

GATE-2005

1. If the Carr's index of a powder is 10% then the type of powder flow is
(a) Poor (b) Excellent (c) Very poor (d) Good
2. Mixing of semisolids is carried out using
(a) Double cone mixer (b) Rotating cube mixer
(c) Planetary mixer (d) Fluidized bed mizer
3. In the preparation of small pox vaccine, the drying process used is
(a) Spray drying (b) Vacuum drying
(c) Drum drying (d) Freeze drying
4. In cosmetic preparations, an antioxidant used in an aqueous system, is
(a) Sodium formaldehyde sulphoxylate
(b) α -Tocopherol
(c) Methyl paraben
(d) Phenol
5. In tablet coating process, inadequate spreading of the coating solution before drying causes
(a) Orange peel effect (b) Sticking effect
(c) Blistering effect (d) Picking effect
6. Presence of one of the following characteristics show that the *Rauwolfia serpentina* is adulterated with other species of *Rauwolfia*
(a) Compound starch grains
(b) Cluster crystals of calcium oxalate
(c) Lignified sclereids
(d) Unlignified pericyclic fibres
7. Chinese rhabotic rhubarb can be distinguished from Indian rhubarb by fluorescence developed in UV light which is
(a) Deep yellow (b) Deep violet (c) Green (d) Blue
8. Citrus flavonoids are rich in
(a) Aesculetin (b) Fraxin
(c) Hesperidin (d) Scopoktin
9. The quantitative values determined for the identification of leaf drugs remain constant throughout the age of plant
(a) Stomatal number (b) Vein termination number
(c) Veiniskt number (d) Stomatal Index
10. The alkalid which inhibits the cholinesterase undergoes hydrolysis in solution to give Methylkarbamic acid and Eseroline is
(a) Scopolamine (b) Pyridostigmine
(c) Neostigmine (d) Physostigmine
11. Luminescence is the term applied to
(a) Absorbed radiation
(b) Re-emission of previously absorbed radiation
(c) Excited radiation
(d) Transmitted radiation
12. Polarogram of a solution containing an electro-reducible substance is obtained by plotting the graph of
(a) Current vs Volume (b) Current vs. Potential
(c) Resistance vs. Time (d) Potential vs. Volume
13. Silica gel used in most of the absorbent columns contains-OH groups. So it is
(a) Basic (b) Neutral
(c) Acidic (d) Both acidic and basic
14. The electronic transition possible in Br_2 is
(a) $\sigma - \sigma^*$ (b) $\sigma - \sigma^*$ and $n - \sigma^*$
(c) $\sigma - \pi^*$ and $\pi - \pi^*$ (d) $n - \sigma^*$ and $\sigma - \pi^*$
15. Ferrous ion is very weakly colored for colorimetric analysis. It can be converted into highly colored complex using
(a) H_2SO_4 (b) PDAB
(c) Thymol blue (d) 1, 10-Phenanthroline
16. Prazepam, Oxazepam, Clonazepam are structurally similar and have the system
(a) SH-Dibenz (b, f) azepine
(b) 1,2,4-Benzothiadiazepine
(c) Benzodiazepine
(d) Phenothiazine
17. $11\beta,21\text{-Dihydroxy pregn-4-ene-3,18,20-trione}$ is
(a) Aldosterone (b) Progesterone
(c) Cholesterol (d) Cortisone
18. 4, 7-Dichloroquinoline on treatment with 4-amino phenol gives
(a) 7-chloro-2-(2-hydroxy phenyl amino) quinoline
(b) 7-chloro-4-(4-amino phenyl) quinoline
(c) 7-chloro-4-(4-hydroxy phenyl amino) quinoline
(d) 4-chloro-7-(4-Hydroxy phenyl amino) quinoline
19. Egonine, a hydrolytic product of cocaine on treatment with chromium trioxide gives a keto acid, which on thermal decarboxylation results in
(a) Atropic acid (b) Tropic acid
(c) Pseudo cocaine (d) Tropinone
20. A natural product derivative developed as an antimalarial is
(a) Artemether (b) Paludrine
(c) Pyrimethamine (d) Halofantrine
21. Ternary complex' refers to the state when
(a) An enzyme forms a covalent complex with its substrate
(b) An enzyme forms a non covalent complex with either a substrate or a product
(c) An enzyme that catalyses a reaction with two or more substrates, is concurrent complexed with both substrates
(d) An enzyme complexed to a product, just after catalysis

