

MAHARAJA RANJIT SINGH PUNJAB TECHNICAL UNIVERSITY, BATHINDA
Ph.D. Entrance Examination of Pharmaceutical Sciences

- Q1. After 7 half-lives, how much drug is excreted out from the body
- 99.22%
 - 96.87%
 - 97.99%
 - 98.87%
- Q2. Antidepressants take 2-4 weeks to show its efficacy. Why?
- Steady state achieved
 - Auto-receptors desensitize
 - Metabolism saturated
 - Fast excretion
- Q3. Main side effect and clinical use of Haloperidol are
- Cardiac depression and Schizophrenia
 - Respiratory depression and analgesic
 - Extrapyramidal side effects and schizophrenia
 - Respiratory stimulant and Schizophrenia
- Q4. A partial agonist has
- Affinity = 1; Intrinsic Activity = 1
 - Affinity = 1; Intrinsic Activity = 0 to 1
 - Affinity = 0; Intrinsic Activity = 0
 - Affinity = 1; Intrinsic Activity = -1
- Q5. Dry cough is prominent side-effect of
- Atenolol
 - Aliskerin
 - Losartan
 - Enalapril
- Q6. Thiazide diuretics are safer than loop diuretics because of
- More hypoglycemia
 - Lesser hyponatremia
 - Lesser hypokalemia
 - Lesser hypocalcemia
- Q7. Azithromycin is the drug of choice for
- Upper respiratory tract infections
 - Malaria
 - Tuberculosis
 - Typhoid
- Q8. Maximal electric shock (MES) induced seizures can be treated with
- Diazepam
 - Pregabalin
 - Gabapentin
 - Phenytoin

- Q9. Clotting factors are secreted from
- Liver
 - Pancreas
 - Kidney
 - Lungs
- Q10. Potency is related to
- Toxicity
 - Tolerance
 - Amount
 - Bioavailability
- Q11. Which drug/s are from marine sources
- Eribulin
 - Cephalosporins
 - Trabectedin
 - All the above
- Q12. Guar gum (also known as guaran) is a natural, water-soluble polysaccharide (galactomannan) extracted from the endosperm of guar beans. It is widely used in
- Heart attack
 - Gluten-Free Baking
 - Depression
 - Asthma
- Q13. Balsam of Tolu is a fragrant, yellowish-brown resin exuded by
- Myroxylon balsamum*
 - Myroderma balsamum*
 - Both a & b
 - None
- Q14. Biogenesis of secondary metabolites is the process by which organisms (plants, fungi, and bacteria) synthesize specialized
- Inorganic molecules from primary metabolites
 - Ethanol from primary metabolites
 - Organic molecules from primary metabolites
 - Vitamins from primary metabolites
- Q15. All are alkaloids except
- Quinine
 - Morphine
 - Papaverine
 - Ginseng
- Q16. Metallic magnesium reduces flavonoid compounds, causing a shift in color from yellow to deep red or magenta in
- Alkaline Reagent Test
 - Shinoda's Test
 - Zinc-Hydrochloride Test
 - Ames test

Q17. Key technique/s for plant tissue culture is

- a) Callus Culture
- b) Cell Suspension Culture
- c) Meristem Culture
- d) All of the above

Q18. Which statement is incorrect

- a) Lemongrass is a plant in the grass family similar to citronella oil, lemon eucalyptus, and citronella (stone root).
- b) There are over 100 lemongrass species, including *Cymbopogon citratus*, which is often used in foods and medicine.
- c) Lemongrass leaf and essential oil contain chemicals that might help prevent some bacteria and yeast from growing. Lemongrass also contains chemicals that might relieve pain and swelling.
- d) People use lemongrass for stomach pain, dandruff, high cholesterol, gingivitis, thrush, and many other conditions, but there is no good scientific evidence to support these uses.

Q19. Adulteration the inferior substance is not added in place of the original crude drug intentionally in which type of adulteration method?

- a) Adulteration by Artificially Manufactured Substance
- b) Usage of Vegetative Part of The Same Plant
- c) Indirect Adulteration
- d) Substitution by Exhausted Drug

Q20. Rauwolfia refers to a genus of medicinal plants, particularly known for Rauwolfia serpentina, which contains numerous therapeutic indole alkaloids and is utilized in traditional medicine for treating various conditions, including hypertension, psychotic disorders, and gastrointestinal illnesses. When reserpine is used to treat hypertension, it precipitates as main side-effect.

