

GPAT QUESTION PAPER 2005 WITH ANSWER KEY

PHARMACEUTICAL SCIENCE

Time : 3 hours

Maximum Marks : 150

(Q. 1 - 30) CARRY ONE MARK EACH

- 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
- Mixing of semisolids is carried out using
(a) Double cone mixer (b) Rotating cube mixer
(c) Planetary mixer (d) Fluidized bed mixer
- In the preparation of small pox vaccine, the drying process used is
(a) Spray drying (b) Vacuum drying (c) Drum drying (d) Freeze drying
- In cosmetic preparations, an oxidant used in an aqueous system, is
(a) Sodium formaldehyde sulfoxylate (b) α -Tocopherol
(c) Methyl paraben (d) Phenol
- 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
- Presence of one of the following characteristics show that the Rauwolfia serpentine is adulterated with other species of Rauwolfia.
(a) Compound starch grains (b) Cluster crystals of calcium oxalate
(c) Lignified sclerides (d) Unlignified pericyclic fibres
- Chinese rhapontic 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
- Citrus flavonoids are rich in
(a) Aesculetin (b) Fraxin (c) Hesperidin (d) Scopoletin
- The quantitative values determined for the identification of leaf drugs remain constant throughout the age of plant EXCEPT
(a) Stomatal number (b) Veinlet termination number
(c) Veinlet number (d) Stomatal Index
- The alkaloid which inhibits the cholinesterase undergoes hydrolysis in solution to give methyl carbamic acid and eseroline is
(a) Scopolamine (b) Pyridostigmine (c) Neostigmine (d) Physostigmine
- 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
- (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) $n - \pi^*$ and $\sigma - \pi^*$
15. Ferrous ion is very weakly colored for colorimetric analysis. It can be converted into a 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) 5H-Dibenz (b, f) azepine (b) 1,2,4-Benzothiadiazepine
(c) Benzodiazepine (d) Phenothiazine
17. $11\beta, 21$ -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. Ecgonine, 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 substance or a product
(c) An enzyme that catalyses a reaction with two or more substrates, is concurrently 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 assignments



23. Diversity in 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 anticholinestrase which is useful in Alzheimer's disease is
 (a) Arecoline (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 (b) Azithromycin (c) Tacrolimus (d) Clarithromycin
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 Sulfalen 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. Phexon benzamine can be prepared from
 (a) Phenol and propylene oxide (b) 3-phenylpropanol
 (c) Phthalic anhydride (d) p-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. Allopolyploids are derived from
- (a) A single parental species genome (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 kinetics, 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 <http://www.xamstudy.com>
(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 γ -glutamyl transaminase. 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 C-H stretching and out of plane bending in propionaldehyde
(b) Keto group in acetone
(c) Two methyl groups in acetone
(d) $-\text{CH}_2$ group in propionaldehyde



46. Nephelometrical measurement are most sensitive for
 (a) Clear solution (b) Concentrated solution
 (c) Thick suspensions (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) 1.1881L/min (b) 0.115L/min (c) 11.5L/min (d) 5.57L/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) Benzyl alcohol (b) Methyl alcohol (c) Dimethyl acetamide (d) Phenol

(Q.52-58)

MULTIPLE SELECTION ITEMS. P, Q, R, S ARE OPTION. TWO OF THESE OPTION ARE CORRECT. CHOOSE THE CORRECT COMBINATION AMONG A, B, C AND D.

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
 (P) Neuromuscular blocking causing spastic paralysis
 (Q) Blocks the response of the Ascaris muscle to ACH, causing flaccid paralysis in the worms
 (R) Inhibits the Helminth specific enzyme fumarate reductase
 (S) Arrest nematode cell divisions in metaphase by interfering with microtubule assemble
 (a) P, Q (b) P, R (c) Q, S (d) Q, R
55. The colour and flavor of saffron are due to –
 (P) Crocin (Q) Crocetin (R) Safranal (S) Crocenylic acid
 (a) R, S (b) P, R (c) Q, S (d) Q, R