22. The most important clue that helped in the determination of the double helical structure of DNA came from
 (a) Chargaff's rules
 (b) Hershey-Chase experiment
 (c) Avery-MacLeod-McCarty experiment
 (d) Nirenberg and Khorana's codon experiment

23. Diversity antibody molecules is brought about by
 (a) Post translational modifications
 (b) Gene rearrangements
 (c) Usage of special genetic codes
 (d) Multiple mutations in the polypeptides

24. The etiological agent of infectious mononucleosis, also associated with a form of Burkitt's lymphoma is
 (a) Varicella Zoster Virus (b) Epstein Barr Virus
 (c) Picorna Virus (d) Papovavirus

25. Tissue plasminogen activator that disperses blood clots, beneficial if it is given within
 (a) 3 days (b) 9 hours (c) 3 hours (d) 24 hours

26. An anticholinesterase which is useful in Alzheimer's disease is
 (a) Arecolin (b) Donepezil
 (c) Isoproterenol (d) Clioquinol

27. A drug is used as an ophthalmic solution in Herpes keratitis is
 (a) Zalcitabine (b) Trifluridine
 (c) Ritonavir (d) Stavudine

28. A macrolide antibiotic used as a powerful immunosuppressive agent is
 (a) Erythromycin Cytosine arabinoside
 (b) Azithromycin
 (c) Tacrolimus
 (d) Chritromycin

29. Cytosine arabinoside acts on this phase of the cell cycle
 (a) G_1 (b) G_2 (c) M (d) S

30. The chairman of the Drugs Technical Advisory Board is
 (a) The drugs Controller of India
 (b) The Director, Central Drugs Laboratory, Kolkata
 (c) The President, Pharmacy Council of India
 (d) The Director General of Health Services

31. Predict the product obtained by treating 6-chloro-3, 5-diamino pyrazin-2-methyl carboxylate with Guanidine
 (a) Amiloride (b) Hydrochlorothiazide
 (c) Triamterene (d) Furosemide

32. 2-hydroxy-5,9-dimethyl-6,7-benzomorphan derivative is
 (a) Pentazocine (b) Hydrocodone
 (c) Codeine (d) Buprenorphine

33. The raw materials used for the synthesis of Sulfalene are
 (a) 4-acetamido benzene sulfonyl chloride and 2-amino-4-methyl pyrimidine
 (b) 4-acetamido benzene sulfonyl chloride and 5-amino-2-ethyl-1,3,4-thiadiazole
 (c) 4-acetamido benzene sulfonyl chloride and 5-amino-3,4-dimethyl isoxazole
 (d) 4-acetamido benzene sulfonyl chloride and 3-amino-2-methoxy pyrazine

34. Phenoxy benzamine can be prepared from
 (a) Phenol and propylene oxide
 (b) 3-phenylpropanol
 (c) Phthalic anhydride
 (d) B-phenyl succinic acid

35. Glycyrrhizin, a sweet principle of liquorice is
 (a) K and Mg salts of glycyrrhizinic acid
 (b) Na and Mg salts of glycyrrhetic acid
 (c) K and Ca salts of glycyrrhizinic acid
 (d) Na and Ca salts of glycyrrhetic acid

36. Allopoloids are polyploids derived from
 (a) A single parental species genomes
 (b) More than one parental species genomes
 (c) A plant with haploid number of chromosomes
 (d) A plant with diploid number of chromosomes

37. The most effective method for producing virus-free plants is
 (a) Root culture (b) Meristem culture
 (c) Somatic embryogenesis (d) Floriculture

38. A person taking organic nitrate has to avoid one of the following drugs as it can cause severe hypotension
 (a) Aspirin (b) Cholestyramine
 (c) Warfarin (d) Sildenafil

