Total No. of Printed Pages: 21

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Α

ARE ASKED TO DO SO) PHD-EE-November, 2025

SET-X

10033

Pharmaceutical Sciences

		Sr. No
Time: 11/4 Hours	Max. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name	Date of Birth	
Father's Name	Mother's Name	
Date of Examination		
(Signature of the Candidate)		(Signature of the Invigilator)

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1.	In formulating a null hypothesis for a tw no difference in mean survival between hypothesis is this?		
	(1) Alternative hypothesis	(2) Null hypothesis	
	(3) Research hypothesis	(4) Working hypothesis	
2.	The term "cross-over design" implies that	t :	
	(1) Subjects cross over from control to to	reatment at midpoint with no wash-out	
	(2) Each subject receives all intervention	as in a defined sequence with wash-out p	eriods
	(3) Investigators cross over roles halfwa	у	
	(4) Randomization is not required		
3.	A drug shows a longer half-life after ora likely reason?	I dosing than after IV dosing. What is th	e most
	(1) Absorption is slower than elimination		
	(2) Elimination is slower than absorption		
	(3) Drug is highly protein-bound		
	(4) Bioavailability increased		
4.	The rate-limiting step in oral absorption	of BCS class II drug is:	
	(1) Dissolution	(2) Permeability	
	(3) Stability	(4) Transit time	
5.	Intrinsic activity = 0 but affinity = high	describes :	
	(1) Full agonist	(2) Partial agonist	
	(3) Neutral antagonist	(4) Inverse agonist	
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6.	In reporting a randomized trial, omission weakens the report because:	on of the allocation concealment mechanism
	(1) It increases the risk of selection bias	(2) It affects external validity
	(3) It reduces sample size	(4) It invalidates ethics approval
7.	For a study of non-parametric data from	three independent groups, the correct test is:
	(1) One-way ANOVA	(2) Kruskal-Wallis test
	(3) Mann-Whitney U test	(4) Paired t-test
8.	In a cohort study, researchers follow exp	osed and unexposed groups forward. This is:
	(1) Experimental design	(2) Observational analytical design
	(3) Case-control design	(4) Cross-sectional design
9.	9. EC50 represents :	
	(1) Dose at 50% receptor occupancy	
	(2) Dose causing 50% toxicity	
	(3) Concentration at max binding	
	(4) Dose producing 50% max response	
10.	A xenobiotic bioactivates to a toxic meta	abolite via :
	(1) Phase III transporters	(2) Phase II glucuronidation
	(3) Phase I CYP450 oxidation	(4) Lysosomal degradation
11.	In the context of research ethics, the prin	nciple of beneficence manner
	(1) Respecting participant's autonomy	incalls:
	(2) Ensuring no harm is done	
	(3) Promoting the well-being of particip	pants
	(4) Guaranteeing financial compensation	
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12.		Control and Supervision of Experiments on ntine" of newly arrived laboratory animals is
	(1) Allow acclimatisation and screening	for diseases before use in experiments
	(2) Increase sample size	
	(3) Randomise animals between groups	
	(4) Reduce cost of housing	
13.	The Stern-Volmer equation is relevant to):
	(1) UV bathochromic shift	(2) Fluorescence quenching
	(3) IR anharmonicity	(4) NMR decoupling
14.	Two compounds have the same conjugation length, but Compound A shows a high λmax than Compound B. Which explanation is most consistent with UV-Vis molecul orbital theory?	
	(1) Compound A has a higher molar abs	sorptivity
	(2) Compound A has greater HOMO-L	UMO energy gap
	(3) Compound A has electron-do delocalization	nating substituents increasing π -electron
	(4) Both compounds absorb identical w	avelengths since conjugation is the same
15.	GABA primarily exerts effect via:	
	(1) Opening Na ⁺ channels	(2) Opening Cl- channels
	(3) Blocking Ca ²⁺ channels	(4) Increasing glutamate transmission
16.	In MTT assay, formazan crystals indicat	te:
	(1) DNA fragmentation	(2) Mitochondrial metabolic activity

(4) Necrotic cell presence

(3) Membrane permeability

17.	Toxicokinetics primarily studies :	
	(1) Toxic mechanism at receptor	
	(2) Dose-response relationship at toxic range	
	(3) Distribution & elimination at toxic doses	
	(4) Therapeutic window estimation	
18.	3. The Beer-Lambert law assumes that the light	source used is:
	(1) Polychromatic (2)	Perfectly monochromatic
	(3) Fluorescent (4)	Laser only
19.	A highly protein-bound drug (>95%) is significantly increases free drug fraction?	administered. Which condition most
	(1) Increased renal clearance (2)	Decrease in plasma albumin
	(2) Income 11	Slower absorption rate
20.	. The difference between "random error" and "s	systematic error" is that:
	(1) Random error alters validity, systematic e	rror alters precision
	(2) Random error alters precision, systematic	error alters validity
	(3) Both only alter precision	
	(4) Both only alter validity	
21.	Which of the following excipients acts as a poorly soluble drugs?	wetting agent to improve dissolution of
	(1) Microcrystalline cellulose	
	(2) Sodium lauryl sulfate	
	(3) Talc	
	(4) Magnesium stearate	
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22.	A drug follows zero-order elimination. Which statement is true?		
	(1) $t^{1/2}$ is constant		
	(2) Elimination rate is constant		
	(3) AUC is not dose-dependent		
	(4) Follows the Michaelis-Menten first-	order region	
23.	Which of the following method can be quantitatively?	be used to determine the number of ba	cteria
	(1) Spread-plate	(2) Streak-plate	
	(3) Pour-plate and spread plate	(4) Pour plate	
24.	Which transport mechanism is saturated	at therapeutic concentrations?	
	(1) Passive diffusion	(2) Filtration	
	(3) Active transport	(4) Paracellular transport	
25.	Acetaminophen toxicity is largely due to):	
	(1) Sulfation	(2) Glucuronidation	
	(3) Oxidative metabolites via CYP2E1	(4) Methylation	
26.	Rate-limiting step in noradrenaline syntl	nesis :	
	(1) Dopamine to noradrenaline via DBI	ł	
	(2) Tyrosine to L-DOPA by tyrosine hydroxylase		
	(3) L-DOPA to dopamine		
	(4) Noradrenaline reuptake		
27.	Which polymer is not commonly used in	n transdermal patches ?	
	(1) Ethyl cellulose	(2) PVA	
	(3) Eudragit RL	(4) Starch sodium glycolate	
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		ised in Woodward-Fieser rules for open-chain
28.	Among the following, the base value of	
	conjugated dienes is:	(2) 253 nm
	(1) 214 nm	(4) 193 nm
	(3) 217 nm	(17) attacks associ
29.	Which of the following is a buffer solution	on?
	(1) H2SO4 + CuSO4	(2) $CH_3COOH + CH_3COONH_4$
	(3) $NaCl + NaOH$	(4) $CH_3COONa + CH_3COOH$
30.	In suspension formulations, flocculating	g agents are added to:
	(1) Increase viscosity	(2) Promote controlled particle aggregation
	(3) Reduce wettability	(4) Improve color
31.	Termination of acetylcholine action is n	nainly via :
3. -	(1) Reuptake	(2) COMT metabolism
	(3) Acetylcholinesterase hydrolysis	(4) MAO metabolism
32.	A competitive antagonist shifts dose-re-	sponse curve :
	(1) Downward without shift in EC50	(2) Rightward with same Emax
	(3) Leftward with increased Emax	(4) Downward with increased slope
33.	Which receptor exhibits rapid describinding?	ensitization via phosphorylation and arresting
	(1) GPCR	(2) RTK
	(3) Nuclear receptors	(4) Ionotropic receptors
34.	Histamine H 1 receptors mediate:	
	(1) Increased gastric acid secretion	
	(2) Vasoconstriction	
	(3) Bronchoconstriction & allergic res	ponse
	(4) CNS sedation only	
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35.	NMDA receptor requires binding of :		
	(1) Glutamate only	(2) Aspartate only	
	(3) Glutamate + Glycine as co-agonist	(4) GABA + Glycine	
36.	In NMR, the phenomenon responsible for correlation time is:	or line broadening due to molecular tum	nbling
	(1) Spin-echo decay	(2) Bloch-Siegert shift	
	(3) T ₂ relaxation	(4) J-coupling	
37.	In reversed-phase HPLC, retention time	increases for compounds with:	
	(1) Higher polarity	(2) Larger ionic radius	
	(3) Higher charge	(4) Lower polarity	
38.	Primary screening in drug discovery aim	s to:	
	(1) Determine toxicity	(2) Evaluate PK	
	(3) Identify active hits	(4) Study receptor selectivity	
39.	A false-positive in cell viability assay ca	n occur due to :	
	(1) Compounds reducing MTT directly	(2) Accurate pipetting	
	(3) Serum-free media	(4) Using fresh medium	
40.	Which parameter changes MOST at high	toxic doses due to saturable metabolism	?
	(1) Clearance increases	(2) Clearance decreases	
	(3) Elimination becomes 1st-order	(4) Bioavailability decreases	
41.	The McLafferty rearrangement requires	:	
	(1) Aromatic ring	(2) γ-Hydrogen in carbonyl compound	
	(3) Halogen substitution	(4) Presence of nitro-group	
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42.	In chromatography, resolution increases	when:
	(1) Plate height increases	(2) Mobile phase velocity increases
	(3) Selectivity factor increases	(4) Peak broadening increases
43.	An electron impact MS typically produc	es:
	(1) Protonated molecular ion	(2) Radical cation M ⁺ ·
	(3) Sodium-adduct peak	(4) Doubly charged ions only
44.	In screening plant extract for anti-epiler differentiate:	otic activity, MES and PTZ models are used to
	(1) Hepatoprotective and anti-inflamma	itory response
	(2) GABA agonistic vs Na ⁺ channel blo	ocking potential
	(3) Analgesic vs Antipyretic effects	
	(4) Peripheral vs Central antispasmodic	action
45.	Which of the following is not part of the	e research methodology section of a thesis?
	(1) Study design	(2) Data collection methods
	(3) Literature review summary	(4) Statistical analysis plan
46.	In MALDI-TOF MS, ionization primar	ily occurs by:
	(1) Electron bombardment	(2) Desorption with matrix and pulsed laser
	(3) Electrospray nebulization	(4) Plasma interaction
47.	Capillary GC columns are preferred du	e to:
	(1) Low theoretical plates	
	(2) High efficiency & minimal sample	loading
	(3) High column diameter	
	(4) Poor peak resolution	
PHD	-EE-November, 2025/(Pharmaceutical	Sciences/CET VIVA

