GATE-2009

Pharmaceutics

1. **Different species of Ephedra can be identified by observing the nature of**
(a) Inner surface (b) Outer surface
(c) Trichomes (d) Scaly leaves

2. **Indian Rhubarb can be distinguished from Rhapontic Rhubarb by the fluorescence it emits under UV light. Indian Rhubarb gives**
(a) Deep yellow (b) Deep violet
(c) Orange (d) Pale green

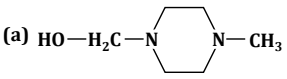
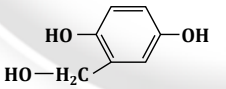
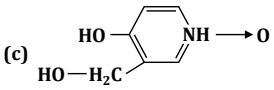
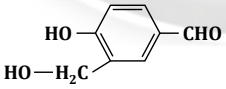
3. **Genetically modified species of Papaver namely Papaver bracteatum and Papaver orientale contain the predominant alkabid**
(a) Morphine (b) Codeine (c) Thebaine (d) Narcotine

4. **Increased risk of atherosclerosis is associated with decreased serum levels of**
(a) LDL (b) HDL (c) Triglycerides (d) VLDL

5. **A peptide hormone which inhibits bone resorption and given as nasal spray is**
(a) Cortisol (b) Alendronate
(c) Calcitonin (d) Calcitriol

6. **An inorganic ion which is used prophylactically in bipolar depression is**
(a) Valproate (b) Lithium (c) Chromium (d) Valium

7. **A β-lactamase inhibitor which contains an 1-oxopenam structure is**
(a) Tazobactam sodium (b) Clavulanate potassium
(c) Sulbactam sodium (d) Thienamycin

8. **Salbutamol is prepared from**
(a) 
(b) 
(c) 
(d) 

9. **Antihypoprothrombinemic effect of one stereochemical form is two to five times more than others**
(a) (S)-(+)- Warfarin (b) R-(+)- Warfarin
(c) (S)-(-)- Warfarin (d) (RS)- Warfarin

10. **Some of the organic reactions are catalysed by a product obtained from starch on treatment with amylase from Bacillus macerans. It is**
(a) Amylopectin (b) Amylose
(c) Cellulose (d) Cyclodextrin

11. **Florentine receiver is used to separate the liquids based on**
(a) Molecular weight (b) Sedimentation rate
(c) Density (d) Freezing point

12. **The official dissolution test apparatus contains cylindrical vessel and lower edge of the blade is positioned from inside bottom of the vessel at**
(a) 18 to 22 mm (b) 23 to 27 mm
(c) 20 to 24 mm (d) 25 to 29 mm

13. **As per Drugs and Cosmetics Act and Rules, the Good Manufacturing Practice is included under schedule**
(a) W (b) P (c) S (d) M

14. **A substance used for modification of silica gel for reversed-phase TLC is**
(a) Benzene (b) Glycerine (c) Silicone oil (d) Ether

15. **In IR spectrum, the functional group region is from**
(a) 4000 cm^{-1} to 900 cm^{-1} (b) 4000 cm^{-1} to 1400 cm^{-1}
(c) 1400 cm^{-1} to 900 cm^{-1} (d) 4000 cm^{-1} to 660 cm^{-1}

16. **The equation $E=E^0 + RT/nF$ In a M^{n+} is used to measure the**
(a) Conductance (b) Potential difference
(c) Resistance (d) Current

17. **Intermediates in the biosynthesis of cholesterol are**
(a) Mevalonic acid and Isopentenyl pyrophosphate
(b) Mevalonic acid and Aldosterone
(c) Isoprenaline and Aldosterone
(d) Isopranaline and Isopentenyl phosphate

18. **A naturally occurring amino acid which does not have a chiral centre is**
(a) Glycine (b) Alanine (c) Tryptophan (d) Tyrosine

19. **A given gram-positive bacterium is differentiated from gram-negative bacteria by gram staining. This is because its cell wall contains**
(a) Lysozyme (b) Teichoic acid
(c) Membrane proteins (d) Lipid A

20. **The drug which increases the plasma concentration of digoxin by a pharmacokinetic mechanism is**
(a) Lidocaine (b) Captopril
(c) Quinidine (d) Hydrochlorthiazide