39. To avoid Lithium toxicity, a patient using Lithium carbonate for mood disorders should not be prescribed
 (a) Acetazolamide (b) Hydrochlorothiazide
 (c) Mannitol (d) Propranolol

40. A selective serotonin reuptake inhibitor used as an antidepressant is
 (a) Venlafaxine (b) Selegiline
 (c) Phenelzine (d) Amoxapine

41. A patient receiving Digoxin for CCF is found to have elevated serum cholesterol Which hypolipidemic agent should not be prescribed
 (a) Clofibrate (b) Cholestyramine
 (c) Lovastatin (d) Niacin

42. In the study of enzyme kinetic V_{max} is said to be attained when
 (a) There is an excess of free enzyme as compared to the substrate
 (b) Virtually all of the enzyme is present as the enzyme-substrate complex and concentration of the free enzyme is vanishingly small
 (c) The maximum velocity of the reaction in the presence of low substrate concentration
 (d) When the concentration of free enzyme equals that of the enzyme-substrate complex

43. Serum sample of a patient shows elevated levels of y-glutamyl transferase. The patient could be suffering from
 (a) Kidney disorder (b) Liver disease
 (c) Parkinson's disease (d) Myocardial infarction

44. Acid-fast organisms are seen in the sputum of a 48-year old alcoholic man. A test to confirm whether he needs long-term multi-drug treatment for tuberculosis is
 (a) Chest X-ray
 (b) Ziehl-Neelsen stain of the sputum

(c) Sputum cytology
(d) Mycobacterial cultures of the sputum

45. The distinguishing feature in IR spectra between propionaldehyde and acetone is
(a) Weak CH stretching and out of plane bending in propionaldehyde
(b) Keto group in acetone
(c) Two methyl group acetone
(d) $-\text{CH}_2$ group in propionaldehyde

46. Nephelometrical measurement are most sensitive for
(a) Clear solution (b) Concentrated solution
(c) Thick suspension (d) Very dilute suspension

47. The number of peaks shown by diethyl ether in an NMR spectrum are
(a) Four (b) Two (c) One (d) Five

48. The half-life for a zero order reaction is calculated using
(a) $t_{1/2} = 0.693/k$ (b) $t_{1/2} = 2.303/k$
(c) $t_{1/2} = 1/ak$ (d) $t_{1/2} = a/2k$

49. The biological half-life of Procaine in patient was 35 minutes and its volume of distribution was estimated to be 60 L. The total clearance rate of Procaine is
(a) 1.188L/min (b) 0.115L/min
(c) 11.5L/min (d) 5.571./min

50. The ratio of the void volume to the bulk volume of the packing of the powder is called as
(a) Porosity (b) True density
(c) Granular density (d) Bulk density

51. A co-solvent used in the preparation of parenteral products is
(a) Benzyle alcohol (b) Methyl alcohol
(c) Dimethyl acetamide (d) Phenol

52. In mass spectroscopy, positively charged ions be produced by
[P] Heating of the sample
[Q] Bombarding the sample with high energy electrons
[R] Bombarding the sample with high energy protons
[S] Chemical ionisation
(a) [Q], [S] (b) [Q], [R] (c) [P], [R] (d) [P], [S]

53. A plasticizer and a high boiling point solvent used in the preparation of nail lacquers are
[P] Butyl stearate [Q] Ethyl lactate
[R] Ethyl alcohol [S] Acetone
(a) [P], [Q] (b) [Q], [S] (c) [R], [S] (d) [Q], [R]

54. Two of the following attributes are true for describing the mechanism of action of Thiabendazole
[P] Neuromuscular blocking causing spastic paralysis
[Q] Blocks the response of the Ascaris muscle to Ach, causing flaccid paralysis in worms
[R] Inhibits the Helminth specific enzyme fumarate reductase
[S] Arrest nematode cell divisions in metaphase by interfering with microtubule assembly
(a) [P], [Q] (b) [R], [S]
(c) [Q], [S] (d) [Q], [R]