48.	The	Cotton	effect	is	associated	with	:
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- (1) CD spectroscopy optical activity in chiral chromophores
- (2) Raman active modes
- (3) Hyperfine splitting in NMR
- (4) Ion trap MS
- 49. Which of the following statements best describes a lead compound?
 - (1) A compound that contains the element lead.
 - (2) A compound from the research laboratory that is chosen to go forward for preclinical and clinical trials.
 - (3) A molecule that shows some activity or property of interest and serves as the starting point for the development of a drug.
 - (4) The first compound of a structural class of compounds to reach the market.
- **50.** Which β-lactam antibiotic belongs to carbapenem class?
 - (1) Meropenem

(2) Ceftriaxone

(3) Amoxicillin

- (4) Nafcillin
- 51. In ion-exchange chromatography, separation depends on :
 - (1) Vapor pressure
 - (2) Ionic charge and affinity to resin
 - (3) Boiling point
 - (4) Molecular rotation
- 52. The bandwidth of UV -Vis spectrum increases when:
 - (1) Slit width decreases

(2) Detector noise reduces

(3) Slit width increases

(4) Light intensity decreases

53.	The maximum amount of solute deconditions of temperature, pressure, and	issolved in a given solvent under standare l pH is known as :
	(1) Dissolution rate	(2) Intrinsic dissolution
	(3) Rate limiting step	(4) Absolute or intrinsic solubility
54.	In HPTLC, peak purity of phytoconstitu	nent can be confirmed using:
	(1) Rf value comparison only	
	(2) Documentation under UV before an	nd after derivatization
	(3) Matching retention time with HPLO	C data
	(4) Color observation post-spray	
55.	Which statement best describes the process dosage form development?	primary purpose of preformulation studies in
	(1) To determine packaging and labeling	g requirements.
	(2) To assess physicochemical propertie	es for rational formulation design.
	(3) To finalize manufacturing equipmen	
	(4) To study patient acceptability and p	alatability.
56.	In EI-MS, which functional group most highly stabilized oxonium ion fragment	commonly undergoes α -cleavage to generate a ?
	(1) Tertiary amines	(2) Carboxylic acids
	(3) Ketones	(4) Primary alcohols
57.	Which capsule size has the largest capac	
	(1) 000	(2) 0
	(3) 2	(4) 5

- **58.** Which detector is most suitable for detecting thermo-labile phytoconstituents during separation?
 - (1) UV detector in HPLC
 - (2) TCD detector in GC
 - (3) RID detector in HPLC
 - (4) FID in GC
- 59. Organoleptic evaluation of crude drugs includes:
 - (1) Taste, smell, and microscopic examination
 - (2) Taste, color, odor, and appearance
 - (3) Odor, TLC profile, and ash values
 - (4) Color, odor, and refractive index
- 60. A drug shows pH-dependent hydrolysis. Stabilization can be achieved by :
 - (1) pH buffering and acid/base catalysts inhibition
 - (2) Reducing particle size
 - (3) Adding surfactants only
 - (4) Removing plasticizer
- 61. During film coating, orange-peel effect is primarily due to:
 - (1) Excessive spray rate
 - (2) High polymer viscosity and improper atomization
 - (3) Low pan temperature
 - (4) Excess plasticizer

62.	Controlled-release tablets rely on Higuc	hi square-root law which is applicable to:
	(1) Zero-order diffusion	
	(2) Fickian diffusion from a matrix	
	(3) Osmotic pump release	
	(4) Burst release system	
63.	The separation of racemic mixture into	the pure enantiomer is:
	(1) Resolution	
	(2) Racemization	
	(3) Isomerization	
	(4) All of the above	
64.	Adulteration of wood powder in red chi	lli powder is identified using
	(1) Morphology	(2) Loss on drying
	(3) Microscopy	(4) Titrimetric
65.	A drug solution follows zero-order kine	tics. Which statement is correct?
	(1) $t_{1/2}$ depends on initial concentration	
	(2) Rate of drug elimination is constant	
	(3) Rate of elimination is proportional	to concentration
	(4) Shelf-life cannot be calculated	
66.	Chitosan nanoparticles primarily utilize	which mechanism for mucosal drug delivery?
	(1) Mucoadhesion due to cationic charge	ge
	(2) P-glycoprotein inhibition	
	(3) Receptor-mediated endocytosis	
	(4) Osmotic pressure differences	
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6	7.	Name of the scientist who gave the term Pharmacognosy:		
		(1) Seydler	(2)	Charak
		(3) Sushrut	(4)	Hippocrates
6	8.	Ash value indicate :		
		(1) Presence of silicates, oxalates, phosp	50	
		(2) Presence of chemical composition o	0.750	nt
		(3) Presence of different cells and tissue	es	
		(4) Presence of Water		
69	Э.	Wurster coating system is used for:		
		(1) Melt extrusion		
		(2) Bottom-spray fluid-bed coating of p	ellets	S
		(3) Solvent casting membranes		
	((4) Dry granulation		
70	. 1	Resolution in chromatography is maximi	ized	hy increasing :
		Column length and efficiency		90 00000
			23 12	Flow rate
	(3) Injection volume	(4)	Detector wavelength
71.	. (Osmotic pump systems follow which rele	ease	mechanism?
		1) Zero-order release independent of pl		
	(2) First-order release		
	(3) Erosion-based release		
	(4	4) Enzyme-controlled release		
70				
72.	Α	Accelerated stability studies follow ICH	guid	eline :
	(1) Q2	(2)	Q3B
	(3) Q1A(R2)	(4)	Q5C

73	Drop-outs in a clinical trial most affect which statistical concern	:
13.	Diop care	

(1) Increase Type I error only

(2) Decrease power and risk attrition bias

(3) Improve validity

(4) Reduce the need for randomization

74. Which of the following is a key requirement of the Declaration of Helsinki regarding vulnerable populations?

- They can be enrolled only if the research is responsive to their health needs and cannot be carried out with non-vulnerable populations
- (2) They should be excluded in all cases
- (3) They require no additional safeguards
- (4) They can be recruited without consent

75. Serotonin Precursor:

- (1) Tyrosine
- (2) Tryptophan
- (3) Glutamine
- (4) Glycine

76. A researcher proposes human challenge studies for a vaccine. According to ethical guidelines (Declaration of Helsinki + ICMR), which conditions are essential?

- Robust scientific justification, minimized risks, independent ethical review, thorough informed consent with comprehension checks, and enhanced clinical care and insurance provisions
- (2) Only fast recruitment
- (3) No need for ethics committee if approved by PI
- (4) Only community consent required

- 77. PEGylation of nanoparticles improves:
 - (1) Cell permeability only
 - (2) Reticuloendothelial clearance & circulation time
 - (3) Crystallinity
 - (4) Hydrolysis rate
- **78.** In sterile manufacturing, Laminar Air Flow (LAF) HEPA filters typically remove particles:
 - (1) 0.1 µm

(2) 3 μ m

(3) $0.5 \, \mu m$

- (4) 5 μm
- **79.** Which scenario best illustrates "conflict of interest" that must be declared in a trial publication?
 - (1) Principal investigator holds equity in the company manufacturing the investigational drug
 - (2) Investigator received travel reimbursement to a conference 5 years ago unrelated to current trial
 - (3) Investigator uses university email
 - (4) Investigator collaborates with another academic
- 80. In accelerated stability testing, a liquid oral formulation shows increased precipitation of the active drug over time. Which adjustment would most appropriately enhance physical stability without altering the chemical stability profile?
 - (1) Increase buffer concentration to maintain constant pH
 - (2) Add a suitable cosolvent such as propylene glycol
 - (3) Replace antioxidant with a stronger one
 - (4) Increase storage temperature to improve solubility

- (1) Preservatives
 - (2) Antioxidants
 - (3) Emulsifying agents
 - (4) Chelators

Which intermolecular force is strongest? 82.

- (1) Vander Waals
- (2) Dipole-dipole
- (3) Hydrogen bonding
- (4) London dispersion

Indicate the correct sequence of steps in rational drug design: 83.

- (1) Hit identification → Target validation → Optimization → Lead identification
- (2) Target identification → Validation → Lead identification → Optimization
- (3) Optimization → Lead identification → Target validation → Screening
- (4) Random screening → Optimization → Target identification
- Science of collecting, monitoring, researching, assessing and evaluating information from healthcare providers and patients on the adverse effects of medications is known as:
 - (1) Clinical Trials
 - (2) Observational study
 - (3) Qualitative study
 - (4) Pharmacovigilance

(4) Propofol

95.	In sample size calculation, which fac number of participants?	ctor does not directly influence the required
	(1) Desired power (e.g., 80%)	
	(2) Significance level (α)	
	(3) Expected effect size	
	(4) Colour of the data collection forms	
96.	Which parameter in QSAR indicates hyd	drophobic contribution ?
	(1) σ	(2) π
	(3) Taft constant	(4) LUMO energy
97.	Which is <i>true</i> about enantiomers in biological	ogical systems?
	(1) Always have identical pharmacologic	ical activity
	(2) Always differ in receptor binding	
	(3) May show different metabolism and	l toxicity profiles
	(4) Never interconverts in biological co	onditions
98.	Which antibiotic causes ototoxicity & no	ephrotoxicity?
	(1) Penicillin G	(2) Gentamicin
	(3) Erythromycin	(4) Doxycycline
99.	Which anti-HIV drug is integrase inhibit	itor?
	(1) Zidovudine	(2) Efavirenz
	(3) Raltegravir	(4) Ritonavir
	1750	

- 100. A prodrug concept is used for:
 - (1) Increasing polarity always
 - (2) Modifying absorption, targeting & reducing toxicity
 - (3) Enhancing shelf-life only
 - (4) Eliminating metabolism completely

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10042

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PHD-EE-November, 2025/(Pharmaceutical Sciences)(SET-X)/(B)

