

Duration: 3 hours

Total marks: 75

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 Identification of drugs based on part of plant is
 - a Taxonomical Classification
 - b Morphological classification
 - c Chemical classification
 - d Serotaxonomical classification

- 2 The content of hydroxy methyl furfural is used to detect the adulteration in a
 - a Honey
 - b Gelatin
 - c Acacia
 - d Wool fat

- 3 Inorganic content of the drug
 - a Ash value
 - b Moisture content
 - c Water soluble extractive
 - d Alcohol soluble extractive

- 4 Vein islet number is
 - a Total number of vein islets beneath each epidermal cell
 - b Total number of vein islets s beneath mesophyll
 - c Total number of vein islets in 1mm² of epidermal cells.
 - d Average number of vein islets beneath four continuous epidermal cells

- 5 Which of the following technique is capable of inducing genetic manipulation resulting in production of pest resistant species
 - a Biological control
 - b Agricultural control
 - c Mechanical control
 - d Chemical control

- 6 Which of the following of Plant growth inhibitor
 - a Cytokinins
 - b Abscisic acid
 - c Auxins
 - d Gibberellins

- 7 Tapping is the method of collection of -----
 - a Gums
 - b Flowers
 - c Fruits
 - d Volatile oil

- 8 Following are the methods of Ex-situ conservation except
 - a Raising nurseries
 - b Seed banks
 - c Seedling
 - d National parks

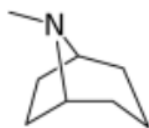
- 9 Which of the following is Adenine derivatives
- a Cytokinins
 - b Abscisic acid
 - c Auxins
 - d Gibberellins

- 10 Following are the micronutrient; except
- a Boron
 - b Iron
 - c Copper
 - d Magnesium

- 11 _____ is a type of culture in which single cell or small aggregates of cell multiply while suspended in agitated liquid medium.
- a Callus culture
 - b Suspension culture
 - c Protoplast culture
 - d Pollen culture

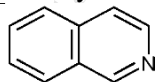
- 12 The alcohol solubility of castor oil is due to the _____ constituent. a
- a Ricinoleic acid
 - b Myricyl palmitate
 - c Stearic acid
 - d Linoleic acid

- 13 Identify the class of compound from the given basic nucleus



- a Tropane Alkaloids
- b Anthraquinone Glycosides
- c Quinoline Alkaloids
- d Cardiac Glycosides

- 14 Identify the class of compound from the given basic nucleus



- a Quinoline
- b Isoquinoline
- c Indole
- d Tropane

- 15 O-Antraquinone glycosides are confirmed by which of the following tests
- a Borntrager's test
 - b Modified Borntrager's test
 - c Keller Killiani test
 - d Shinoda test

- 16 Jute is an example of fibre belonging to the class
a Regenerated fibre
b Mineral fibre
c Carbohydrate fibre
d Protein fibre
- 17 ----- are a diverse group of drugs that alter perception, thoughts, and feelings
a Teratogens
b Allergens
c Hallucinogens
d Enzymes
- 18 ----- is an enzyme secreted in stomach it digests proteins found in ingested food.
a Urokinase
b Streptokinase
c Serratiopeptidase
d Pepsin
- 19 ----- is an example of mucilage from marine sources
a Agar
b Acacia
c Tragacanth
d Honey
- 20 Which the following is obtained from the aqueous extract of the bones of domestic animals
a Papain
b Gelatin
c Acacia
d Tragacanth

- Q. IIA Answer the following. (Any two out of three) 20**
- 1) a) Explain the significance of Ash value and extractive value in the identification of DONO. 10
b) Write the source, preparation, constituents, chemical tests and uses of 'Tragacanth'.
- 2) a. Give salient features and applications of edible vaccine. 10
b. Draw the heterocyclic nucleus/ general structure and write one example with its use and chemical test for the following phytoconstituents
i. Tropane alkaloid
ii. Cardiac glycosides
- 3) a) Classify fibres based on the biological source. Write a note on any one vegetable fibre. 10
b) Write a note on various methods of propagation with suitable example.

