to active form
b) Dissolution time enhanced
c) Change in Drug distribution
d) Body converts active to inactive form of drug

17.Factors that cause variability in plasma drug concentrations after the same drug dose is given to different patients include variations in the
a) drug absorption
b) drug distribution

c) pharmacokinetics
d) pharmacodynamics

18. By-product of phase I metabolism
a) Derivative, is pharmacologically inactive but more chemically reactive than the parent drug
b) Derivative, is pharmacologically active but more chemically Inactive than the parent drug
c) Too polar or hydrophilic for sufficient absorption
d) facilitated by active transport systems

19. The rate which drug reaches the systemic circulation is determined by the slowest of the various steps
a) Dissolution time enhanced
b) Gastric emptying
c) Disintegration lowers
d) Rate limiting step

20. Cs is approximated by the
a) The solubility of the drug substance
b) The disintegration of the drug substance
c) solubility at pH 6.5
d) Enhanced the rate of excretion

Q. 2 A **Answer any one question.** **12**

a **i.** Explain one compartment open model and its assumptions

ii. What is optimal dosage regimen? For one compartment model state the mathematical expressions for maximum,minimum and steady state concentration of drugin the plasma

b **i.** Explain and derive equation to estimate elimination rate constant, elimination half-life and clearance following an IV Bolus administration

ii. Explain Linear and non-linear kinetics and describe the factors resulting in non- linear kinetics.

Q. 2 B **Answer any four questions.** **48**

a **i.** Explain Factors affecting drug absorption-Physicochemical properties
ii. Enlist Physiological Barriers in Drug distribution and explain any two in detail

b **i.** Define excretion and elaborate on causes of non-linearity in excretion
ii. Enlist the criteria necessary for BCS biowaiver for in vivo bioavailability and bioequivalence studies

c **i.** How does the solubility and dissolution rate of a drug affect its metabolism
ii. Define volume of distribution and clearance, explain trapezoidal rule for estimation of AUC

d **i.** What are effects of enzyme induction on drug metabolism. Discuss in detail
ii. What is Total renal clearance explain deceased renal function effect drug excretion

e **i.** Explain Film theory for drug dissolution, elaborate on type 2 dissolution apparatus
ii. Enlist and explain the elements of Bioequivalence study protocol

Subject: Pharmaceutical Biotechnology
Class: Third Year B.Pharm. (Sem-VI) R-2019

Maximum Marks: 80 **Duration: 3 Hrs**

N.B.: 1. All questions are compulsory
2. Figures to right indicate full marks

Q. I Choose the appropriate option for following multiple choice based questions. 20M

1. Which method is the easiest method of enzyme immobilization

a) Adsorption

b) Covalent bonding

c) Microencapsulation

d) Entrapment

2. Which is the correct flow chart of a biosensor

a) Bioreceptor-Biosample-Transducer-Display

b) Biosample-Bioreceptor-Transducer-Display

c) Transducer-Biosample-Bioreceptor-Display

d) Display-Biosample-Bioreceptor-Transducer

3. Which of the following is not obtained using Biotechnology

a) Insulin

b) Interferon

c) Golden rice

d) Diclofenac

4. Enzyme immobilization is done because

a) It protects the enzyme

b) It changes the action of the enzyme

c) It reduces the rate of the reaction

d) It helps the enzyme to mutate

5. Biosensors are developed for

a) Detection of an analyte

b) Increase the quantity of an analyte

c) Increase the rate of an enzymatic reaction

d) Mutating a gene

6. Restriction enzymes are called as

a) Molecular glue

b) Molecular scissors

c) Molecular degraders

d) Molecular blockers

7. Cloning Vectors are used in r DNA experiments to

a) Know the sequence of amino acids

b) Carry the gene into the host

c) Mutate the gene at a specific location

d) To know the sequence of the target gene

8. Plasmid vectors are obtained from

a) Plants

b) animals

c) bacteria

d) Algae

9. Restriction endonuclease enzyme

a) can recognize specific base sequence in a DNA

b) can join two genes

c) can join two RNA sequences

d) Can join two peptides

10. _____ works as an antigen detector in cell mediated immunity.

a) Phagocytes

b) B-Cells

c) Receptors

d) MHC molecules

11. Sera are_____ types of Immunity

a) Naturally acquired active

b) Naturally acquired passive

c) Artificially acquired active

d) Artificially stimulated passive

12. Which Antibody is present in high concentration in serum

a) IgG

b) IgA

c) IgM

d) IgD

13. _____ is the Antigen binding site of Antibody.

a) N terminus

b) C terminus

c) Disulphide bonds

d) H terminus

14. _____ is not an example of an anticoagulant used in blood collection.

a) Heparin

b) Citrates

c) Tartrate

d) Disodium EDTA

15. In the beads on a string model, the bead is made up of _____

a) 6 histone proteins

b) 8 histone proteins

c) 6 histone proteins and DNA

d) 8 histone proteins and DNA

16. When viral genome integrates into the bacterial genome it is known as _____

a) temperate phage

b) prophage

c) bacteriophage

d) episome

17. The _____ biotechnology involves the use of microbial biotransformation for generating products of interest.

a) White

b) Green

c) Blue

d) Purple

18. Aeration in fermenter is achieved by

a) Agitator

b) Impeller

c) Sparger

d) Baffles

19. Microorganism used for the production of Vitamin B12 by fermentation method is

a) Penicillium chrysogenum

b) Aspergillus niger

c) Pseudomonas denitrificans

d) Saccharomyces cerevisiae

20. Microorganism used for the production of Citric acid by fermentation method is

a) Penicillium chrysogenum

b) Aspergillus niger

c) Pseudomonas denitrificans

d) Saccharomyces cerevisiae

Q. II A) Answer any one question. 12M

a) Explain any two methods of enzyme immobilization with diagrams (06)

b) Describe in detail the parts of a biosensor (06)

OR

a) Write about restriction enzymes in detail (06)

b) Enlist any three cloning vectors and explain plasmid cloning vector in detail (06)

Q. II B) Answer any four questions. 48M

1. a) Draw and explain the diagram of MHC molecules and comment on its function. (06)

b) Define Hypersensitivity reaction, enlist the types and explain any one in detail (06)

2. a) Explain the principle of ELISA in detail and enlist its applications (06)

b) Define Mutation and write a short note on Induced mutation. (06)

3. a) Describe gene therapy in detail and explain its applications (06)

b) Write about DNA fingerprinting in detail (06)

4. a) Explain the methods of Fermentation and Comment on the Aeration process in Fermenter. (06)

b) What do you mean by Plasma Substitutes? Enlist their properties. (06)

5. a) Define Sera. Explain the process of production of Diphtheria antitoxin in detail. (06)

b) Elaborate Hybridoma technology and enlist the applications of Monoclonal antibodies. (06)