SEAL

1.	Osmotic pump systems follow which release mechanism? (1) Zero-order release independent of pu		
	(1) Zero-order release independent of pH		
	(2) First-order release		
	(3) Erosion-based release(4) Enzyme-controlled release		
	(1) = 11=j=110 Total delicase		
2.	Accelerated stability studies follow ICH	guideline:	
	(1) Q2	(2) Q3B	
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3.	Drop-outs in a clinical trial most affect	which statistical concern?	
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4.	4. Which of the following is a key requirement of the Declaration of Helsinki regarding vulnerable populations?		
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 - (3) Replace antioxidant with a stronger one
 - (4) Increase storage temperature to improve solubility
- In ion-exchange chromatography, separation depends on :
 - (1) Vapor pressure
 - (2) Ionic charge and affinity to resin
 - (3) Boiling point
 - (4) Molecular rotation
- 12. The bandwidth of UV -Vis spectrum increases when:
 - (1) Slit width decreases

(2) Detector noise reduces

(3) Slit width increases

- (4) Light intensity decreases
- 13. The maximum amount of solute dissolved in a given solvent under standard conditions of temperature, pressure, and pH is known as:
 - (1) Dissolution rate

(2) Intrinsic dissolution

(3) Rate limiting step

- (4) Absolute or intrinsic solubility
- 14. In HPTLC, peak purity of phytoconstituent can be confirmed using:
 - (1) Rf value comparison only
 - (2) Documentation under UV before and after derivatization
 - (3) Matching retention time with HPLC data
 - (4) Color observation post-spray

15.	Which statement best describes to dosage form development?	he primary purpose of preformulation studies in	
(1) To determine packaging and labeling requirements.			
	(2) To assess physicochemical prop	perties for rational formulation design.	
	(3) To finalize manufacturing equip	pment.	
	(4) To study patient acceptability a	nd palatability.	
16.	16. In EI-MS, which functional group most commonly undergoes α-cleavage to go highly stabilized oxonium ion fragment?		
	(1) Tertiary amines	(2) Carboxylic acids	
	(3) Ketones	(4) Primary alcohols	
17.	Which capsule size has the largest of	capacity?	
	(1) 000	(2) 0	
	(3) 2	(4) 5	
18.	Which detector is most suitable for separation?	or detecting thermo-labile phytoconstituents during	
	(1) UV detector in HPLC		
	(2) TCD detector in GC		
	(3) RID detector in HPLC		
	(4) FID in GC		
19.	Organoleptic evaluation of crude drugs includes :		
	(1) Taste, smell, and microscopic examination		
	(2) Taste, color, odor, and appeara		
	(3) Odor, TLC profile, and ash val		
	(4) Color, odor, and refractive inde		
PHD-I	EE-November, 2025/(Pharmaceuti		
		(OLI I II) (D)	

20	0. A drug shows pH-dependent hydrolysis. Stabilization can be achieved by :		
	(1) pH buffering and acid/base catalysts inhibition		
	(2) Reducing particle size		
	(3) Adding surfactants only		

	(4) Removing plasticizer		
21.	Termination of acetylcholine action is	mainly via :	
	(1) Reuptake	(2) COMT metabolism	
	(3) Acetylcholinesterase hydrolysis	(4) MAO metabolism	
22.	A competitive antagonist shifts dose-re	enonce curve :	
15.50	(1) Downward without shift in EC50	(2) Rightward with same Emax	
	(3) Leftward with increased Emax	(4) Downward with increased slope	
23.	3. Which receptor exhibits rapid desensitization via phosphorylation and arrestin binding?		
	(1) GPCR	(2) RTK	
	(3) Nuclear receptors	(4) Ionotropic receptors	
24.	Histamine H 1 receptors mediate :		
	(1) Increased gastric acid secretion		
	(2) Vasoconstriction		
	(3) Bronchoconstriction & allergic resp	onse	
	(4) CNS sedation only		
25.	NMDA receptor requires binding of:		
	(1) Glutamate only	(2) Aspartate only	
	(3) Glutamate + Glycine as co-agonist	(4) GABA + Glycine	
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26.	In NMR, the phenomenon responsible for line broadening due to molecular tumbling correlation time is:		
	(1) Spin-echo decay	(2) Bloch-Siegert shift	
	(3) T ₂ relaxation	(4) J-coupling	
27.	In reversed-phase HPLC, retention time	increases for compounds with:	
	(1) Higher polarity	(2) Larger ionic radius	
	(3) Higher charge	(4) Lower polarity	
28.	Primary screening in drug discovery aim	as to :	
	(1) Determine toxicity	(2) Evaluate PK	
	(3) Identify active hits	(4) Study receptor selectivity	
29.	. A false-positive in cell viability assay can occur due to :		
	(1) Compounds reducing MTT directly		
	(2) Accurate pipetting		
	(3) Serum-free media		
	(4) Using fresh medium		
30.	Which parameter changes MOST at Livi		
50.	(1) Clearance increases	toxic doses due to saturable metabolism?	
	N250	(2) Clearance decreases	
	(3) Elimination becomes 1st-order	(4) Bioavailability decreases	
31.	In the context of research ethics, the prin	nciple of beneficence means:	
	(1) Respecting participant's autonomy		
	(2) Ensuring no harm is done		
	(3) Promoting the well-being of particip	Dants	
	(4) Guaranteeing financial compensation	n.	
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32.	Under Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA) guidelines, "quarantine" of newly arrived laboratory animals is required to:		
	(1) Allow acclimatisation and screening for diseases before use in experiments		
	(2) Increase sample size		
	(3) Randomise animals between groups		

- 33. The Stern-Volmer equation is relevant to:
 - (1) UV bathochromic shift

(4) Reduce cost of housing

(2) Fluorescence quenching

(3) IR anharmonicity

- (4) NMR decoupling
- 34. Two compounds have the same conjugation length, but Compound A shows a higher λmax than Compound B. Which explanation is most consistent with UV-Vis molecular orbital theory?
 - (1) Compound A has a higher molar absorptivity
 - (2) Compound A has greater HOMO-LUMO energy gap
 - (3) Compound A has electron-donating substituents increasing π -electron delocalization
 - (4) Both compounds absorb identical wavelengths since conjugation is the same
- 35. GABA primarily exerts effect via:
 - (1) Opening Na+ channels
- (2) Opening Cl- channels
- (3) Blocking Ca²⁺ channels
- (4) Increasing glutamate transmission
- 36. In MTT assay, formazan crystals indicate:
 - (1) DNA fragmentation

- (2) Mitochondrial metabolic activity
- (3) Membrane permeability
- (4) Necrotic cell presence

37.	. Toxicokinetics primarily studies :		
	(1) Toxic mechanism at receptor		
	(2) Dose-response relationship at toxic range		
	(3) Distribution & elimination at toxic d	oses	
	(4) Therapeutic window estimation		
38.	The Beer-Lambert law assumes that the	light source used is:	
	(1) Polychromatic	(2) Perfectly monochromatic	
	(3) Fluorescent	(4) Laser only	
39.	A highly protein-bound drug (>95% significantly increases free drug fraction	b) is administered. Which condition most ?	
	(1) Increased renal clearance	(2) Decrease in plasma albumin	
	(3) Increased hepatic blood flow	(4) Slower absorption rate	
40.	The difference between "random error" a	and "systematic error" is that:	
	(1) Random error alters validity, systematic error alters precision		
	(2) Random error alters precision, systematic error alters validity		
	(3) Both only alter precision		
	(4) Both only alter validity		
41.	Which is an irreversible MAO inhibitor	?	
	(1) Fluoxetine	(2) Selegiline	
	(3) Moclobemide	(4) Diazepam	
42.	Which step is Phase-I metabolism?		
	(1) Oxidation	(2) Glucuronidation	
	(3) Sulfation	(4) (1)	
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43.	Sulfonamides act as:	
	(1) DHFR inhibitors	
	(2) PABA analogs blocking folate syn	ithesis
	(3) Cell wall synthesis inhibitors	
	(4) RNA polymerase inhibitors	
44.	Which general anesthetic works by NN	MDA receptor inhibition ?
	(1) Halothane	(2) Isoflurane
	(3) Ketamine	(4) Propofol
45.	In sample size calculation, which fanumber of participants?	actor does not directly influence the required
	(1) Desired power (e.g., 80%)	
	(2) Significance level (α)	
	(3) Expected effect size	
	(4) Colour of the data collection forms	
16.	Which parameter in QSAR indicates hy	ydrophobic contribution ?
	(1) o	(2) π
	(3) Taft constant	(4) LUMO energy
17.	Which is <i>true</i> about enantiomers in bio	logical systems ?
	(1) Always have identical pharmacolog	gical activity
	(2) Always differ in receptor binding	
	(3) May show different metabolism and	d toxicity profiles
	(4) Never interconverts in biological co	onditions

48.	Which antibiotic causes ototoxicity & nephrotoxicity?		
	(1) Penicillin G	(2) Gentamicin	
	(3) Erythromycin	(4) Doxycycline	
49.	Which anti-HIV drug is integrase inhibit	or?	
	(1) Zidovudine	(2) Efavirenz	
	(3) Raltegravir	(4) Ritonavir	
50.	A prodrug concept is used for:		
	(1) Increasing polarity always		
	(2) Modifying absorption, targeting & r	educing toxicity	
	(3) Enhancing shelf-life only		
	(4) Eliminating metabolism completely		
51.	. During film coating, orange-peel effect is primarily due to :		
	(1) Excessive spray rate		
	(2) High polymer viscosity and improper atomization		
	(3) Low pan temperature		
	(4) Excess plasticizer		
52.	Controlled-release tablets rely on Higue	hi square-root law which is applicable to:	
	(1) Zero-order diffusion	which is applicable to:	
	(2) Fickian diffusion from a matrix		
	(3) Osmotic pump release		
	(4) Burst release system		
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53	53. The separation of racemic mixture into the pure enantiomer is :		
	(1) Resolution		
	(2) Racemization		
	(3) Isomerization		
	(4) All of the above		
54.	. Adulteration of wood powder in red chilli powder is identified using		
	(1) Morphology	(2) Loss on drying	
	(3) Microscopy	(4) Titrimetric	
55.	A drug solution follows zero-order kinetics. Which statement is <i>correct</i> ?		
	(1) t _{1/2} depends on initial concentration	ı	
	(2) Rate of drug elimination is constant	t	
	(3) Rate of elimination is proportional	to concentration	
	(4) Shelf-life cannot be calculated		
56.	Chitosan nanoparticles primarily utilize which mechanism for mucosal drug delivery ?		
	(1) Mucoadhesion due to cationic char	ge	
	(2) P-glycoprotein inhibition		
	(3) Receptor-mediated endocytosis		
	(4) Osmotic pressure differences		
57.	Name of the scientist who gave the term Pharmacognosy:		
	(1) Seydler	(2) Charak	
	(3) Sushrut	(4) Hippocrates	
PHD-I	EE-November, 2025/(Pharmaceutical	Sciences)(SET-X)/(B)	P. T. C