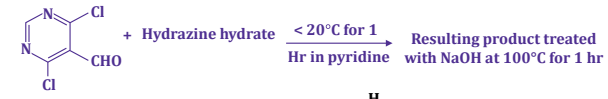
21. **Microscopic characters of ginger rhizome are**
(a) Spindle shaped lignified fibers and sclereids
(b) Cluster crystal of calcium oxalite and screids
(c) Non-lignified vessels and sac shaped starch grains
(d) Non-lignified fibers and sckreids

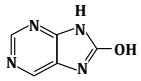
22. **Klunge's test is for the identification of**
(a) Barbaloin (b) Isobarbaloin
(c) Abinosides (d) Alosin

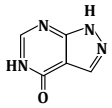
23. **3, 4 Benzpyrene present in cigarette smoke reduces the therapeutic activity of Diazepam by**
(a) Altering excretion
(b) Binding to plasma proteins
(c) Inhibiting metabolism
(d) Increasing the activity of liver microsomal enzymes

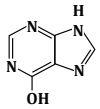
24. An NMDA antagonist introduced for treatment of Alzheimer's disease is
(a) Dopamine (b) Nor-epinephrine
(c) Serotonin (d) Memantine

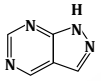
25. Resulting product treated with NaOH at 100°C for 1 hr



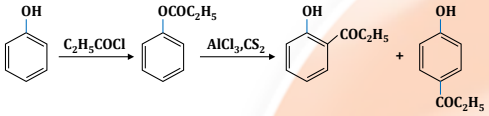
(a) 

(b) 

(c) 

(d) 

26. Phenol, an antiseptic when treated as follows



Gave the above two phenolic ketones. The Reaction is
(a) Hofmann Rearrangement
(b) Fries Rearrangement
(c) Kolbe's Reaction
(d) Reimer-Tiemann Reaction

27. The quantity of drug required to make a 2% w/w solution in 240 ml of alcohol is (The density of alcohol is 0.816 g/ml)
(a) 1632 g (b) 2.400 g (c) 4.000 g (d) 4.800 g

28. In multistation punching machine , the upper as well as lower punches are connected by
(a) Cams (b) Turrets
(c) Wire meshes (d) Revolving belts

29. As per the Drugs and Cosmetics Act, the HEPA filters are required to filter the air in the pharmaceutical manufacturing unit. Grade A filter is used for
(a) Aseptic preparation and filling
(b) Background room used for preliminary activities
(c) Filtering liquid preparations
(d) Handling of components after washing

30. The deflection of positive ions formed in a mass spectrometer by electric and magnet fields depends upon its
(a) Mass (b) Charge
(c) Velocity (d) Mass, charge and velocity

31. Cyclohexane can be used as a solvent in UV spectrophotometric analysis because
(a) It has a ring structure
(b) Energy requirement for σ - σ* is in the range of 120-200 nm
(c) It is volatile
(d) It is immiscible with water

32. Quaternary structure in protein molecules refers to the
(a) Arrangement of multiple domains in a single polypeptide chain
(b) Specific arrangement of multiple subunits in multi-subunit proteins
(c) Formation of molten globules
(d) Protein foiling in single subunit proteins

33. Interleukins are
(a) Polypeptide cytokines important in the inflammatory cascade
(b) Prostaglandins that account for gastrointestinal disorders
(c) Enkephalins which are specific for asthma
(d) Dipeptides which have antimicrobial properties

34. Phase I clinical studies of a drug under development is generally carried out on
(a) At least 10,000 people from different ethnic communities and a wide range of age groups
(b) A medium sized group of 500-1000 patients suffering from the disease for which the drug is being developed
(c) A small group of 20-100 healthy male and female volunteers
(d) Reliable in-vitro cell-lines derived from people suffering with the disease

35. A young patient complains that he gets severe shortness of breath whenever he takes Aspirin for headache. Increased levels of a substance responsible for Aspirin hypersensitivity is
(a) Prednisone (b) Prostacycline
(c) Ibuprofen (d) Leukotriene LTC_4

36. Match group I with Group II and Identify the correct combinations

Group I	Group II
Glycoside	Type
1. Gentisin	[P] Flavonol
2. Genistein	[Q] Flavone
3. Apigenin	[R] Xanthone
4. Quercetin	[S] Isoflavone

(a) 1-[S], 2-[R], 3-[P], 4-[Q]
(b) 1-[P], 2-[Q], 3-[S], 4-[R]
(c) 1-[R], 2-[S], 3-[Q], 4-[P]
(d) 1-[Q], 2-[P], 3-[R], 4-[S]

37.