55. The colour and flavor of saffron are due to
[P] Crocin [Q] Crocetin
[R] Safranal [S] Crepenyic acid
(a) [R], [S] (b) [P], [R] (c) [Q], [S] (d) [Q], [P]

56. Predict the two impurities which are likely to be present in Glipizide
[P] 5-methyl-N-[2-(4-sulphamoyl phenyl ethyl] pyrazine-2-carboxamide
[Q] 5-methyl-N-[2-(2-sulphamoyl phenyl ethyl] pyrimidine-2-carboxamide
[R] Cyclohexanamine
[S] Cyclohexane
(a) [P], [R] (b) [P], [Q] (c) [R], [Q] (d) [R], [S]

57. Cakipotriene, synthetic vitamin D3, analogue has the following attributes
[P] Pronounced antirachitic activity
[Q] Inhibits epidermal cell proliferation and enhances cell differentiation
[R] Used as a topical application in the treatment of moderate plaque psoriasis
[S] Effect on calcium metabolism is 200 times more than Ergocalciferol
(a) [Q], [S] (b) [P], [Q] (c) [P], [S] (d) [Q], [S]

58. Insulin when released from the pancreatic β cells
[P] Can sequester blood glucose by forming a complex with it
[Q] Gets full conjugated with glucuronic acid immediately, to be released upon suitable stimuli in normal health
[R] Acts on the transporter molecules to facilitate glucose movement across the membranes
[S] Increases storage of glucose to glycogen in the liver
(a) [P], [R] (b) [R], [S] (c) [Q], [S] (d) [Q], [P]

59.

Group-I	Group-II
Drugs	Titrants used in IP assays
1. Ascorbic acid	[P] THAH
2. Pyridoxine HCl	[Q] Iodine
3. Dapsone	[R] HClO_4
4. Fluorouracil	[S] Sodium nitrite
(a) 1-[P], 2-[S], 3-[R], 4-[Q] (b) 1-[Q], 2-[R], 3-[S], 4-[P] (c) 1-[S], 2-[Q], 3-[P], 4-[R] (d) 1-[R], 2-[Q], 3-[S], 4-[P]	

60.

Group-I	Group-II
Umbelliferous fruit	Diagnostic character
1. Fennel	[P] Wavy sclerenchyma
2. Indian Dill	[Q] Branched and unbranched vitta
3. Coriander	[R] Reticulately lignified parenchyma
4. Anise	[S] Lateral ridges with vascular bundles

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

Group-I	Group-II
Enzyme systems responsible	Phase 2. conjugation pathways
1. UDP-glucuronosyl transferase	[P] N-methylation
2. ATP-sulfurylase & APS-Phosphokinase	[Q] Sulphate conjugation
3. Acyl synthetase & transacetylase	[R] Glucuronidation
4. ATP-methionine adenosine transferase and methyl transferase	[S] Amino acid conjugation
(a) 1-[P], 2-[S], 3-[R], 4-[Q] (b) 1-[Q], 2-[R], 3-[P], 4-[S] (c) 1-[R], 2-[Q], 3-[S], 4-[P] (d) 1-[S], 2-[P], 3-[Q], 4-[R]	

Group-I	Group-II
Drug	Mechanism
1. Levofloxacin	[P] Inhibits adenosine deaminase
2. Econazole	[Q] Inhibits topoisomerase
3. Pentostatine	[R] Forms adducts with DNA
4. Procarbazine	[S] Interferes with amino acid transport by action on the membrane
(a) 1-[R], 2-[Q], 3-[P], 4-[S] (b) 1-[Q], 2-[S], 3-[P], 4-[R] (c) 1-[P], 2-[Q], 3-[S], 4-[R] (d) 1-[S], 2-[Q], 3-[R], 4-[P]	