:

- (1) Presence of silicates, oxalates, phosphates
- (2) Presence of chemical composition of plant
- (3) Presence of different cells and tissues
- (4) Presence of Water

59. Wurster coating system is used for:

- (1) Melt extrusion
- (2) Bottom-spray fluid-bed coating of pellets
- (3) Solvent casting membranes
- (4) Dry granulation

60. Resolution in chromatography is maximized by increasing:

- (1) Column length and efficiency
- (2) Flow rate

(3) Injection volume

(4) Detector wavelength

61. BHT and BHA are used in dosage forms as:

- (1) Preservatives
- (2) Antioxidants
- (3) Emulsifying agents
- (4) Chelators

62. Which intermolecular force is strongest?

- (1) Vander Waals
- (2) Dipole-dipole
- (3) Hydrogen bonding
- (4) London dispersion

- 63. Indicate the correct sequence of steps in rational drug design :
 - (1) Hit identification → Target validation → Optimization → Lead identification
 - (2) Target identification → Validation → Lead identification → Optimization
 - (3) Optimization → Lead identification → Target validation → Screening
 - (4) Random screening → Optimization → Target identification
- 64. Science of collecting, monitoring, researching, assessing and evaluating information from healthcare providers and patients on the adverse effects of medications is known as:
 - (1) Clinical Trials
 - (2) Observational study
 - (3) Qualitative study
 - (4) Pharmacovigilance
- **65.** Which of the following is a *correct* statement regarding Type I and Type II errors in hypothesis testing?
 - (1) Type I error is the risk of rejecting the null when it is true; Type II error is failing to reject the null when it is false.
 - (2) Type I error is failing to reject the null when it is false; Type II error is rejecting the null when it is true.
 - (3) They are the same if you set $\alpha = \beta$.
 - (4) Only Type I error matters in superiority clinical trials.
- 66. In which algorithm does AutoDock perform its docking search?
 - (1) Simulated Annealing
 - (2) Lamarckian Genetic Algorithm
 - (3) Monte Carlo Algorithm
 - (4) Particle Swarm Optimization

67.	In QSAR, sterimol parameters represent.			
	(1) Lipophilicity			
	(2) Steric bulk			
	(3) H-bonding ability			
	(4) Electronic constant			
68.	Which one of the following drugs does NOT act through G-Protein coupled receptors			
	(1) Epinephrine	(2) Insulin		
	(3) Dopamine	(4) TSH		
69.	Which one of the following is a flocculating agent for a negatively charged drug?			
	(1) Aluminium chloride	(2) Bentonite		
	(3) Tragacanth	(4) Sodium biphosphate		
70.	Coulter counter is used in determination of:			
	(1) Particle surface area			
	(2) Particle size			
	(3) Particle volume			
	(4) All of the above			
71.	The McLafferty rearrangement requires	Đ		
	(1) Aromatic ring	(2) γ-Hydrogen in carbonyl compound		
	(3) Halogen substitution	(4) Presence of nitro-group		
72.				
	(1) Plate height increases			
	(3) Selectivity factor increases	(2) Mobile phase velocity increases		
		(4) Peak broadening increases		
PHD-EE-November, 2025/(Pharmaceutical Sciences)(SET-X)/(B)				
(CZ 1-A)/(D)				

73	3. An electron impact MS typically produ	ces:	
	(1) Protonated molecular ion	(2) Radical cation M ⁺ -	
	(3) Sodium-adduct peak	(4) Doubly charged ions only	
74	. In screening plant extract for anti-epile differentiate :	ptic activity, MES and PTZ models are used to	
	(1) Hepatoprotective and anti-inflamma	atory response	
	(2) GABA agonistic vs Na ⁺ channel blo	ocking potential	
	(3) Analgesic vs Antipyretic effects		
	(4) Peripheral vs Central antispasmodic	action	
75.	Which of the following is <i>not</i> part of the	e research methodology section of a thesis?	
	(1) Study design	(2) Data collection methods	
	(3) Literature review summary	(4) Statistical analysis plan	
76.	In MALDI-TOF MS, ionization primari	ly occurs by:	
	(1) Electron bombardment	(2) Desorption with matrix and pulsed laser	
	(3) Electrospray nebulization	(4) Plasma interaction	
77.	Capillary GC columns are preferred due	to:	
	(1) Low theoretical plates		
	(2) High efficiency & minimal sample l	oading	
	(3) High column diameter		
	(4) Poor peak resolution		
78.	The Cotton effect is associated with:		
	(1) CD spectroscopy optical activity in	chiral chromophores	
	(2) Raman active modes		
	(3) Hyperfine splitting in NMR		
	(4) Ion trap MS		
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79.	. Which of the following statements best describes	a lead compound?		
	(1) A compound that contains the element lead.	(1) A compound that contains the element lead.		
	(2) A compound from the research laborator preclinical and clinical trials.	y that is chosen to go forward for		
	(3) A molecule that shows some activity or p starting point for the development of a drug.	property of interest and serves as the		
	(4) The first compound of a structural class of co	ompounds to reach the market.		
80.	O. Which β-lactam antibiotic belongs to carbapener	m class ?		
	(1) Meropenem	ftriaxone		
	(3) Amoxicillin (4) Na			
	(4) Na	nenn		
81.	of the following excipients acts as a w	retting agent to improve dissolution of		
	- · · · · · · · · · · · · · · · · · · ·	o gas a improve dissolution of		
	(1) Microcrystalline cellulose			
	(2) Sodium lauryl sulfate			
	(3) Tale			
	(4) Magnesium stearate			
82.	32. A drug follows zero-order elimination. Which s	121		
	(1) t ^{1/2} is constant	tatement is true?		
	(2) Elimination rate is constant			
	(3) AUC is not dose-dependent			
	(4) Follows the Michaelia M			
	(4) Follows the Michaelis-Menten first-order r			
83	83. Which of the following method can be used quantitatively?	d to determine the number of bacteria		
	(1) Spread-plate			
	(3) Pour-plate and spread plate	treak-plate		
	(4) [our plate		
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	ocience	s)(SET-X)/(B)		

84	!. Which transport mechanism is saturated	l at therapeutic concentrations?
	(1) Passive diffusion	(2) Filtration
	(3) Active transport	(4) Paracellular transport
85	. Acetaminophen toxicity is largely due to	o:
	(1) Sulfation	(2) Glucuronidation
	(3) Oxidative metabolites via CYP2E1	(4) Methylation
86.	Rate-limiting step in noradrenaline syntl	nesis :
	(1) Dopamine to noradrenaline via DBF	I
	(2) Tyrosine to L-DOPA by tyrosine hy	droxylase
	(3) L-DOPA to dopamine	
	(4) Noradrenaline reuptake	
87.	Which polymer is not commonly used in	transdermal patches ?
	(1) Ethyl cellulose	(2) PVA
	(3) Eudragit RL	(4) Starch sodium glycolate
88.	Among the following, the base value u conjugated dienes is:	sed in Woodward-Fieser rules for open-chair
	(1) 214 nm	(2) 253 nm
	(3) 217 nm	(4) 193 nm
89.	Which of the following is a buffer solution	on ?
	$(1) H_2SO_4 + CuSO_4$	(2) $CH_3COOH + CH_3COONH_4$
	10.000 Attached 10.00 Area (2000)	(4) $CH_3COONa + CH_3COOH$

		•
90.	In suspension formulations, flocculating	
	(1) Increase viscosity	(2) Promote controlled particle aggregation
	(3) Reduce wettability	(4) Improve color
91.	In formulating a null hypothesis for a two no difference in mean survival between hypothesis is this?	vo-arm superiority trial, you decide: "There is n Drug X and standard care." What type of
	(1) Alternative hypothesis	(2) Null hypothesis
	(3) Research hypothesis	(4) Working hypothesis
92.	The term "cross-over design" implies that (1) Subjects cross over from control to the (2) Each subject receives all intervention (3) Investigators cross over roles halfwar (4) Randomization is not required	reatment at midpoint with no wash-out
93.		I dosing than after IV dosing. What is the most
	(1) Absorption is slower than elimination	on.
	(2) Elimination is slower than absorption	n
	(3) Drug is highly protein-bound	••
	(4) Bioavailability increased	
94.	The rate-limiting step in oral absorption (1) Dissolution (3) Stability	of BCS class II drug is: (2) Permeability (4) Transit time
PHD-E	EE-November, 2025/(Pharmaceutical S	ciences)(SET-X)/(R)
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95.	Intrinsic activity = 0 but affinity = high describes:		
	(1) Full agonist	(2) Partial agonist	
	(3) Neutral antagonist	(4) Inverse agonist	
96.	In reporting a randomized trial, omiss weakens the report because:	ion of the allocation concealment mechanism	1
	(1) It increases the risk of selection bias		
	(2) It affects external validity		
	(3) It reduces sample size		
	(4) It invalidates ethics approval		
97.	For a study of non-parametric data from	three independent groups, the correct test is:	
	(1) One-way ANOVA	(2) Kruskal-Wallis test	
	(3) Mann-Whitney U test	(4) Paired t-test	
98.	In a cohort study, researchers follow exp	osed and unexposed groups forward. This is:	
	(1) Experimental design		
	(2) Observational analytical design		
	(3) Case-control design		
	(4) Cross-sectional design		
99.	EC50 represents:		
	(1) Dose at 50% receptor occupancy		
	(2) Dose causing 50% toxicity		
	(3) Concentration at max binding		
	(4) Dose producing 50% max response		
PHD-H	EE-November, 2025/(Pharmaceutical Sc	iences)(SET-X)/(B) P. T. O.	

- 100. A xenobiotic bioactivates to a toxic metabolite via:
 - (1) Phase III transporters
- (2) Phase II glucuronidation
- (3) Phase I CYP450 oxidation
- (4) Lysosomal degradation

Total No. of Printed Pages: 21

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Sr. No.	 	 	 		