Group I	Group II
Bark	Diagnostic Microscopical Characters
1. Kurchi	[P] Heavily lignified phloem fibres with Y-shaped pits, secretory canals. microcrystals of calcium oxalate
2. Cascara	[Q] Pericycle with stone cells having horse shoe shaped thickening, ail cells. minute needles of calcium oxalate
3. Cinnamon	[R] Alternating layers of stone cells and phloem,non fignified pericyclic fibres, prismatic crystals of calcium oxalate
4. Cinchona	[S] Wavy medullary rays, groups of heavily lignified sclereids, crystal sheath of calcium oxalate

(a) 1-[Q], 2-[P], 3-[S], 4-[R]
(b) 1-[S], 2-[R], 3-[P], 4-[Q]
(c) 1-[R], 2-[S], 3-[Q], 4-[P]
(d) 1-[P], 2-[Q], 3-[R], 4-[S]

38.

Group I	Group II
Drug	Mechanism of action is by inhibition of
1. Levofloxacin	[P] DNA dependent RNA polymerase
2. Caspofungin	[Q] Topoisomerase II (DNA gyrase) the enzyme that produces a negative supercoil
3. Aztreonam	[R] The synthesis of (1-2) glycan
4. Rifibutin	[S] Cell wall synthesis preferentially binding to a specific Penicillin binding protein

(a) 1-[Q], 2-[R], 3-[S], 4-[P]
(b) 1-[R], 2-[S], 3-[P], 4-[Q]
(c) 1-[S], 2-[P], 3-[Q], 4-[R]
(d) 1-[P], 2-[Q], 3-[R], 4-[S]

39.

Group I	Group II
Drug	Receptor agonist/antagonist
1.Granisetrum	[P] β_1 adrenergic receptor antagonist
2.Pirentepine	[Q] GABA-B agonist
3. Acebutolo	[R] $5HT_3$ antagonist
4.Baclofen	[S] M1 antagonist

(a) 1-[P], 2-[Q], 3-[R], 4-[S]
(b) 1-[R], 2-[S], 3-[P], 4-[Q]
(c) 1-[Q], 2-[R], 3-[S], 4-[P]
(d) 1-[S], 2-[P], 3-[Q], 4-[R]

40.

Group I	Group II
Drug	Biotransformation
1. Chlorpromazine	[P] S-oxidation
2. Thioridazine	[Q] Microsomal bydroxylation
3. Diazepam	[R] Desulphurisation
4. Thiopentone	[S] N-dealkylation

(a) 1-[S], 2-[P], 3-[Q], 4-[R]
(b) 1-[Q], 2-[R], 3-[S], 4-[P]
(c) 1-[S], 2-[R], 3-[Q], 4-[P]
(d) 1-[S], 2-[Q], 3-[R], 4-[P]

41.

Group I	Group II
Drug	7-Subtitution in 1. 3-dimethyl xanthine with
1. Diprophylline	[P] $-CH_2-CH(OH)-CH_2OH$
2. Ethophylline	[Q] $-NH-CH_2-N(CH_2-CH_3)_2$
3. Etamiphylline	[R] $-CH_2-CH_2-OH$
4.Proxyphylline	[S] $-CH_2-CH(OH)-CH_3$

(a) 1-[R], 2-[Q] 3-[S], 4-[P]
(b) 1-[Q], 2-[S], 3-[R], 4-[P]
(c) 1-[P], 2-[R], 3-[Q], 4-[S]
(d) 1-[P], 2-[S], 3-[R], 4-[Q]

42.