- a) Alzheimer's disease
- b) Depression
- c) Tuberculosis
- d) Autism

Q21. Loading dose depends upon

- a) Clearance
- b) Volume of distribution
- c) Half life
- d) None

Q22. ICH focuses on biopharmaceutics classification system-based biowaivers, including recommendations for assay systems and setups, data interpretation, and eligibility criteria for filing.

- a) M9 guideline
- b) M11 guideline
- c) BS9 guideline
- d) B9 guideline

- Q23. Angle of Repose is the maximum angle formed between the slope of a powder pile and the horizontal surface. A lower angle (e.g., $<35^\circ$) indicates, while a high angle (e.g., $>50^\circ$) indicates
- Cohesiveness and free-flowing powder
 - Free-flowing powder and cohesiveness
 - Adhesiveness and free-flowing powder
 - Adhesion and Cohesion

- Q24. display a constant rate of metabolism and/or elimination independent of the concentration of a drug.
- One compartment model
 - Two compartment model
 - First-order kinetics
 - Zero-order kinetics

- Q25. The hydrophilic-lipophilic-balance (HLB) scale ranges from 0 to 20. Where 0 represents completely behavior and 20 represents completely behavior.
- Lipophilic and hydrophilic
 - Hydrophilic and Lipophilic
 - Hydroalcoholic and Lipophilic
 - Lipophilic and Hydroalcoholic

Q26. Match the following as per categories of medication error classification

A	C: Error that reached patient but unlikely to cause harm (omissions considered to reach patient)	1	Anticoagulant, such as warfarin, was ordered daily when the patient takes it every other day
B	D: Error that reached the patient and could have necessitated monitoring and/or intervention to preclude harm	2	Blood pressure medication was inadvertently omitted from the orders
C	E: Error that could have caused temporary harm	3	Regular release metoprolol was ordered for patient instead of extended-release
B	F: Error that could have caused temporary harm requiring initial or prolonged hospitalization	4	Multivitamin was not ordered on admission

- A-3, B-1, C-2, D-4
- A-2, B-1, C-4, D-3
- A-4, B-1, C-2, D-3
- A-1, B-4, C-2, D-3

Q27. Choose the incorrect statement

- The International Council for Harmonisation of Technical Requirements for Pharmaceuticals for Human Use (ICH), along with the World Health Organization (WHO), has provided a set of guidelines (ICH Q1A-E, Q3A-B, Q5C, Q6A-B) intended to unify the standards for the European Union, Japan, and the United States to facilitate the mutual acceptance of stability data that are sufficient for registration by the regulatory authorities in these jurisdictions.
- The intermediate and accelerated testing should cover a minimum of 6 months at $40^\circ\text{C} \pm 2^\circ\text{C}/75\% \text{RH} \pm 5\% \text{RH}$ and $30^\circ\text{C} \pm 2^\circ\text{C}/65\% \text{RH} \pm 5\% \text{RH}$ respectively.

- c) ICH stability studies involve a drug substance tested under storage conditions and assess its thermal stability and sensitivity to moisture.
- d) The long-term testing should be performed over a minimum of 12 months at $25\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}/60\% \text{ RH} \pm 5\% \text{ RH}$ or at $30\text{ }^{\circ}\text{C} \pm 2\text{ }^{\circ}\text{C}/65\% \text{ RH} \pm 5\% \text{ RH}$.

Q28. When an enzyme requires a cofactor for its activity, the inactive protein component is generally referred to as, and the plus the cofactor is called

- a) Holoenzyme, apoenzyme and holoenzyme
- b) Heteroenzyme, Holoenzyme and apoenzyme
- c) Apoenzyme, apoenzyme and holoenzyme
- d) Apoenzyme, holoenzyme and heteroenzyme

Q29. Choose the correct statement

- a) Partition coefficient is the ratio of a solute's concentration in two immiscible or partially miscible solvents at equilibrium.
- b) A positive Log P indicates a hydrophilic substance.
- c) A negative Log P indicates a hydrophobic (lipophilic) substance.
- d) Pharmacologists rely on Log P to predict a drug's ability to cross hydrophilic biological membranes.