Q. IIB Answer the following. (Any seven out of Nine)

- 1) Give biological source, chemical constituent and identification tests for bees wax **5**
- 2) Draw the heterocyclic nucleus/ general structure and write one example with its use and chemical test for the following phytoconstituents **5**
 - i. Anthraquinone glycoside
 - ii. Indole alkaloid
- 3) Define plant tissue culture and its advantages. Explain briefly callus culture and protoplast culture. **5**
- 4) Explain the importance of storage of crude drugs with suitable examples. **5**
- 5)
 - a) Write a note on dried juices and Latex. **5**
 - b) Write a note on conservation of medicinal plants. **5**
- 6) Give advantages & disadvantages of morphological and pharmacological classification of drugs of natural origin. **5**
- 7) Explain any two proteolytic enzymes obtained from plant source. **5**
- 8) Write a note on leaf constants for quantitative microscopy. **5**
- 9) Classify Flavanoids with suitable examples, Give its chemical test. **5**

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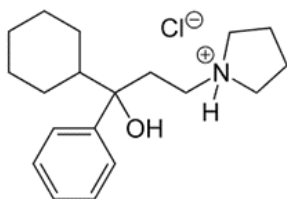
Q. 1 Choose the appropriate option for following multiple choice-based questions. (20)

Each question carries one mark.

- 1 Which of the following statement is incorrect with respect to ionisation of drug
 - [a] The ionization of the drug depends on its pKa & the surrounding pH
 - [b] Ionized form is the preferred form of the drug to cross cell membranes.
 - [c] Most of the drugs are either weak acids or base and can exist in either ionised or unionised state.
 - [d] Ionization imparts good water solubility to drug
- 2 Oxazepam is the active metabolite of which of the following pairs of drugs
 - [a] Chlordiazepoxide and Chlorazepate
 - [b] Chlordiazepoxide and Diazepam
 - [c] Chlordiazepoxide and Alprazolam
 - [d] Chlordiazepoxide and Lorazepam
- 3 When the acetyl group in Acetylcholine is replaced by higher homologs _____.
 - [a] Potency decreases
 - [b] Activity retains
 - [c] No effect on the activity
 - [d] Potency increases
- 4 Which of the following is an example of dissociative anaesthetics
 - [a] Sevoflurane
 - [b] Ketamine HCl
 - [c] Isoflurane
 - [d] Desflurane
- 5 Which of the following is not an examples of 2-arylimidazoline class?
 - [a] Phenylephrine
 - [b] Naphazoline
 - [c] Oxymetazoline
 - [d] Xylometazoline
- 6 Droperidol is a member of ---- class of antipsychotic agents.
 - [a] Phenothiazine
 - [b] Butyrophenone
 - [c] Benzazepine
 - [d] Benzoisoxazole
- 7 Primary site for Drug Metabolism is
 - [a] Intestine
 - [b] Lung
 - [c] Liver
 - [d] Both a and b

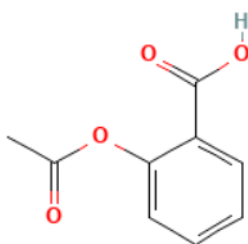
- 8 Mephenytoin acts as an anticonvulsant by
 [a] inhibiting calcium channels
 [b] inhibiting sodium channels
 [c] inhibiting GABA metabolism
 [d] increasing GABA reuptake
- 9 Identify the opioid agonist containing 4-methylpiperidine pharmacophore
 [a] Meperidine
 [b] pentazocine
 [c] Levorphanol
 [d] Codeine
- 10 Ibuprofen is marketed as a racemic mixture, although biologic activity resides almost exclusively in the _____ isomer
 [a] S-(+)
 [b] R-(+)
 [c] S-(-)
 [d] Both R & S

- 11 What is the category of the following drug?



- [a] Parasympathomimetic
 [b] Anticholinergic
 [c] Adrenergic agonist
 [d] Adrenergic blocker

- 12 Identify the drug



- [a] Aspirin
 [b] Diclofenac
 [c] Ibuprofen
 [d] Sulindac

- 13 Which of the following is pure antagonist at all opioid receptor subtype
 [a] Morphine
 [b] Pentazocine
 [c] Naloxone
 [d] Nalorphine

- 14 Identify the drug used to reverse opioids overdose
 [a] Fentanyl
 [b] Loperamide
 [c] Nalorphine
 [d] Morphine
- 15 The longest duration of action of the following benzodiazepines
 [a] Chlordiazepoxide
 [b] Diazepam
 [c] Oxazepam
 [d] Lorazepam
- 16 Uncharged form of which drug exists as a pair of tautomers?
 [a] Methyldopa
 [b] Terbutaline
 [c] Isoproterenol
 [d] Clonidine
- 17 Which of the following is incorrect pair of NSAIDs
 [a] Indole acetic acid: Diclofenac
 [b] Pyrazoles and Pyrazolidinediones: Phenylbutazone
 [c] p-aminophenols: Acetaminophen
 [d] Salicylates: Aspirin
- 18 Select the benzisoxazole and piperidine containing drug from the following.
 [a] Risperidone
 [b] Loxapine
 [c] Clozapine
 [d] Sulpiride
- 19 Which of the following is incorrect statement about Codeine
 [a] Codeine is not a prodrug
 [b] Codeine is the 3-methoxy analogue of Morphine
 [c] Codeine is converted to morphine by the action of CYP enzymes.
 [d] Use of Codeine longer than 6 months is associated with an increased risk of severe cardiovascular events.
- 20 Which of the following anti-inflammatory agents is a prodrug
 [a] Morphine
 [b] Sulindac
 [c] Ibuprofen
 [d] Naproxen