Group I	Group II
Equipment	To determine
1.Cascade Impactor	[P] Flash point
2. Tag Open Cup apparatus	[Q] Sedimentation rate
3. Pycnometer	[R] Particle size
4. Rheometer	[S] Density of liquid

(a) 1-[R], 2-[P], 3-[S], 4-[Q]
(b) 1-[P], 2-[R], 3-[Q], 4-[S]
(c) 1-[S], 2-[Q], 3-[R], 4-[P]
(d) 1-[Q], 2-[R], 3-[P], 4-[S]

43.

Group I	Group II
Classification	Penetration enhancer
1. Janic surfactant	[P] Terpenes
2. Nonionic surfactant	[Q] Polyoxyethylene-20-cetyl ether
3. Non surfactant	[R] Polyethylene-9-lauryl ether
4. Chelating agent	[S] Citric acid

(a) 1-[R], 2-[Q], 3-[P], 4-[S]
(b) 1-[Q] 2-[R], 3-[P], 4-[S]
(c) 1-[R], 2-[S], 3-[P], 4-[Q]
(d) 1-[S]. 2-[Q], 3-[R], 4-[P]

44.

Group I	Group II
Transdermal drug delivery system	Method of preparation
1.Membrane modulated system	[P] Drug is homogenously dispersed in polymer and then moulded into a patch
2. Diffusion controlled system	[Q] Drug reservoir is encapsulated in rate controlling polymer patch
3. Matrix dispersion system	[R] Drug dispersed in hydrophilic polymer and then cross linked with lipophilic polymer by high shear mechanical force
4. Microreservoir system	[S] Drug is directly dispersed in polymer patch

(a) 1-[Q], 2-[S], 3-[P], 4-[R]
(b) 1-[P], 2-[Q], 3-[R], 4-[S]
(c) 1-[P], 2-[S], 3-[Q], 4-[R]
(d) 1-[S], 2-[P], 3-[R], 4-[Q]

45.

Group I	Group II
Term used	Explanation
1.Chromophore	[P] Amino group
2.Blue shift	[Q] Increase in wavelength of absorption
3.Auxochrome	[R] Decrease in wavelength of absorption
4.Red shift	[S] Carbonyl group

(a) 1-[S], 2-[R], 3-[P], 4-[Q]
(b) 1-[R], 2-[P], 3-[Q], 4-[S]
(c) 1-[P], 2-[Q], 3-[R], 4-[S]
(d) 1-[Q], 2-[S], 3-[R], 4-[P]

46.

Group I	Group II
Symbol	Description
1. v	[P] Specific resistance
2. id	[Q] Chemical shift
3. δ	[R] Diffusion current
4. ρ	[S] Frequency

(a) 1-[R], 2-[S], 3-[P], 4-[Q]
(b) 1-[Q], 2-[P], 3-[S], 4-[R]
(c) 1-[S], 2-[R], 3-[Q], 4-[P]
(d) 1-[P], 2-[Q], 3-[S], 4-[R]

47.

Group I	Group II
Type of inhibitor	Description
1.Competitive inhibitors	[P] Have affinity only for the [E-S] complex and not for the free [E]
2.Non competitive inhibitors	[Q] Binding of the inhibitor and that of the natural substrate are mutually exclusive
3. Uncompetitive inhibitors	[R] Ultimately binds covalently to the enzyme
4.Suicide inhibitors	[S] Binds with the same affinity to [E] and [E-S]

(a) 1-[R], 2-[Q], 3-[P], 4-[S]
(b) 1-[P], 2-[R], 3-[Q], 4-[S]
(c) 1-[S], 2-[P], 3-[R], 4-[Q]
(d) 1 [Q], 2-[S], 3-[P], 4-[R]

48.

Group I	Group II
Process	Required molecules
1. Post translation modification	[P] Signal peptidase
2.DNA repair	[Q] Sigma factor
3.Control of prokaryotic transcription	[R] Proteasome complex
4. Protein degradation	[S] Photolyase

(a) 1-[P], 2-[S], 3-[Q], 4-[R]
(b) 1-[Q], 2-[R], 3-[P], 4-[S]
(c) 1-[R], 2-[Q], 3-[S], 4-[P]
(d) 1-[Q], 2-[P], 3-[R], 4-[S]

49.