Time: 11/4 Hours	Max. Marks : 100	Total Questions: 100
Roll No. (in figures)	(in words)	
Name		
Father's Name	Mother's Name	
Date of Examination		
(Signature of the Candidate)		(Signature of the Invigilator)

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- 1. All questions are compulsory.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- 5. The candidate *must not* do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers *must not* be ticked in the question booklet.
- There will be negative marking and a deduction of 0.25 marks for each wrong answer. Each correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

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1.	The McLafferty rearrangement require	es:	
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PHD-I	EE-November, 2025/(Pharmaceutical S	ciences)(SET-X)/(C)	P. T. O.

7.	Capillary GC columns are preferred due to:		
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PHD-I	PHD-EE-November, 2025/(Pharmaceutical Sciences)(SET-X)/(C)		

12.	A drug follows zero-order elimination.	Which statement is <i>true</i> ?	
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17.	Which polymer is not commonly used in	transdermal patches?	
	(1) Ethyl cellulose	(2) PVA	
	(3) Eudragit RL	(4) Starch sodium glycolate	
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Section Communication Co.	Among the following, the base value used in Woodward-Fieser rules for open-chair
	conjugated dienes is:

(1) 214 nm

(2) 253 nm

(3) 217 nm

(4) 193 nm

19. Which of the following is a buffer solution?

(1) $H_2SO_4 + CuSO_4$

(2) $CH_3COOH + CH_3COONH_4$

(3) NaCl + NaOH

(4) $CH_3COONa + CH_3COOH$

20. In suspension formulations, flocculating agents are added to :

- (1) Increase viscosity
- (2) Promote controlled particle aggregation
- (3) Reduce wettability
- (4) Improve color

21. In formulating a null hypothesis for a two-arm superiority trial, you decide: "There is no difference in mean survival between Drug X and standard care." What type of hypothesis is this?

- (1) Alternative hypothesis
- (2) Null hypothesis
- (3) Research hypothesis
- (4) Working hypothesis

22. The term "cross-over design" implies that:

- (1) Subjects cross over from control to treatment at midpoint with no wash-out
- (2) Each subject receives all interventions in a defined sequence with wash-out periods
- (3) Investigators cross over roles halfway
- (4) Randomization is not required

23.	A drug shows a longer half-life after o likely reason?	ral dosing than after IV dosing. What is the most
	(1) Absorption is slower than eliminat	ion
	(2) Elimination is slower than absorpti	ion
	(3) Drug is highly protein-bound	
	(4) Bioavailability increased	
24.	The rate-limiting step in oral absorption	n of BCS class II drug is :
	(1) Dissolution	(2) Permeability
	(3) Stability	(4) Transit time
25.	Intrinsic activity = 0 but affinity = high	describes:
	(1) Full agonist	(2) Partial agonist
	(3) Neutral antagonist	(4) Inverse agonist
26.	In reporting a randomized trial, omiss weakens the report because:	sion of the allocation concealment mechanism
	(1) It increases the risk of selection bias	s (2) It affects external validity
	(3) It reduces sample size	(4) It invalidates ethics approval
27.	For a study of non-parametric data from	three independent groups, the correct test is:
	(1) One-way ANOVA	(2) Kruskal-Wallis test
	(3) Mann-Whitney U test	(4) Paired t-test
28.	In a cohort study, researchers follow exp	oosed and unexposed groups forward. This is:
	(1) Experimental design	(2) Observational analytical design
	(3) Case-control design	(4) Cross-sectional design

29.	EC50 represents:	
	(1) Dose at 50% receptor occupancy	
	(2) Dose causing 50% toxicity	
	(3) Concentration at max binding	
	(4) Dose producing 50% max response	
00	Y YY . I TY Y	
30.	A xenobiotic bioactivates to a toxic meta	abolite via:
	(1) Phase III transporters	(2) Phase II glucuronidation
	(3) Phase I CYP450 oxidation	(4) Lysosomal degradation
24	Which is a man and a man a	
31.	Which is an irreversible MAO inhibitor	?
	(1) Fluoxetine	(2) Selegiline
	(3) Moclobemide	(4) Diazepam
32.	Which step is Phase-I metabolism?	
JZ.	which step is I hase-I metabolism:	
	(1) Oxidation	
	(2) Glucuronidation	
	(3) Sulfation	
	(4) Glutathione conjugation	

33. Sulfonamides act as:

- (1) DHFR inhibitors
- (2) PABA analogs blocking folate synthesis
- (3) Cell wall synthesis inhibitors
- (4) RNA polymerase inhibitors

. Which general anesthetic works by NM	MDA receptor inhibition ?	
(1) Halothane		
(2) Isoflurane		
(3) Ketamine		
(4) Propofol		
In sample size calculation, which fanumber of participants?	actor does not directly influence the r	equired
(1) Desired power (e.g., 80%)		
(2) Significance level (α)		
(3) Expected effect size		
(4) Colour of the data collection forms		
. Which parameter in QSAR indicates hydrophobic contribution ?		
(1) σ	(2) π	
(3) Taft constant	(4) LUMO energy	
. Which is <i>true</i> about enantiomers in biological systems?		
(1) Always have identical pharmacological activity		
(2) Always differ in receptor binding		
(3) May show different metabolism and toxicity profiles		
(4) Never interconverts in biological conditions		
Which antibiotic causes ototoxicity & nephrotoxicity?		
(1) Penicillin G	(2) Gentamicin	
(3) Erythromycin	(4) Doxycycline	
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39.	Which anti-HIV drug is integrase inhibit (1) Zidovudine (3) Raltegravir	cor ? (2) Efavirenz (4) Ritonavir
40.	A prodrug concept is used for: (1) Increasing polarity always (2) Modifying absorption, targeting & (3) Enhancing shelf-life only (4) Eliminating metabolism completely	
41.	During film coating, orange-peel effect (1) Excessive spray rate (2) High polymer viscosity and impro- (3) Low pan temperature (4) Excess plasticizer	
42	 Controlled-release tablets rely on High Zero-order diffusion Fickian diffusion from a matrix Osmotic pump release Burst release system 	nchi square-root law which is applicable to :
4	3. The separation of racemic mixture int(1) Resolution(2) Racemization(3) Isomerization(4) All of the above	o the pure enantiomer is:

14. Adulteration of wood powder in red chilli powder is identified using	
(1) Morphology	(2) Loss on drying
(3) Microscopy	(4) Titrimetric
A drug solution follows zero-order kine	tics. Which statement is <i>correct</i> ?
(1) $t_{1/2}$ depends on initial concentration	
(2) Rate of drug elimination is constant	
(3) Rate of elimination is proportional to	o concentration
(4) Shelf-life cannot be calculated	
Chitosan nanoparticles primarily utilize	which mechanism for mucosal drug delivery?
(1) Mucoadhesion due to cationic charg	e
(2) P-glycoprotein inhibition	
Charles American Species	
(4) Osmotic pressure differences	
7. Name of the scientist who gave the term Pharmacognosy:	
(1) Seydler	(2) Charak
(3) Sushrut	(4) Hippocrates
Ash value indicate :	
(1) Presence of silicates, oxalates, phosp	hates
(2) Presence of chemical composition of plant	
(3) Presence of different cells and tissues	3
	 Morphology Microscopy A drug solution follows zero-order kines t_{1/2} depends on initial concentration Rate of drug elimination is constant Rate of elimination is proportional to Shelf-life cannot be calculated Chitosan nanoparticles primarily utilizes Mucoadhesion due to cationic chargs P-glycoprotein inhibition Receptor-mediated endocytosis Osmotic pressure differences Name of the scientist who gave the term Seydler Sushrut Presence of silicates, oxalates, phosp Presence of chemical composition of

49.	Wurster coating system is used for:	
	(1) Melt extrusion	
	(2) Bottom-spray fluid-bed coating of pe	llets
	(3) Solvent casting membranes	
	(4) Dry granulation	
50	Deceleties in absorbate another is maximi	and by increasing:
50.	Resolution in chromatography is maximi	
	(1) Column length and efficiency	(2) Flow rate
	(3) Injection volume	(4) Detector wavelength
51.	Termination of acetylcholine action is m	ainly via :
	(1) Reuptake	(2) COMT metabolism
	(3) Acetylcholinesterase hydrolysis	(4) MAO metabolism
52.		
	(1) Downward without shift in EC50	17 17 17 17 17 17 17 17 17 17 17 17 17 1
	(3) Leftward with increased Emax	(4) Downward with increased slope
53.	. Which receptor exhibits rapid dese	nsitization via phosphorylation and arrestin
	binding?	
	(1) GPCR	(2) RTK
	(3) Nuclear receptors	(4) Ionotropic receptors
	Iliatamina II 1 maaantam madist	
54		
	(1) Increased gastric acid secretion	
	(2) Vasoconstriction	
	(3) Bronchoconstriction & allergic res	ponse
	(4) CNS sedation only	

55.	NMDA receptor requires binding of:	
	(1) Glutamate only	(2) Aspartate only
	(3) Glutamate + Glycine as co-agonist	(4) GABA + Glycine
56.	In NMR, the phenomenon responsible correlation time is:	for line broadening due to molecular tumbling
	(1) Spin-echo decay	(2) Bloch-Siegert shift
	(3) T ₂ relaxation	(4) J-coupling
57.	In reversed-phase HPLC, retention time	increases for compounds with:
	(1) Higher polarity	(2) Larger ionic radius
	(3) Higher charge	(4) Lower polarity
58.	Primary screening in drug discovery aim	s to :
	(1) Determine toxicity	(2) Evaluate PK
	(3) Identify active hits	(4) Study receptor selectivity
59.	A false-positive in cell viability assay ca	n occur due to :
	(1) Compounds reducing MTT directly	(2) Accurate pipetting
	(3) Serum-free media	(4) Using fresh medium
60.	Which parameter changes MOST at high	toxic doses due to saturable metabolism?
	(1) Clearance increases	
	(2) Clearance decreases	
	(3) Elimination becomes 1st-order	
	(4) Bioavailability decreases	