Q30. Match the following as per categories of medication error classification

A	Blistering	1	The adhered film on the tablet's surface that may be torn away, resulting in the sticking of tablets
B	Chipping	2	Specific pits have appeared on the surface of the dosage form without any visual disappearance of the FC
C	Pitting	3	A condition where the film becomes dented
D	Picking	4	The detachment of film from the surface of the tablet

- a) A-2, B-3, C-4, D-1
- b) A-3, B-2, C-4, D-1
- c) A-4, B-3, C-2, D-1
- d) A-1, B-2, C-3, D-4

Q31. Regarding computer-aided drug design,

1. Computer-aided drug design is the most beneficial method in early-phase drug discovery.
 2. Computer-aided drug design reduces drug discovery costs and the process is expedited.
 3. Essential pillars of drug discovery are computer-aided drug design, AI, and ML tools.
 4. Structure-based and Ligand-based drug design are essential tools of computer-aided drug design.
- a) Statement 1 & 2 are correct.
 - b) Statement 3 & 2 are incorrect.
 - c) Statement 3 is incorrect.
 - d) All Statements are correct.

- Q32. does not restrict the movement of enzymes or cells on a solid support matrix to improve stability, enable continuous reusability, and simplify product separation.
- a) Adsorption
 - b) Polishing
 - c) Entrapment
 - d) Cross-linking
- Q33. refers to the Good Manufacturing Practices and facility standards for pharmaceutical manufacturers in India
- a) Schedule M
 - b) Schedule N
 - c) Schedule G
 - d) Schedule Y
- Q34. Type I Errors is
- a) False Positives—failing to reject a false null hypothesis
 - b) False Negatives—rejecting a false null hypothesis
 - c) False Positives—rejecting a true null hypothesis
 - d) False Negatives—failing to reject a false null hypothesis
- Q35. Redox reactions are everywhere and drive many natural and industrial processes except:
- a) Combustion
 - b) Rusting
 - c) Corrosion & Batteries
 - d) Adhesion
- Q36. The Mohr method is a classic precipitation titration used to determine the concentration of ions in a sample.
- a) Sodium or potassium
 - b) Chloride or bromide
 - c) Calcium and magnesium
 - d) Chloride or bicarbonate
- Q37. Which is not an advantage of nuclear magnetic resonance spectroscopy
- a) Presence of high magnetic field
 - b) Noninvasiveness
 - c) Adjustability
 - d) Lack of Ionizing Radiation
- Q38. Total Quality Management (TQM) is a continuous organizational philosophy that ensures all employees and departments work together to improve processes, products, services, and workplace culture. TQM relies on an integrated approach built around several key pillars except
- a) Process Centered
 - b) Customer Focused
 - c) Isolated system
 - d) Fact-based decision making

Q39. Regarding High Performance Liquid Chromatography (HPLC),

1. There are two phases for HPLC: the mobile phase and the stationary phase. The mobile phase is the liquid that dissolves the target compound. The stationary phase is the part of a column that interacts with the target compound.
2. In the column, the stronger the affinity (e.g.; van der waals force) between the component and the mobile phase, the slower component moves through the column along with the mobile phase. On the other hand, the stronger the affinity with the stationary phase, the faster it moves through the column.
3. Retention time (t_R) is the time interval between sample injection point and the apex of the peak. The required time for non-retained compounds (compounds with no interaction for the stationary phase) to go from the injector to the detector is called the dead time (t_0).
4. The peak height (h) is the vertical distance between a peak's apex and the baseline, and the peak area (A) colored in light blue is the area enclosed by the peak and baseline. These results will be used for the qualitative and quantitative analysis of a sample's components.
 - a) Statement 1 & 2 are correct.
 - b) Statement 2 is incorrect.
 - c) Statement 3 is incorrect.
 - d) All Statements are correct.

Q40. Karl-Fischer (KF) aquametry is the industry-standard chemical technique used to quantitatively measure water content in various substances. The technique operates on a stoichiometry between water (H_2O) and iodine (I_2).

- a) 1:2
- b) 2:1
- c) 1:1
- d) 1:1.5

Course: PHARMACY

Answer Key

Question	Answer	Question	Answer
1	A	21	B
2	B	22	A
3	C	23	B
4	B	24	D
5	D	25	A
6	C	26	C
7	A	27	B
8	D	28	C
9	A	29	A
10	C	30	C
11	D	31	D
12	B	32	B
13	A	33	A
14	C	34	C
15	D	35	D
16	B	36	B
17	D	37	A
18	A	38	C
19	C	39	B
20	B	40	C

[Handwritten signature]