Group-I	Group-II
Terms	Explanation
1. Saturated air	[P] Pounds of water vapour carried one pound of dry air under any set of conditions
2. Dew point	[Q] The water vapour is in equilibrium with liquid water at the conditions of temperature & pressure
3. Humid volume	[R] The volume is cubic feet occupied by one pound of dry air and its accompanying water vapour
4. Humidity	[S] Temperature to which a mixture of air and water vapour must be cooled in order to become saturated
(a) 1-[P], 2-[S], 3-[Q], 4-[R] (b) 1-[S], 2-[R], 3-[P], 4-[Q] (c) 1-[R], 2-[P], 3-[S], 4-[Q] (d) 1-[Q], 2-[S], 3-[R], 4-[R]	

Group-I	Group-II
Antibiotic	Test organism for microbiological assay IP
1. Bleomycin	[P] <i>Pseudomonas aeruginosa</i>
2. Nystatin	[Q] <i>Mycobacterium smegmatis</i>
3. Carbenicillin	[R] <i>Bacillus subtilis</i>
4. Streptomycin	[S] <i>Saccharomyces cerevisiae</i>

Group-I	Group-II
Pathoimmunological condition	Drugs used in the treatment
1. Urticaria	[P] Cyclosporine
2. Autoimmune thrombocytopenia	[Q] Antihistaminic
3. Rheumatoid arthritis	[R] Intravenous immunoglobulin
4. Organ transplant rejection	[S] Glucocorticoids
(a) 1-[P], 2-[Q], 3-[S], 4-[R] (b) 1-[S], 2-[P], 3-[R], 4-[Q] (c) 1-[R], 2-[P], 3-[Q], 4-[S] (d) 1-[Q], 2-[R], 3-[S], 4-[P]	

Statement for linked answer
 Question 66, 67

A sample of *Cinnamomum zeylanicum* purchased from the market was evaluated for its authenticity

66. It shows
 (a) Presence of cork and cortex
 (b) Absence of cork and cortex
 (c) Absence of phloem fibres
 (d) Presence of xylem parenchyma

67. Volatile oil should not be less than
 (a) 0.05% (b) 0.20% (c) 0.50% (d) 1.00%

Statement for linked answer
 Question 68, 69, 70

Chloroacetic acid and hydrazine are treated with X to get semicarbazide acetic acid in which ring closure takes place to 1-amino hydantoin. It is subsequently treated with 2-diacetoxy ethyl-5-nitrofuran to get nitrofurantoin

68. Reagent 'X' is
 (a) Cuprous chloride (b) Potassium cyanate
 (c) Silver nitrate (d) Mercurous chloride

69. Its IUPAC name is

- (a) 1-(5-nitrofurfuryl) hydantoin
- (b) 1-(5-nitrofurfurylidene hydroxy) hydantoin
- (c) 1-(5-nitrofurfurylidine amino) hydantoin
- (d) 1-(5-aminofurfurylidine nitro) hydantoin

70. Its gastrointestinal tolerance can be improved without interfering with oral absorption by preparing a

- (a) Solid dispersion
- (b) Prodrug
- (c) Large cysalline form (Macrodantian)
- (d) Suspension

Statement for linked answer
Question 71,72

A compound 'X' with molecular formula C_2H_4O exhibits a strong absorption band at 1730 cm^{-1} in IR spectrum On reduction is converted into 'Y' which shows a strong band at 3640 cm^{-1}

71. Assign the band in X to

- (a) CH_3
- (b) $C=C$
- (c) $C=O$
- (d) $CH_2C=O$

72. The strong band in Y is due to

- (a) $-C-C-$
- (b) $-C-O-C-$
- (c) $=CH_2$
- (d) $-OH$

Statement for linked answer
Question 73, 74, 75

In the management of asthma, the drugs used are Salmeterol, Zafirlukast, Budesonide, Nedocromil sodium and Bambuterol

73. Zafirlukast acts as

- (a) β_2 adrenoceptor agonist
- (b) Cysteinyl-leukotriene receptor antagonist
- (c) Muscarinic receptor antagonist
- (d) Antihistamine

74. A prodrug of Terbutaline is

- (a) Zafirlukast
- (b) Salmeterol
- (c) Bambuterol
- (d) Nedocromil sodium

75. Warfarin interacts with this antiasthmatic drug and increases prothrombin time

- (a) Budesonide
- (b) Zafirlukast
- (c) Salmeterol
- (d) Bambuterol

Statement for linked answer
Question 76, 77, 78

In a pharmaceutical industry batch filtration of liquids where the proportion of liquids is high is to be carried out. The complete recovery of solids is required. After filter the filtrate, which is corrosive, gives a crystalline product on evaporation. The liquid to deposit scales or crystals on the heating surface during evaporation.