Group I	Group II
Microorganism	Typical characteristics
1.Corynebacterium diptheriae	[P] Cells divide in three planes in an irregular pattern, producing bunches
2. Streptococcus pyogenes	[Q] Cells are lined side by side like matchsticks and at angles to one another
3. Staphylococcus aureus	[R] Longbranched multinuclear filaments called hyphae
4. Streptomyces viridochromogenes	[S] Cells divide in one plane and remain attached to form chain

(a) 1-[R], 2-[S], 3-[Q], 4-[P]
(b) 1-[S], 2-[P], 3-[Q], 4-[R]
(c) 1-[Q], 2-[S], 3-[P], 4-[R]
(d) 1 [R], 2-[Q], 3-[P], 4-[S]

50.

Group I	Group II
Condition	Description
1.Agranulocytosis	[P] Reduced lifespan of erythrocytes
2.Anisocytosis	[Q] Lack of neutrophils
3.Aplastic anemia	[R] Abnormal variation in RBC size
4.Hemolytic anemia	[S] Depression of synthesis of all cell types in bone marrow

(a) 1-[Q], 2-[R], 3-[S], 4-[P]
(b) 1-[Q], 2-[S], 3-[R], 4-[P]
(c) 1-[P], 2-[Q], 3-[S], 4-[R]
(d) 1-[S], 2-[Q], 3-[P], 4-[R]

51. The method Transgenic plants are devekiped by genetic engineering techniques
(a) Individual genes from one species inserted inte another; the offspring will contain coples of now gene
(b) By crusing two species or varieties differing at least in one set of characters.
(c) Exposing the plant tissue to radiation
(d) Bioproduction of natural compounds under aseptic conditions

52. In the production of transgenic plants, the gene transfer is carried out by
(a) Induction of meristematic primordial
(b) Gel filtration
(c) Clonal propagation
(d) Silicon carbide whiskers

53. In the design of Captoprit the
(a) -COOH group is introduced in proline to enhance the binding capability at the receptor site the binding capability of the drug with cubation of

(b) -SH group is introduced to enhance the binding capability of the drug with cobalt ion of ACE
(c) -SH group is introduced to enhance the binding to the nine ion of ACE
(d) -COOH and -SH groups to introduce hydrophilic pockets at the receptor site

54. Captopril IP is assayed by titration
(a) Against 0.1N sodium hydroxide using phenolphthalein indicator
(b) Of a solution in dimethylformamide with 0.1M of tetrabutyl ammonium hydroxide
(c) Of a solution in anhydrous formic acid and acetic anhydride with 0.18 perchloric acid
(d) Of a solution containing 1.8M sulphuric acid and potassium iodide with 0.025M potassium lodite using starch solution

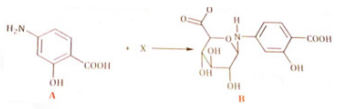
55. Liposomes are used as carriers for drugs and macro-molecules in pharmaceutical formulations. They are
(a) Phospholipids dispersed gently in aqueous medium to obtain muhilamellar vesicles
(b) Hydrophilic ar lipophilic polymer matrix with a drug reservoir
(c) A shallow compartment moulded from a drag imperme-able system and rate controlling polymeric membrane
(d) Microporous membrane made from ethylene/vinyl acetate polymer

56. They can interact by different mechanisms
(a) Biological fluid diffuses into the matrix and causes erosion of polymer
(b) Entbcytosis by phagocytic cell of the reticulo endothe-lial system such as macrophages and neutrophil
(c) Magnetic beads dispersed throughout the polymer ma trix. On exposure the drug is released slowly by diffusion
(d) Receptor binding mediated by the peptide

57. A Chinese tree Camptotheca acuminate is useful in cancer chemotherapy the Comptothecis present in the plant and useful in treating ovarian cancer is
(a) Etoposide (b) Vincristine
(c) Padition (d) Topoteca

58. The drug selected above acts by
(a) Inhibiting topoisomerase !
(b) Inhibiting topoisomerase II
(c) Inhibiting thymidybe synthase
(d) Farming hydrogen peroxide which generates free radical