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61.	1. Osmotic pump systems follow which release mechanism?		
	(1) Zero-order release independent of pH		
	(2) First-order release		
	(3) Erosion-based release		
	(4) Enzyme-controlled release		
62.	Accelerated stability studies follow ICH	guideline :	
	(1) Q2	(2) Q3B	
	(3) Q1A(R2)	(4) Q5C	
63.	Drop-outs in a clinical trial most affect v	which statistical concern 2	
	(1) Increase Type I error only		
	(3) Improve validity	(2) Decrease power and risk attrition bias (4) Reduce the pool for	
	www.s	(4) Reduce the need for randomization	
64.	Which of the following is a key requirement of the Declaration of Helsinki regarding vulnerable populations?		
	(1) They can be enrolled only if the research is responsive to their health needs and cannot be carried out with non-vulnerable populations		
	(2) They should be excluded in all cases		
	(3) They require no additional safeguards		
	(4) They can be recruited without consent		
65.	Serotonin Precursor:		
	(1) Tyrosine		
	(2) Tryptophan		
	(3) Glutamine		
	(4) Glycine		
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(C)			

- **66.** A researcher proposes human challenge studies for a vaccine. According to ethical guidelines (Declaration of Helsinki + ICMR), which conditions are essential?
 - Robust scientific justification, minimized risks, independent ethical review, thorough informed consent with comprehension checks, and enhanced clinical care and insurance provisions
 - (2) Only fast recruitment
 - (3) No need for ethics committee if approved by PI
 - (4) Only community consent required
- **67.** PEGylation of nanoparticles improves :
 - (1) Cell permeability only
 - (2) Reticuloendothelial clearance & circulation time
 - (3) Crystallinity
 - (4) Hydrolysis rate
- 68. In sterile manufacturing, Laminar Air Flow (LAF) HEPA filters typically remove particles:
 - (1) 0.1 µm

(2) 3 µm

(3) 0.5 μm

- (4) 5 μm
- **69.** Which scenario best illustrates "conflict of interest" that must be declared in a trial publication?
 - (1) Principal investigator holds equity in the company manufacturing the investigational drug
 - (2) Investigator received travel reimbursement to a conference 5 years ago unrelated to current trial
 - (3) Investigator uses university email
 - (4) Investigator collaborates with another academic

- 70. In accelerated stability testing, a liquid oral formulation shows increased precipitation of the active drug over time. Which adjustment would most appropriately enhance physical stability without altering the chemical stability profile?
 - (1) Increase buffer concentration to maintain constant pH
 - (2) Add a suitable cosolvent such as propylene glycol
 - (3) Replace antioxidant with a stronger one
 - (4) Increase storage temperature to improve solubility
- 71. BHT and BHA are used in dosage forms as:
 - (1) Preservatives
 - (2) Antioxidants
 - (3) Emulsifying agents
 - (4) Chelators
- 72. Which intermolecular force is strongest?
 - (1) Vander Waals
 - (2) Dipole-dipole
 - (3) Hydrogen bonding
 - (4) London dispersion
- 73. Indicate the *correct* sequence of steps in rational drug design:
 - (1) Hit identification \rightarrow Target validation \rightarrow Optimization \rightarrow Lead identification
 - (2) Target identification \rightarrow Validation \rightarrow Lead identification \rightarrow Optimization
 - (3) Optimization → Lead identification → Target validation → Screening
 - (4) Random screening \rightarrow Optimization \rightarrow Target identification

- 74. Science of collecting, monitoring, researching, assessing and evaluating information from healthcare providers and patients on the adverse effects of medications is known as:
 - (1) Clinical Trials
 - (2) Observational study
 - (3) Qualitative study
 - (4) Pharmacovigilance
- **75.** Which of the following is a *correct* statement regarding Type I and Type II errors in hypothesis testing?
 - (1) Type I error is the risk of rejecting the null when it is true; Type II error is failing to reject the null when it is false.
 - (2) Type I error is failing to reject the null when it is false; Type II error is rejecting the null when it is true.
 - (3) They are the same if you set $\alpha = \beta$.
 - (4) Only Type I error matters in superiority clinical trials.
- 76. In which algorithm does AutoDock perform its docking search?
 - (1) Simulated Annealing
 - (2) Lamarckian Genetic Algorithm
 - (3) Monte Carlo Algorithm
 - (4) Particle Swarm Optimization
- 77. In QSAR, sterimol parameters represent:
 - (1) Lipophilicity
 - (2) Steric bulk
 - (3) H-bonding ability
 - (4) Electronic constant

78.	Which one of the following drugs does NOT act through G-Protein coupled receptors?		
	(1) Epinephrine	(2) Insulin	
	(3) Dopamine	(4) TSH	
79.	Which one of the following is a floccula	ting agent for a negatively charged drug?	
	(1) Aluminium chloride	(2) Bentonite	
	(3) Tragacanth	(4) Sodium biphosphate	
80.	Coulter counter is used in determination	of:	
	(1) Particle surface area		
	(2) Particle size		
	(3) Particle volume		
	(4) All of the above		
81.	In the context of research ethics, the prin	nciple of beneficence means:	
	(1) Respecting participant's autonomy	i se senerice means.	
	(2) Ensuring no harm is done		
	(3) Promoting the well-being of participants		
	(4) Guaranteeing financial compensation		
82.	2. Under Committee for the Purpose of Control and Supervision of Experiments of Animals (CPCSEA) guidelines, "quarantine" of newly arrived laboratory animals required to:		
	 Allow acclimatisation and screening Increase sample size 	g for diseases before use in experiments	
	(3) Randomise animals between groups	s	
	(4) Reduce cost of housing		
	高"。		

83.	The Stern-Volmer equation is relevant to:	
	(1) UV bathochromic shift	(2) Fluorescence quenching
	(3) IR anharmonicity	(4) NMR decoupling
84.	84. Two compounds have the same conjugation length, but Compound A shows a hig λmax than Compound B. Which explanation is most consistent with UV-Vis molecular orbital theory?	

(1) Compound A has a higher molar absorptivity

- (2) Compound A has greater HOMO-LUMO energy gap
- (3) Compound A has electron-donating substituents increasing π -electron delocalization
- (4) Both compounds absorb identical wavelengths since conjugation is the same

85. GABA primarily exerts effect via:

- (1) Opening Na+ channels
- (2) Opening Cl- channels
- (3) Blocking Ca2+ channels
- (4) Increasing glutamate transmission

86. In MTT assay, formazan crystals indicate:

(1) DNA fragmentation

- (2) Mitochondrial metabolic activity
- (3) Membrane permeability
- (4) Necrotic cell presence

87. Toxicokinetics primarily studies:

- (1) Toxic mechanism at receptor
- (2) Dose-response relationship at toxic range
- (3) Distribution & elimination at toxic doses
- (4) Therapeutic window estimation

88	The Beer-Lambert law assumes that the light source used is:			
	(1) Polychromatic	(2) Perfectly monochromatic		
	(3) Fluorescent	(4) Laser only		
89	 A highly protein-bound drug (>95° significantly increases free drug fraction 	%) is administered. Which condition most		
	(1) Increased renal clearance	(2) Decrease in plasma albumin		
	(3) Increased hepatic blood flow	(4) Slower absorption rate		
90	The difference between "random error"	and "systematic error" is that:		
	(1) Random error alters validity, system			
	(2) Random error alters precision, syste			
	(3) Both only alter precision	made error affers validity		
	(4) Both only alter validity			
	who variately			
91.	In ion-exchange chromatography, separa	ition depends on :		
	(1) Vapor pressure	mon depends off.		
	(2) Ionic charge and affinity to resin			
	(3) Boiling point			
	(4) Molecular rotation			
	(v) suscessful rotation			
92.	The bandwidth of UV -Vis spectrum inci	rausa l		
	(1) Slit width decreases			
	(3) Slit width increases	(2) Detector noise reduces		
		(4) Light intensity decreases		
93.	The maximum amount of solute dis	solved in a given solvent under standard		
	conditions of temperature, pressure, and (1) Dissolution rate	pH is known as:		
	(1) Dissolution rate	(2) Intrinsic dissolution		
	(3) Rate limiting step	(4) Absolute or intrinsic solubility		
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94.	In HPTLC, peak purity of phytoconstit	uent can be confirmed using	
	(1) Rf value comparison only	se commed using:	
	(2) Documentation under UV before a	nd after derivatization	
	(3) Matching retention time with HPL	C data	
	(4) Color observation post-spray		
95.	Which statement best describes the dosage form development?	primary purpose of preformulation stud	lies in
	(1) To determine packaging and labeling	ng requirements.	
	(2) To assess physicochemical properti	es for rational formulation design.	
	(3) To finalize manufacturing equipme		
	(4) To study patient acceptability and p	palatability.	
96.	6. In EI-MS, which functional group most commonly undergoes α-cleavage to generate highly stabilized oxonium ion fragment?		rate a
	(1) Tertiary amines	(2) Carboxylic acids	
	(3) Ketones	(4) Primary alcohols	
97.	Which capsule size has the largest capac	city ?	
	(1) 000	(2) 0	
	(3) 2	(4) 5	
98.	3. Which detector is most suitable for detecting thermo-labile phytoconstituents during separation?		ıring
	(1) UV detector in HPLC		
	(2) TCD detector in GC		
	(3) RID detector in HPLC		
Pin	(4) FID in GC	·	T. O.
. an-l	EE-November, 2025/(Pharmaceutical Se	ciences)(SE1-18)/(C)	

- 99. Organoleptic evaluation of crude drugs includes:
 - (1) Taste, smell, and microscopic examination
 - (2) Taste, color, odor, and appearance
 - (3) Odor, TLC profile, and ash values
 - (4) Color, odor, and refractive index
- 100. A drug shows pH-dependent hydrolysis. Stabilization can be achieved by :
 - (1) pH buffering and acid/base catalysts inhibition
 - (2) Reducing particle size
 - (3) Adding surfactants only
 - (4) Removing plasticizer

Total No. of Printed Pages: 21

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

D

PHD-EE-November, 2025

SET-X

10011

Pharmaceutical Sciences

		Sr. No
Fime: 1¼ Hours Roll No. (in figures)	Max. Marks : 100 (in words)	Total Questions : 100
ather's Name	Mother's Name	
Date of Examination		
(Signature of the Candidate)		(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

- 1. All questions are compulsory.
- 2. The candidates must return the question booklet as well as OMR Answer-Sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfairmeans / mis-behaviour will be registered against him / her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
- 3. Keeping in view the transparency of the examination system, carbonless OMR Sheet is provided to the candidate so that a copy of OMR Sheet may be kept by the candidate.
- 4. Question Booklet along with answer key of all the A, B, C & D code shall be got uploaded on the University Website immediately after the conduct of Entrance Examination. Candidates may raise valid objection/complaint if any, with regard to discrepancy in the question booklet/answer key within 24 hours of uploading the same on the University Website. The complaint be sent by the students to the Controller of Examinations by hand or through email. Thereafter, no complaint in any case, will be considered.
- The candidate must not do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question booklet itself. Answers must not be ticked in the question booklet.
- There will be negative marking and a deduction of 0.25 marks for each wrong answer. Each
 correct answer will be awarded one full mark. Cutting, erasing, overwriting and more than one
 answer in OMR Answer-Sheet will be treated as incorrect answer.
- 7. Use only Black or Blue Ball Point Pen of good quality in the OMR Answer-Sheet.
- 8. Before answering the questions, the candidates should ensure that they have been supplied correct and complete booklet. Complaints, if any, regarding misprinting etc. will not be entertained 30 minutes after starting of the examination.