Q.2 Answer **any two** of the following three questions.

(20)

A (i) Discuss importance of ionization and solubility with respect to biological action of drug with example

(4)

(ii) Predict any two Phase-I metabolites and Phase 2 metabolites for each of the following (Draw structures): Propranolol and Chlorpromazine.

(6)

B (i) Discuss the SAR of anticholinergic agents with suitable examples. (5)

(ii) Give structure, mechanism of action and uses of Dicyclomine. Outline its synthesis along with reaction conditions and necessary reagents. (5)

C (i) Discuss SAR of morphine analogues with suitable example (structures necessary) (6)

(ii) Give structure and metabolism of Halothane and Ketamine hydrochloride (4)

Q.3 Answer **any seven** of the following nine questions. (35)

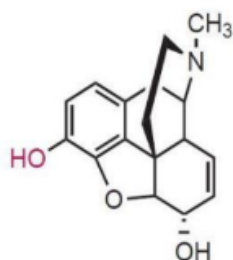
A Classify β -adrenergic agonist based on selectivity with suitable examples (including structures). Explain why Salbutamol is orally active. (5)

B Match the anticonvulsant drugs with their mechanisms of action. (5)

	Drug		Anticonvulsant mechanism
1.	Phenytoin	a.	GABA receptor agonist
2.	Clonazepam	b.	increases GABA biosynthesis
3.	Trimethadone	c.	Na channel inhibitor
4.	Felbamate	d.	T-type Calcium channel inhibitor
5.	Gabapentin	e.	NMDA receptor antagonist

C The list of antimuscarinic agents is given below. Draw their structures and write the chemical class they belong to. Cyclopentolate, Tropicamide, Bzotropine, Biperiden hydrochloride and Dicyclomine. (5)

D Answer the following with respect to the structure given below: (5)



i. Identify the structure

ii. Predict any one Phase I and Phase II metabolite of the structure.

iii. Give name and structure of 3 methoxy analogue of given structure

iv. Indicate the types of substitution at 17th position that give rise to pure opioid antagonists

- E Explain MAO pathway and COMT pathway in metabolism of Norepinephrine and Epinephrine. (5)
- F Give chemical classification of NSAIDs. (5)
- G Depict the synthesis of Chlorpromazine indicating the reagents and reaction conditions used. Give an example of a thioxanthene bioisostere of Chlorpromazine. (5)
- H Enlist Phase I metabolic reactions and discuss in detail oxidation reactions with suitable examples (5)
- I Name the antidote used for organophosphate poisoning. Draw its structure and discuss the mechanism of action. (5)

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1. Multiple Choice Questions (select single best answer)

(20x1= 20)

1. Tachyphylaxis is defined as _____
 - a. Requirement of higher dose of drug to produce a given response.
 - b. The development of tolerance to pharmacologically related drugs.
 - c. Inert substance which is given in the garb of a medicine.
 - d. The rapid development of tolerance when doses of the drug repeated in quick succession result in marked reduction of response

2. Acetylation is an example of _____
 - a. Nonsynthetic reaction
 - b. Synthetic reaction
 - c. Phase I reaction
 - d. Functionalization reaction

3. Which of the following effect can be seen in equilibrium type competitive antagonism in a drug-response curve?
 - a. Non-parallel left shift
 - b. Non-parallel right shift
 - c. Parallel right shift
 - d. Parallel left shift

4. Receptor agonists possess _____
 - a. Affinity but no intrinsic activity
 - b. Intrinsic activity but no affinity
 - c. Affinity and intrinsic activity with a + sign
 - d. Affinity and intrinsic activity with a – sign

5. Mephenesin is a _____
 - a. Nondepolarizing blocker
 - b. Centrally acting muscle relaxants
 - c. Depolarizing Blocker
 - d. Peripherally acting muscle relaxants