59. The compound A combined with X to get converted into B. in the presence of an appropriate enzyme The reaction can be described as
(a) Bioactivation
(b) Glucuronide conjugation
(c) B-Oxidation
(d) Stereospecific glycine conjugation



60. The significance of the above reaction in drug therapy is that the reaction
(a) Converts water soluble compound into a lipid soluble compound, there by increasing its potency
(b) Converts an uncharged species into a charged species, increasing the shelf life of the compound
(c) Adds an ionic hydrophilic moiety, facilitating its urinary elimination
(d) Adds a bulky substituent to convert it into an active compound

Answer Key

1-d	2-b	3-c	4-b	5-c	6-b	7-b	8-d	9-a	10-d
11-c	12-b	13-d	14-c	15-b	16-b	17-a	18-a	19-b	20-c
21-c	22-b	23-d	24-d	25-b	26-b	27-c	28-b	29-a	30-d
31-b	32-b	33-a	34-c	35-d	36-c	37-c	38-a	39-b	40-a
41-c	42-a	43-a	44-a	45-a	46-c	47-d	48-a	49-c	50-a
51-a	52-d	53-c	54-b	55-a	56-b	57-d	58-a	59-b	60-c

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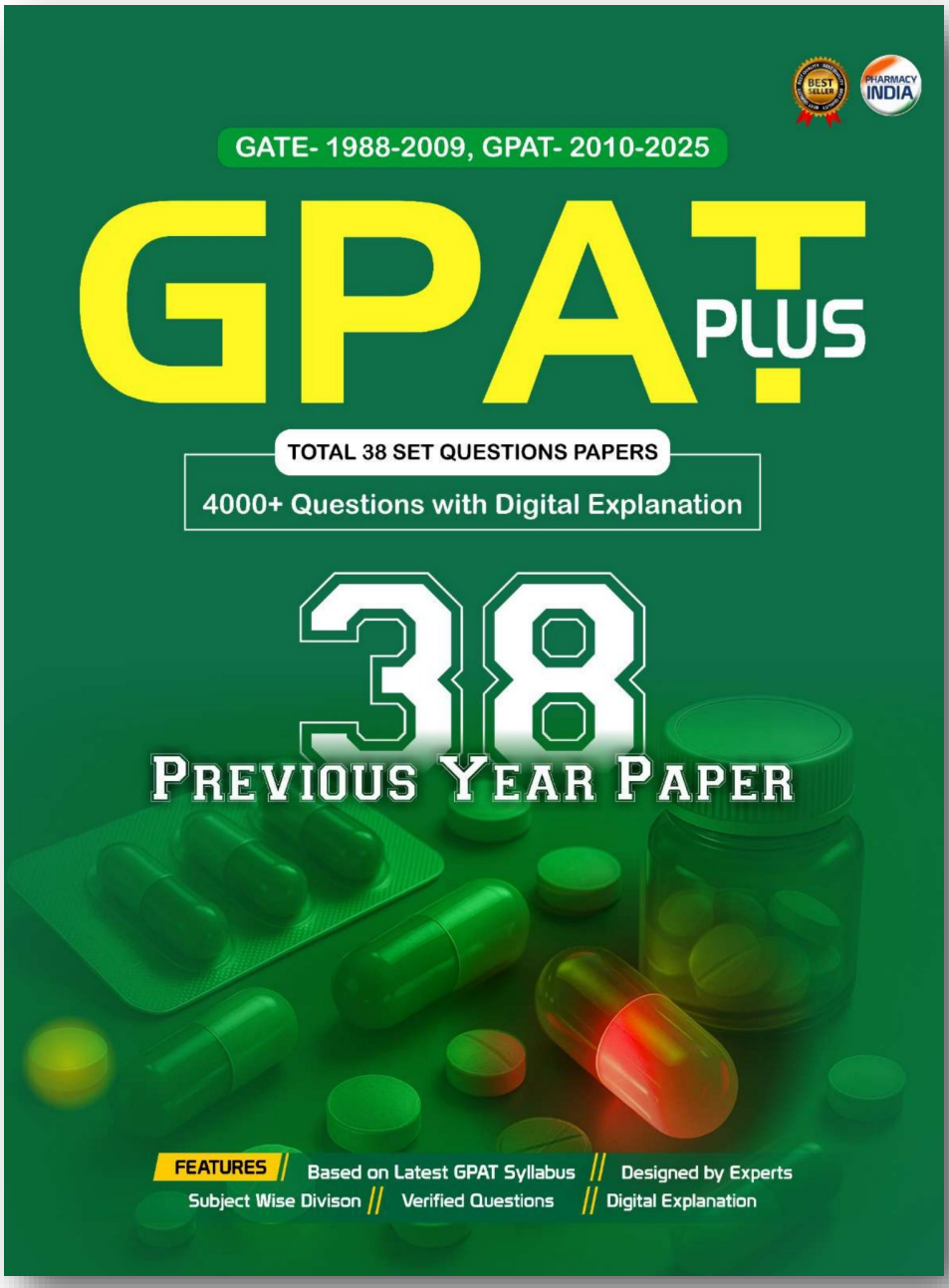