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SEAL

- 1. In the context of research ethics, the principle of beneficence means:
 - (1) Respecting participant's autonomy
 - (2) Ensuring no harm is done
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11.	Which is an irreversible MAO inhibitor	?	
	(1) Fluoxetine	(2) Selegiline	
	(3) Moclobemide	(4) Diazepam	
12.	Which step is Phase-I metabolism?		
	(1) Oxidation		
	(2) Glucuronidation		
	(3) Sulfation		
	(4) Glutathione conjugation		
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PHD-F	EE-November, 2025/(Pharmaceutical S	ciences)(SET-X)/(D)	P. T. O.

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16.		(2) π		
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	(3) Erosion-based release			
	(4) Enzyme-controlled release			
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22.	22. Accelerated stability studies follow ICH guideline:		
	(1) Q2	(2) Q3B	
	(3) Q1A(R2)	(4) Q5C	
23.	Drop-outs in a clinical trial most aff	ect which statistical concern?	
	(1) Increase Type I error only	(2) Decrease power and risk attrition bia	as
	(3) Improve validity	(4) Reduce the need for randomization	
24.	24. Which of the following is a key requirement of the Declaration of Helsir vulnerable populations?		arding
	(1) They can be enrolled only if the cannot be carried out with non-v	ne research is responsive to their health need rulnerable populations	ls and
	(2) They should be excluded in all c	ases	
	(3) They require no additional safeg	uards	
	(4) They can be recruited without co	onsent	
25.	Serotonin Precursor:		
	(1) Tyrosine	(2) Tryptophan	
	(3) Glutamine	(4) Glycine	
26.	** ***	lenge studies for a vaccine. According to e + ICMR), which conditions are essential?	ethical
	A 0 181 0	minimized risks, independent ethical re comprehension checks, and enhanced clinical	
	and insurance provisions		
	(2) Only fast recruitment		
	(3) No need for ethics committee if a		
	(4) Only community consent require	d	
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27.	PEGylation	of	nanoparticles	improves	:
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- (1) Cell permeability only
- (2) Reticuloendothelial clearance & circulation time
- (3) Crystallinity
- (4) Hydrolysis rate
- 28. In sterile manufacturing, Laminar Air Flow (LAF) HEPA filters typically remove particles:
 - (1) $0.1 \, \mu m$

(2) $3 \mu m$

(3) 0.5 µm

- (4) 5 µm
- 29. Which scenario best illustrates "conflict of interest" that must be declared in a trial publication?
 - Principal investigator holds equity in the company manufacturing the investigational drug
 - (2) Investigator received travel reimbursement to a conference 5 years ago unrelated to current trial
 - (3) Investigator uses university email
 - (4) Investigator collaborates with another academic
- 30. In accelerated stability testing, a liquid oral formulation shows increased precipitation of the active drug over time. Which adjustment would most appropriately enhance physical stability without altering the chemical stability profile?
 - (1) Increase buffer concentration to maintain constant pH
 - (2) Add a suitable cosolvent such as propylene glycol
 - (3) Replace antioxidant with a stronger one
 - (4) Increase storage temperature to improve solubility

31.	In ion-exchange chromatography, separ	ration depends on:
	(1) Vapor pressure	
	(2) Ionic charge and affinity to resin	
	(3) Boiling point	
	(4) Molecular rotation	
32.	The bandwidth of UV -Vis spectrum in	creases when :
	(1) Slit width decreases	(2) Detector noise reduces
	(3) Slit width increases	(4) Light intensity decreases
	(5) One width increases	(4) Light intensity decreases
33.	The maximum amount of solute di- conditions of temperature, pressure, and	issolved in a given solvent under standard pH is known as:
	(1) Dissolution rate	(2) Intrinsic dissolution
	(3) Rate limiting step	(4) Absolute or intrinsic solubility
34.	In HPTLC, peak purity of phytoconstitu	ent can be confirmed using:
04.	(1) Rf value comparison only	on can be committee asing .
	(2) Documentation under UV before an	d after derivatization
	(3) Matching retention time with HPLC	
		data
	(4) Color observation post-spray	
35.	Which statement best describes the process dosage form development?	primary purpose of preformulation studies in
	(1) To determine packaging and labelin	g requirements.
	(2) To assess physicochemical properties	es for rational formulation design.
	(3) To finalize manufacturing equipmer	nt.
	(4) To study patient acceptability and pa	alatability.

36.	In EI-MS, which functional group most commonly undergoes α -cleavage to generate a highly stabilized oxonium ion fragment ?		
	(1) Tertiary amines	(2) Carboxylic acids	
	(3) Ketones	(4) Primary alcohols	
37.	Which capsule size has the largest capac	ity?	
	(1) 000	(2) 0	
	(3) 2	(4) 5	
38.	Which detector is most suitable for detecting thermo-labile phytoconstituents during separation?		
	(1) UV detector in HPLC		
	(2) TCD detector in GC		
	(3) RID detector in HPLC		
	(4) FID in GC		
20	0		
39.	e i i i i i i i i i i i i i i i i i i i		
	(1) Taste, smell, and microscopic exan	nination	
	(2) Taste, color, odor, and appearance		
	(3) Odor, TLC profile, and ash values		
	(4) Color, odor, and refractive index		
40.	 pH buffering and acid/base catalys Reducing particle size 	s. Stabilization can be achieved by: ts inhibition	
	(3) Adding surfactants only(4) Removing plasticizer		
	(4) Kemoving plasticizer		

41	. Termination of acetylcholine action is r	mainly via :
	(1) Reuptake	(2) COMT metabolism
	(3) Acetylcholinesterase hydrolysis	(4) MAO metabolism
42.	A competitive antagonist shifts dose-res	sponse curve :
	(1) Downward without shift in EC50	(2) Rightward with same Emax
	(3) Leftward with increased Emax	(4) Downward with increased slope
43.	Which receptor exhibits rapid dese binding?	nsitization via phosphorylation and arrestin
	(1) GPCR	(2) RTK
	(3) Nuclear receptors	(4) Ionotropic receptors
44.	Histamine H 1 receptors mediate:	
	(1) Increased gastric acid secretion	
	(2) Vasoconstriction	
	(3) Bronchoconstriction & allergic resp	onse
	(4) CNS sedation only	
45.	NMDA receptor requires binding of:	
	(1) Glutamate only	(2) Aspartate only
	(3) Glutamate + Glycine as co-agonist	(4) GABA + Glycine
46.	In NMR, the phenomenon responsible correlation time is:	for line broadening due to molecular tumbling
	(1) Spin-echo decay	(2) Bloch-Siegert shift
	(3) T ₂ relaxation	(4) J-coupling
47.	In reversed-phase HPLC, retention time	increases for compounds with:
	(1) Higher polarity	(2) Larger ionic radius
	(3) Higher charge	(4) Lower polarity
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48.	Primary screening in drug discovery aims to:				
	(1) Determine toxicity	(2) Evaluate PK			
	(3) Identify active hits	(4) Study receptor selectivity			
49.	A false-positive in cell viability assay car	n occur due to:			
	(1) Compounds reducing MTT directly	(2) Accurate pipetting			
	(3) Serum-free media	(4) Using fresh medium			
50.	Which parameter changes MOST at high	toxic doses due to saturable metabolism?			
	(1) Clearance increases	(2) Clearance decreases			
	(3) Elimination becomes 1st-order	(4) Bioavailability decreases			
51.	Which of the following excipients acts poorly soluble drugs?	as a wetting agent to improve dissolution of			
	(1) Microcrystalline cellulose				
	(2) Sodium lauryl sulfate				
	(3) Talc				
	(4) Magnesium stearate				
52.	A drug follows zero-order elimination. V	Which statement is <i>true</i> ?			
	(2) Elimination rate is constant				
	(3) AUC is not dose-dependent				
	(4) Follows the Michaelis-Menten first-	order region			
53.	Which of the following method can quantitatively?	be used to determine the number of bacteria			
	(1) Spread-plate	(2) Streak-plate			
	(3) Pour-plate and spread plate	(4) Pour plate			
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5	4. Which transport mechanism is saturated	at therapeutic concentrations?
	(1) Passive diffusion	(2) Filtration
	(3) Active transport	(4) Paracellular transport
5	5. Acetaminophen toxicity is largely due to);
	(1) Sulfation	(2) Glucuronidation
	(3) Oxidative metabolites via CYP2E1	(4) Methylation
56	5. Rate-limiting step in noradrenaline synth	nesis :
	(1) Dopamine to noradrenaline via DBF	I
	(2) Tyrosine to L-DOPA by tyrosine hy	droxylase
	(3) L-DOPA to dopamine	
	(4) Noradrenaline reuptake	
57.	Which polymer is not commonly used in	transdermal patches?
	(1) Ethyl cellulose	(2) PVA
	(3) Eudragit RL	(4) Starch sodium glycolate
58.	Among the following, the base value us conjugated dienes is:	sed in Woodward-Fieser rules for open-chain
	(1) 214 nm	(2) 253 nm
	(3) 217 nm	(4) 193 nm
59.	Which of the following is a buffer solution	on ?
	$(1) H_2SO_4 + CuSO_4$	
	(2) $CH_3COOH + CH_3COONH_4$	
	(3) $NaCl + NaOH$	
	(4) $CH_3COONa + CH_3COOH$	