76. The suitable filtration equipments is

- (a) Plate and frame
- (b) Leaf filter
- (c) Meta filters
- (d) Membrane filters

77. The filter aid used in the above filtration is

- (a) Sand
- (b) Nylon fiber cloth
- (c) Activated carbon
- (d) Filter paper

78. A suitable evaporator is

- (a) Falling film evaporator
- (b) Forced circulation evaporator
- (c) Vertical evaporator
- (d) Horizontal tube evaporator

Statement for linked answer
Question 79, 80

Isoprenoid biosynthesis is involved in the production of many biologically important compounds such as cholesterol, Steroid hormones, Vitamin K, Vitamin E and bile acid

79. HMG-CoA reductase, a key enzyme in the pathway, catalyzes

- (a) Side-chain cleavage in the conversion of cholesterol to steroid hormones
- (b) The reduction of the thio-ester group to an alcohol in mevalonate biosynthesis D
- (c) The reduction of the hydroxyl group mevalonate to Vitamin
- (d) Steroid condensation reaction in biosynthesis of bile acids

80. The inhibition of HMG-CoA reductase is a strategy used in the treatment of

- (a) Familial hypercholesterolemia
- (b) Vitamin K deficiency
- (c) Inflammation in the joints
- (d) Hepatic parenchymal disease

Statement for linked answer
Question 81a, 81b

A person after orthopaedic surgery is prescribed a selective COX-2 inhibitor

81a. The selective COX-2 inhibitor is

- (a) Ketorolac
- (b) Rofecoxib
- (c) Indomethacin
- (d) Naproxen

81b. The drug selected is not be given, if the patient is already taking

- (a) Antiallergic drugs
- (b) Anxiolytic drugs
- (c) Antihypertensive drugs
- (d) Oral antidiabetic agents

Statement for linked answer
Question 82a, 82b

A drug solution has an initial potency of 300 mg/10 ml. When stored in a refrigerator for (a) 30 days, its potency was found to be 100mg/10ml

82a. The rate constant, assuming that the drug solution undergoes first order kinetics

- (a) 0.0366 day^{-1}
- (b) 0.0074 da y^{-1}
- (c) 0.0174 day^{-1}
- (d) 0.0506 day^{-1}

82b. Half - life of the drugs solution, under these condition is

- (a) 9.4 days
- (b) 19 days
- (c) 47 days
- (d) 4.7 days

Statement for linked answer Question 83a.83b

Ginger is a widely used herbal drug, containing many chemical constituents

**Statement for linked answer
Question 84a, 84b**

2,6-dimethylphenol and chloroacetone reaction gives "X", which on treatment with hydroxylamine and hydrochloric acid gives intermediate product. This on further treatment with Raney nickel in acid, gives the final product

84a. The product 'X' is

- (a) 1-(2,6-Dimethyl phenoxy)-2-propanone
- (b) 1-(2,6-Dimethyl phenoxy)-2-butanone
- (c) 1-(2,6-Dimethyl phenoxy)-2-isopropanone
- (d) 1-(2,6-Dimethyl phenoxy)-2-pentanone

84b. The final product is

- (a) 1-methyl-2-(2,6-xylyloxy) isopropylamine
- (b) 1-methyl-2-(2,6-xylyloxy) ethylamine
- (c) 1-methyl-2-(2,6-xylyloxy) butylamine
- (d) 1-methyl-2-(2,6-xylyloxy) pentylamine