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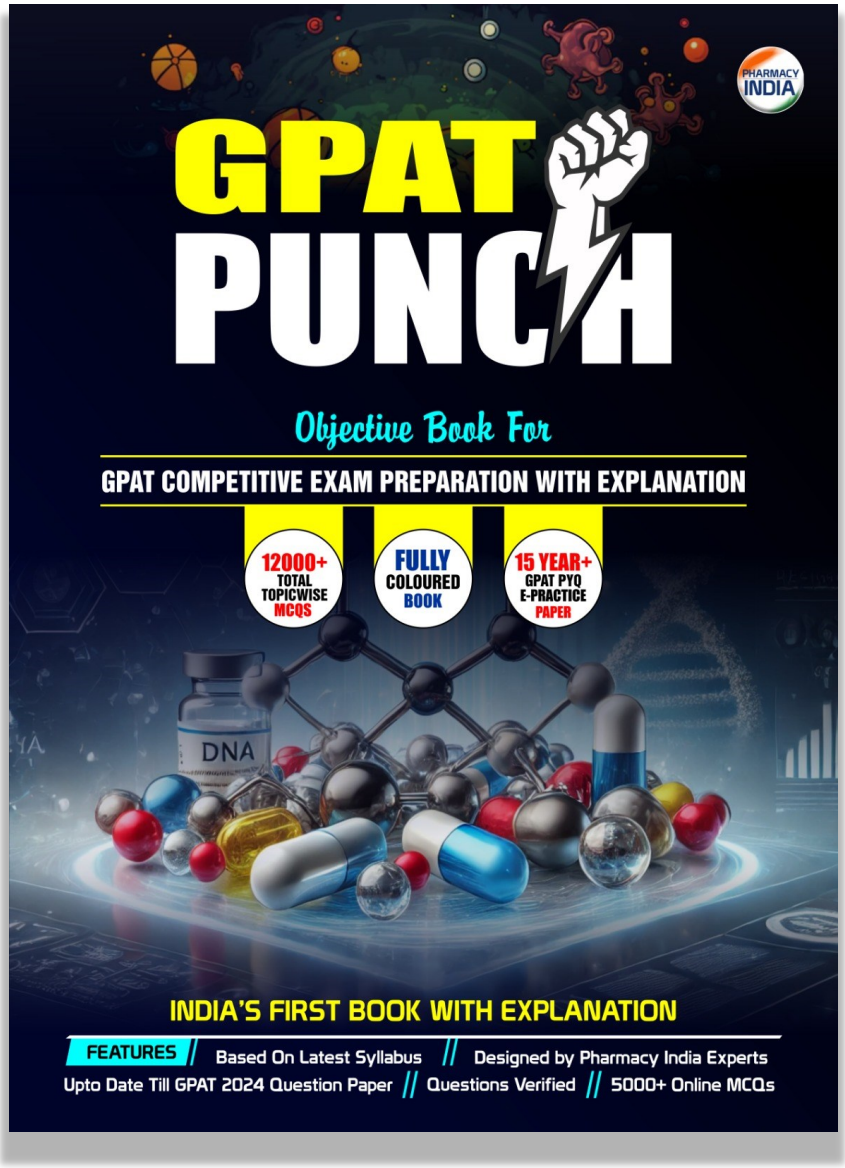

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