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60.	In suspension formulations, flocculating	agents are added to:
	(1) Increase viscosity	(2) Promote controlled particle aggregation
	(3) Reduce wettability	(4) Improve color
61.	The McLafferty rearrangement requires	•
	(1) Aromatic ring	(2) γ-Hydrogen in carbonyl compound
	(3) Halogen substitution	(4) Presence of nitro-group
62.	In chromatography, resolution increases	when:
	(1) Plate height increases	(2) Mobile phase velocity increases
	(3) Selectivity factor increases	(4) Peak broadening increases
63.	An electron impact MS typically produc	ces:
	(1) Protonated molecular ion	(2) Radical cation M ⁺ .
	(3) Sodium-adduct peak	(4) Doubly charged ions only
64.	In screening plant extract for anti-epile differentiate:	ptic activity, MES and PTZ models are used to
	(1) Hepatoprotective and anti-inflamm	atory response
	(2) GABA agonistic vs Na ⁺ channel bl	ocking potential
	(3) Analgesic vs Antipyretic effects	
	(4) Peripheral vs Central antispasmodi	e action
65.	Which of the following is <i>not</i> part of the	ic research methodology section of a thesis?
	(1) Study design	
	(2) Data collection methods	
	(3) Literature review summary	
	(4) Statistical analysis plan	
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66. In MALDI-TOF MS, ionization primarily of	ccurs by	٠
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- (1) Electron bombardment
- (2) Desorption with matrix and pulsed laser
- (3) Electrospray nebulization
- (4) Plasma interaction

67. Capillary GC columns are preferred due to:

- (1) Low theoretical plates
- (2) High efficiency & minimal sample loading
- (3) High column diameter
- (4) Poor peak resolution

68. The Cotton effect is associated with:

- (1) CD spectroscopy optical activity in chiral chromophores
- (2) Raman active modes
- (3) Hyperfine splitting in NMR
- (4) Ion trap MS

69. Which of the following statements best describes a lead compound?

- (1) A compound that contains the element lead.
- (2) A compound from the research laboratory that is chosen to go forward for preclinical and clinical trials.
- (3) A molecule that shows some activity or property of interest and serves as the starting point for the development of a drug.
- (4) The first compound of a structural class of compounds to reach the market.

70. Which β -lactam antibiotic belongs to carbapenem class?

(1) Meropenem

(2) Ceftriaxone

(3) Amoxicillin

(4) Nafcillin

71.	. During film coating, orange-peel effect is prim	narily due to:
	(1) Excessive spray rate	
	(2) High polymer viscosity and improper ator	mization
	(3) Low pan temperature	
	(4) Excess plasticizer	
72.	2. Controlled-release tablets rely on Higuchi squ	are-root law which is applicable to:
	(1) Zero-order diffusion	2.2
	(2) Fickian diffusion from a matrix	
	(3) Osmotic pump release	
	(4) Burst release system	
73.	(1) Resolution(2) Racemization(3) Isomerization(4) All of the above	
74	powder in red clinii pe	owder is identified using
	(1) Morphology (2)	Loss on drying
	(3) Microscopy (4)	Titrimetric
75	75. A drug solution follows zero-order kinetics.	Which statement is correct?
	(1) t _{1/2} depends on initial concentration	to correct ?
	(2) Rate of drug elimination is constant	
	(3) Rate of elimination is proportional to co	Oncontrat'
	(4) Shelf-life cannot be calculated	DICCIRRATION
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6. Chitosan nanoparticles primarily utilize which mechanism for mucosal drug delivery	?
(1) Mucoadhesion due to cationic charge	
(2) P-glycoprotein inhibition	
(3) Receptor-mediated endocytosis	
(4) Osmotic pressure differences	
. Name of the scientist who gave the term Pharmacognosy:	
(1) Seydler (2) Charak	
(3) Sushrut (4) Hippocrates	
Ash value indicate :	
(1) Presence of silicates, oxalates, phosphates	
(2) Presence of chemical composition of plant	
(3) Presence of different cells and tissues	
(4) Presence of Water	
Wurster coating system is used for :	
(1) Melt extrusion	
(2) Bottom-spray fluid-bed coating of pellets	
(3) Solvent casting membranes	
(4) Dry granulation	
Resolution in chromatography is maximized by increasing :	
	(1) Mucoadhesion due to cationic charge (2) P-glycoprotein inhibition (3) Receptor-mediated endocytosis (4) Osmotic pressure differences Name of the scientist who gave the term Pharmacognosy: (1) Seydler (2) Charak (3) Sushrut (4) Hippocrates Ash value indicate: (1) Presence of silicates, oxalates, phosphates (2) Presence of chemical composition of plant (3) Presence of different cells and tissues (4) Presence of Water Wurster coating system is used for: (1) Melt extrusion (2) Bottom-spray fluid-bed coating of pellets (3) Solvent casting membranes

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(2) Flow rate

(3) Injection volume

(4) Detector wavelength

81.	In formulating a null hypothesis for a two no difference in mean survival between hypothesis is this?	n Drug X and standard care." What type of		
	(1) Alternative hypothesis	(2) Null hypothesis		
	(3) Research hypothesis	(4) Working hypothesis		
82.	The term "cross-over design" implies the	at:		
	(1) Subjects cross over from control to	treatment at midpoint with no wash-out		
	(2) Each subject receives all intervention	ons in a defined sequence with wash-out periods		
	(3) Investigators cross over roles halfw	ay		
	(4) Randomization is not required			
83.	. A drug shows a longer half-life after or likely reason?	ral dosing than after IV dosing. What is the most		
	(1) Absorption is slower than eliminat	ion		
	(2) Elimination is slower than absorpt	ion		
	(3) Drug is highly protein-bound			
	(4) Bioavailability increased			
8	4. The rate-limiting step in oral absorption	on of BCS class II drug is :		
	(1) Dissolution	(2) Permeability		
	(3) Stability	(4) Transit time		
ε	35. Intrinsic activity = 0 but affinity = his	gh describes :		
	(1) Full agonist	(2) Partial agonist		
	(3) Neutral antagonist	(4) Inverse agonist		
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86.	. In reporting a randomized trial, omission of the allocation concealment mechanism weakens the report because:	m
	(1) It increases the risk of selection bias	
	(2) It affects external validity	
	(3) It reduces sample size	
	(4) It invalidates ethics approval	
87.	For a study of non-parametric data from three independent groups, the correct test is:	
	(1) One-way ANOVA (2) Kruskal-Wallis test	
	(3) Mann-Whitney U test (4) Paired t-test	
88.	In a cohort study, researchers follow exposed and unexposed groups forward. This is:	
	(1) Experimental design	
	(2) Observational analytical design	
	(3) Case-control design	
	(4) Cross-sectional design	
89.	EC50 represents:	
	(1) Dose at 50% receptor occupancy	
	(2) Dose causing 50% toxicity	
	(3) Concentration at max binding	
	(4) Dose producing 50% max response	

- 90. A xenobiotic bioactivates to a toxic metabolite via:
 - (1) Phase III transporters
 - (2) Phase II glucuronidation
 - (3) Phase I CYP450 oxidation
 - (4) Lysosomal degradation

91.	BHT and BHA are used in dosage forms as:
	(1) Preservatives
	(2) Antioxidants
	(3) Emulsifying agents
	(4) Chelators
92.	Which intermolecular force is strongest?
	(1) Vander Waals
	(2) Dipole-dipole
	(3) Hydrogen bonding
	(4) London dispersion
93.	Indicate the correct sequence of steps in rational drug design:
	 Hit identification → Target validation → Optimization → Lead identification
	(2) Target identification → Validation → Lead identification → Optimization
	(3) Optimization → Lead identification → Target validation → Screening
	(4) Random screening → Optimization → Target identification
94.	Science of collecting, monitoring, researching, assessing and evaluating information from healthcare providers and patients on the adverse effects of medications is known as:
	(1) Clinical Trials
	(2) Observational study
	(3) Qualitative study
	(4) Pharmacovigilance

- 95. Which of the following is a *correct* statement regarding Type I and Type II errors in hypothesis testing?
 - (1) Type I error is the risk of rejecting the null when it is true; Type II error is failing to reject the null when it is false.
 - (2) Type I error is failing to reject the null when it is false; Type II error is rejecting the null when it is true.
 - (3) They are the same if you set $\alpha = \beta$.
 - (4) Only Type I error matters in superiority clinical trials.
- 96. In which algorithm does AutoDock perform its docking search?
 - (1) Simulated Annealing
 - (2) Lamarckian Genetic Algorithm
 - (3) Monte Carlo Algorithm
 - (4) Particle Swarm Optimization
- 97. In QSAR, sterimol parameters represent:
 - (1) Lipophilicity
 - (2) Steric bulk
 - (3) H-bonding ability
 - (4) Electronic constant
- 98. Which one of the following drugs does NOT act through G-Protein coupled receptors ?
 - (1) Epinephrine

(2) Insulin

(3) Dopamine

- (4) TSH
- 99. Which one of the following is a flocculating agent for a negatively charged drug?
 - (1) Aluminium chloride

(2) Bentonite

(3) Tragacanth

(4) Sodium biphosphate

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- 100. Coulter counter is used in determination of:
 - (1) Particle surface area
 - (2) Particle size
 - (3) Particle volume
 - (4) All of the above

S.No.	SeT A	Set B	Set C	
1	В	A	Set C	Set D
2	В	C	C	C
3	A	В		A
4			В	В
-	A	A	В	С
6	1	В	C	В
ס -	A	Α	В	В
	В	В	В	С
8	В	С	Α	В
9	D	Α	С	В
10	С	В	Α	B
11	С	В	В	В
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16	В	В	С	D
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21	В	C .	В	Α
22	В	В	В	С
23	С	Α	Α	В
24	С	С	Α	Α
25	C	С	С	В
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4	C .	С	С	В
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6	С	В	В	D
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74 75	A	C .	A	В
76	B A	В	В	A
	В	В	В	A
77	С	Δ	В	Α
78 79	A	C	A	В
80	B	A	D	Α
81	В	В	С	В
82	C	В	Α	В
83	В	C	В	А
84	D	С	С	Α
85	A	С	В	С
86	В	В	В	А
87	В	D	С	В
88	В	А	В	В
89	A	D	В	D
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