6. Which of the following statement is true for Atropine?
 - a. Produces mydriasis
 - b. Precipitates asthmatic attack
 - c. Markedly increases sweat, salivary, tracheobronchial and lacrimal secretion
 - d. Causes tachycardia

7. On-off syndrome is associated with _____
 - a. Carbidopa
 - b. Seligeline
 - c. Entacapone
 - d. Levodopa

8. Which of the following is a dissociative type of anesthetic agent?
- Nitrous oxide
 - Ketamine
 - Halothane
 - Ether
9. The repetitive consumption of drug to avoid withdrawal symptoms by a subject is termed as _____
- Drug addiction
 - Drug tolerance
 - Drug dependence
 - Drug abuse
10. Selegiline is a _____ drug used in Parkinsonism treatment.
- MAO B inhibitor
 - MAO A inhibitor
 - COMT inhibitor
 - Dopa decarboxylase inhibitor
11. The process of transport across the cell in particulate form by formation of vesicles is _____
- Active transport
 - Pinocytosis
 - Facilitated diffusion
 - Passive transport
12. Which of the following receptor type has 7 helical membrane spanning amino acid segments with 3 extracellular and 3 intracellular loops?
- Metabotropic Receptor
 - Iontropic Receptor
 - Nuclear Receptor
 - Tyrosine protein kinase receptor
13. An example of Injectable and Surface anaesthetic is _____
- Benoxinate
 - Benzocaine
 - Procaine
 - Lidocaine
14. The balanced anesthesia means _____
- Administration of preanesthetic medications to relieve pain, relax muscles and ease the patient
 - Administration of specific one medication to relieve pain, relax muscles and ease the patient
 - Administration of two or more medication to relieve pain, relax muscles and ease the patient
 - Administration of postanesthetic medications to relieve pain, relax muscles and ease the patient

15. The atypical antipsychotic drug that leads to agranulocytosis _____
- Haloperidol
 - Clozapine
 - Flouxetine
 - Chlorpromazine
16. Wine reaction is the major side effect exerted by _____
- Disulfiram
 - TCA
 - Levodopa
 - MAO inhibitors
17. Which of the following statement is NOT correct with respect to plasma protein binding?
- Generally expressed plasma concentrations of the drug refer to bound as well as free drug
 - High degree of protein binding generally makes the drug long acting
 - Highly plasma protein-bound drugs are largely restricted to the intracellular compartment
 - The bound fraction is not available for action
18. How many people will be checked under phase IV surveillance?
- 20-50 people
 - 20-300 people
 - 20-300 people
 - The whole market will be under surveillance
19. Organophosphates act by _____
- Blockage of cholinergic receptors
 - Activation of beta receptors
 - Inhibition of cholinesterase
 - Blockage of alpha receptors
20. The drawback of nitrous oxide as an anesthetic agent is _____
- Incompatibility with other anesthetic agents
 - It has hangover effect
 - It is highly explosive
 - It may lead to diffusion hypoxia

II. Long Answers (Answer 2 out of 3)

(2x10= 20)

- Define the receptor. Discuss the theories of drug-receptor interactions. Write a note on the nuclear receptor.
- What are sympatholytics? Classify them and give the pharmacology of Propranolol.
- Classify antiepileptics based on mechanism of action. Discuss in detail hydantoin derivatives as antiepileptics

III. Short Answers (Answer 7 out of 9)

(7x5= 35)

- A. Give the advantages and disadvantages of oral route.
- B. Define Adverse drug reactions. Mention the scope and objectives of pharmacovigilance.
- C. Enlist various factors modifying drug action and discuss any two in detail.
- D. Write a note on pressor agents.
- E. Explain the mechanism of action of local anesthetics. Enlist various techniques of anesthesia.
- F. Write a note on pharmacological actions of morphine
- G. Differentiate between benzodiazepines and barbiturates
- H. Add a note on hallucinogens.
- I. Discuss in detail use of anticholinesterases in treatment of Alzheimer's disease

Time: 3 Hours

Marks: 75

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

- 1 Coulter counter is used to determine
 - a Number of particles
 - b Particle volume
 - c Particle interaction
 - d Viscosity

- 2 Andreason Pipette is widely used method to determine particle size distribution by
 - a Sedimentation method
 - b Microscopy method
 - c Seiving menthod
 - d Conductivity method

- 3 If the angle of repose is > 45 degrees, then flow will be
 - a Poor
 - b Excellent
 - c Passable
 - d Fair

- 4 Which of the following is the half life of Second order reaction
 - a $t_{1/2} = 0.693/k$
 - b $t_{1/2} = 1/ak$
 - c $t_{1/2} = A_0/2k$
 - d $t_{1/2} = A_0/2k$