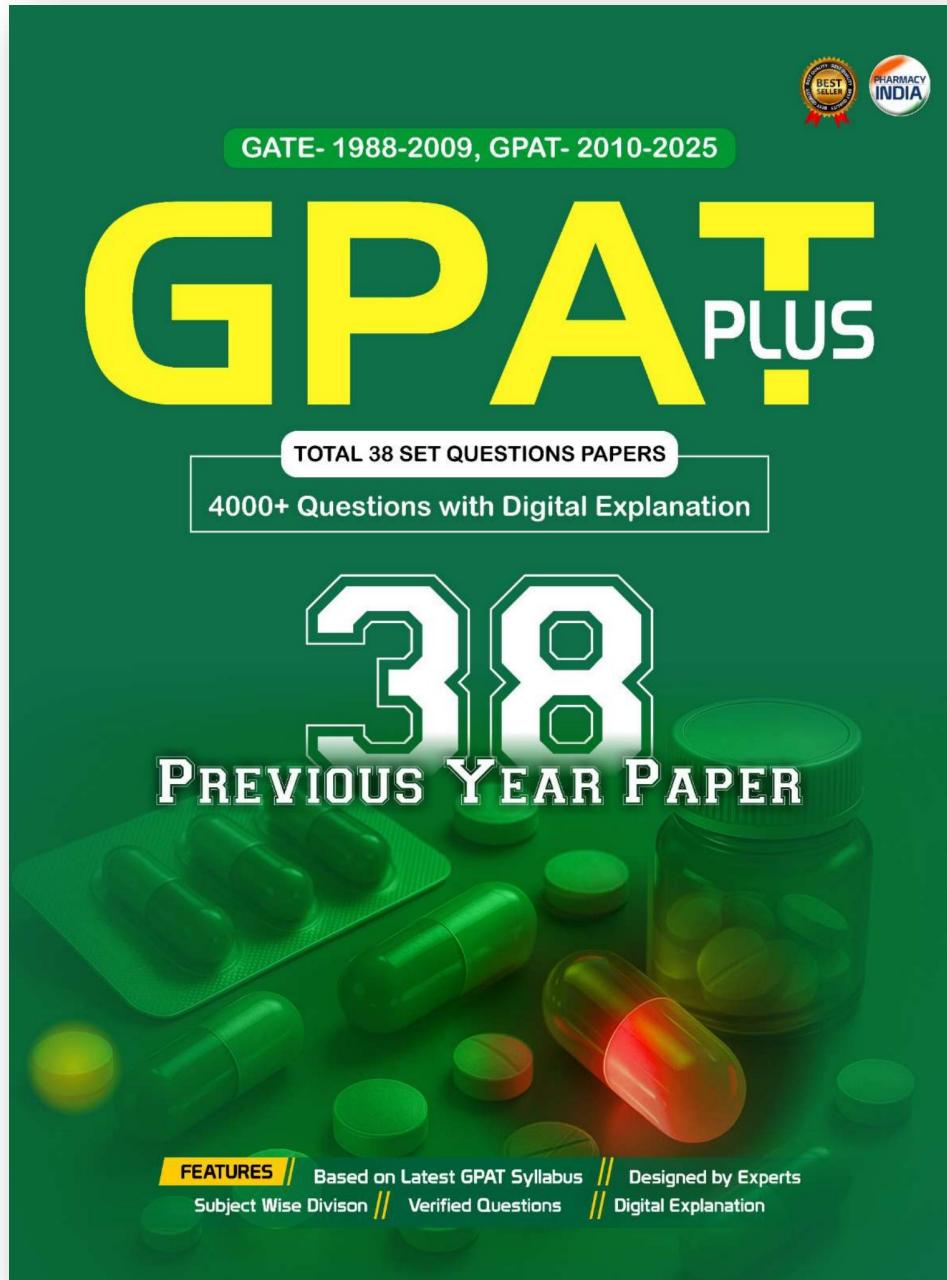
Statement for linked answer Question 85a, 85b

An organic compound 'X' has an absorption maxima at 217 nm. Its epsilon ϵ_{max} is 1600. The absorbance is 0.64 when the cell length is 1 cm.

Answer Key

1-b	2-c	3-d	4-a	5-a	6-c	7-d	8-c	9-d	10-d
11-b	12-b	13-c	14-b	15-d	16-c	17-a	18-c	19-d	20-a
21-c	22-a	23-b	24-b	25-b	26-b	27-b	28-c	29-d	30-d
31-a	32-a	33-d	34-a	35-c	36-b	37-b	38-d	39-b	40-a
41-c	42-b	43-b	44-a	45-a	46-d	47-b	48-d	49-a	50-a
51-c	52-a	53-a	54-b	55-d	56-a	57-a	58-b	59-b	60-d
61-c	62-b	63-d	64-a	65-d	66-b	67-d	68-b	69-c	70-c
71-c	72-d	73-b	74-c	75-b	76-b	77-c	78-b	79-b	80-a
81(a)-b	81(b)-c	82(a)-a	82(b)-b	83(a)-c	83(b)-a	84(a)-a	84(b)-b	85(a)-c	85(b)-d

COD AVAILABLE ON



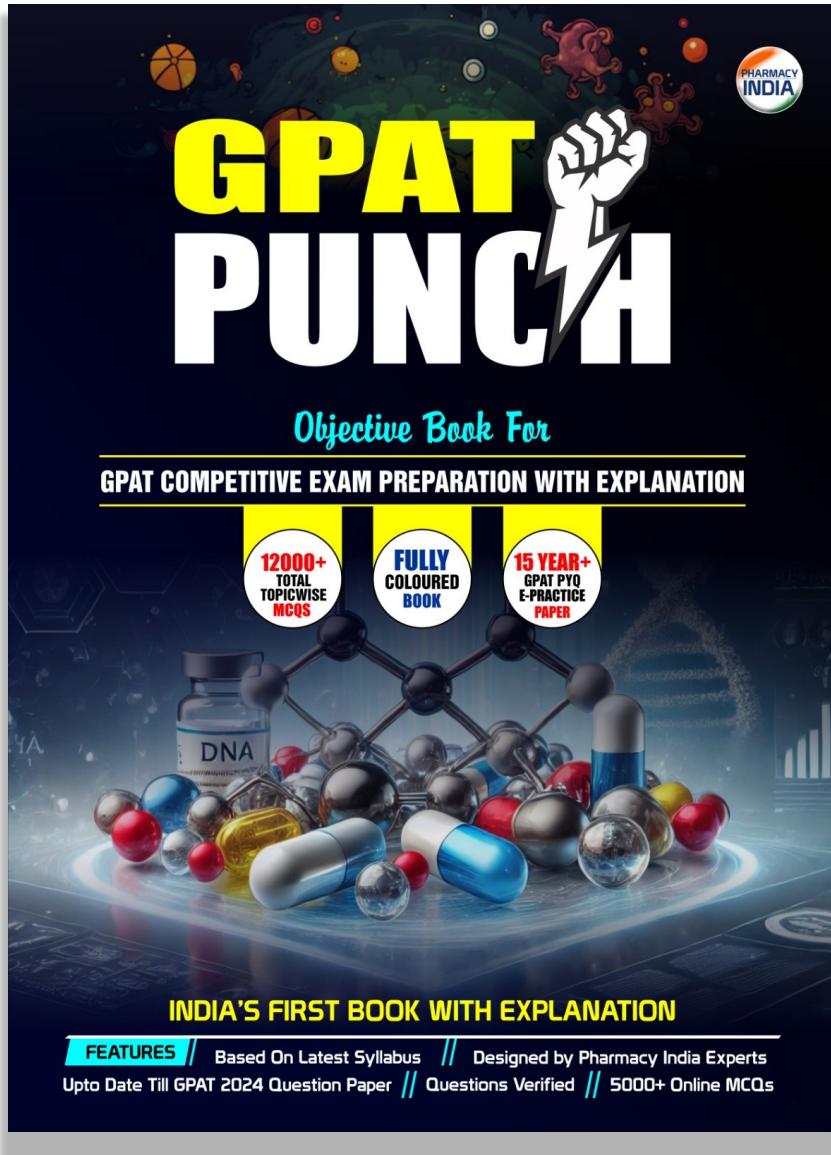
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