- 5 Climate zone IV is
 - a Hot/dry climate
 - b Hot/humid climate
 - c Subtropical and Mediterranean climate
 - d Moderate climate

- 6 The effect of temperature on rate of reaction is explained by
 - a Nernst equation
 - b Arrhenius equation
 - c Noyes whitney equation
 - d Fick's law

- 7 _____ is the reaction of compounds and molecular oxygen
 - a Auto-Oxidation
 - b Hydrolysis
 - c Photolysis
 - d Thermolysis

- 8 Which of following is an example of shear thinning system:
- a Tragacath in water
 - b 10% sugar in water
 - c Alcohol in water
 - d Benzene in water
- 9 As the temperature of liquid increases, what is the change in viscosity?
- a Decreases
 - b Decreases with pressure
 - c Doesnot effect
 - d Increases
- 10 Kinematic viscosity is the:
- a ratio of viscosity of dispersion to that of its liquid continuous medium
 - b ratio of specific viscosity to concentration
 - c absolute viscosity divided by density of liquid at specified temperature
 - d ratio of viscosity of continuous medium to that of its dispersion
- 11 A deformation that does not completely recover after the release of stress is known as
- a plastic deformation
 - b elastic deformation
 - c pseudoelastic deformation
 - d this phenonon is non existent
- 12 Heckel relationship deals with
- a. Force Density Relationship
 - b. Temperature Density relationship
 - c. Force Dissolution relationship
 - d. Temperature - surface tension relationship
- 13 The phenomenon of suspended solids growing in size during storage is known as ____
- a Sedimentation
 - b Agglomeration
 - c Flocculation
 - d Crystal growth
- 14 Andraesen apparatus is widely used to determine particle size distribution by
- a Microscopy method
 - b Sedimentation method
 - c Sieving method
 - d Conductivity method
- 15 Which is of the following is a correct sentence about emulsions
- a All emulsions are heterogeneous systems
 - b All emulsions are homogeneous systems
 - c Some emulsions are heterogeneous systems
 - d Some emulsions are homogeneous systems

- 16 Emulsions can be stabilized by
- a electrostatic repulsion between the droplets
 - b electrostatic attraction between the droplets
 - c aggregation of droplets
 - d precipitation of droplets
- 17 Which of the following is a correct sentence
- a Creaming is an irreversible process
 - b Creaming is a reversible process
 - c Breaking is a reversible process
 - d The cream floccules cannot be easily redispersed.
- 18 Which of the following statement is correct
- a Lyophobic systems show most intense Tyndall effect
 - b Lyophilic systems show most intense Tyndall effect
 - c Lyophobic systems do not show Tyndall effect
 - d Lyophobic systems show little Tyndall effect
- 19 During the Brownian motion
- a the velocity of the particles increases with the decrease in particle size
 - b the velocity of the particles decreases with the decrease in particle size
 - c the velocity of the particles increases with the increase in particle size
 - d the velocity of the particles is not affected by the increase in particle size
- 20 Which of the following statement is correct
- a Linear colloidal materials yield dispersions of relatively low viscosity
 - b Spherical colloidal materials yield dispersions of relatively low viscosity
 - c Viscosity of the colloidal dispersion does not depend on the shape of the colloidal material
 - d Spherical colloidal materials yield dispersions of relatively high viscosity

Q.II Long Answer Questions (Answer any two) (20)

Q.1 (A) Mention the measures that could be taken to prevent or reduce hydrolytic decomposition of drugs. (5M)

(B) The initial concentration of a drug X was found to be 0.080 M. The concentration after 12 hours was 0.060 M. Calculate the reaction rate constant if decomposition of drug follows first order kinetics. (5M)

Q.2 Explain the terms with respect to powder properties: Void volume, True density, Bulk density, Granule density. (10M)

Q.3 Write a short note on Microemulsions. (10M)

Q.III Short Answer Questions (Answer any seven) (35)

1. Enlist the derived properties of powders. Explain Liquid displacement method to determine true density. (5M)
2. What are the methods used for determining particle surface area? Explain any one. (5M)
3. What are the limitations of accelerated stability studies? (5M)
4. Explain non-Newtonian type of flow (time independent) with rheograms, mechanism and suitable examples. (5M)
5. Describe elastic and plastic deformation of solids. (5M)
6. Write a short note on electrophoresis and sedimentation potential (5M)
7. What is zeta potential? (5M)
8. Describe the rheologic properties of emulsion. (5M)
9. Write a short note on coalescence and breaking. (5M)