56. Predict the two impurities which are likely to be present in Glipizide
 (P) 5-methyl-N-[2-(4-sulphamoyl phenyl ethyl) pyrazin-2- carboxamid
 (Q) 5-methyl-N-[2-(2-sulphamoyl phenyl) pyrazine-2-carboxamide
 (R) Cyclohexanamine
 (S) Cyclohexane
 (a) P, R (b) P, Q (c) R, Q (d) R, S
57. Calcipotrience, 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 Ergocaliferol
 (a) Q, R (b) P, Q (c) R, S (d) Q, S
58. Insulin when released from the pancreatic b cells
 (P) Can sequester blood glucose by forming a complex with it.
 (Q) Gets fully 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 cell membranes
 (S) Increases storage of glucose to glycogen in the liver
 (a) R, S (b) P, R (c) Q, S (d) Q, P

(Q. 59-65) ARE "MATCHING" EXERCISES.

MATCH GROUP I WITH GROUP II CHOOSE THE CORRECT COMBINATION AMONG THE ALTERNATIVES A,B,C AND D.

59. **Group- I**

- (P) Ascorbic acid
 (Q) Pyridoxine HCl
 (R) Dapsone
 (S) Fluorouracil
 (a) P -1, Q-4, R-3, S-2
 (c) P -4,Q-2, R-1, S-3

Group- II

- (1) TBAH
 (2) Iodine
 (3) HClO₄
 (4) Sodium nitrite
 (b) P -1, Q-4, R-3, S-2
 (d) P -3,Q-2, R-4, S-1

60. **Group- I**

Umbelliferous fruit

- (P) Fennel
 (Q) Indian Dill
 (R) Coriander
 (S) Anise
 (a) P-1, Q-2, R-3, S-4
 (c) P-2, Q-3, R-4, S-1

Group- II

Diagnostic character

- (1) Wavy sclerenchyma
 (2) Branched and unbranched vittae
 (3) Reticulately lignified parenchyma
 (4) Lateral ridges with vascular bundles
 (b) P-3, Q-4, R-1, S-2
 (d) P-4, Q-1, R-2, S-3



61. **Group- I**

Enzyme systems responsible for Phase 2 conjugation pathways

- (P) UDP-glucuronosyl transferase
- (Q) ATP-sulfurylase & APS-Phosphokinase
- (R) Acyl synthetase & transacetylase
- (S) ATP-methionine adenosine transferase and methyl transferase

- (a) P-1, Q-4, R-3, S-2
- (c) P-3, Q-2, R-4, S-1

62. **Group-I**

Drug

- (P) Levofloxacin
- (Q) Econazole
- (R) Pentostatin
- (S) Procarbazine

- (a) P -3, Q-2, R-1, S-4
- (c) P -1, Q-2, R-4, S-3

63. **Group-I**

Terms

- (P) Saturated air
- (Q) Dew point
- (R) Humid volume
- (S) Humidity

- (a) P -1, Q-4, R-2, S-3
- (c) P -3, Q-1, R-4, S-2

Group- II

Types

- (1) N-methylation
- (2) Sulphate conjugation
- (3) Glucuronidation
- (4) Amino acid conjugation

- (b) P-2, Q-3, R-1, S-4
- (d) P-4, Q-1, R-2, S-3

Group-II

Mechanism

- (1) Inhibits adenosine deaminase
- (2) Inhibits topoisomerase II
- (3) Forms adducts with DNA
- (4) Interferes with amino acid transport by action on the membrane

- (b) P -2, Q-4, R-1, S-3
- (d) P -4, Q-2, R-3, S-1

Group-II

Explanation

- (1) Pounds of water vapour carried by one pound of dry air under any given set of conditions
- (2) The water vapour is in equilibrium with liquid Water at the given conditions of temperature and pressure
- (3) The volume is cubic feet occupied by one Pound of dry air and its accompanying water vapour
- (4) Temperature to which a mixture of air and Water vapour must be cooled in order to Become saturated

- (b) P -4, Q-3, R-1, S-2
- (d) P -2, Q-4, R-3, S-1



64. **Group-I**

Antibiotic

- (P) Bleomycin
- (Q) Nystatin
- (R) Carbenicillin
- (S) Streptomycin
- (a) P -2, Q-4, R-1, S-3
- (c) P -3, Q-2, R-4, S-1

65. **Group-I**

Pathoimmunological condition

- (P) Uraticaria
- (Q) Autoimmune thrombocytopenia
- (R) Rheumatoid arthritis
- (S) Organ transplant rejection
- (a) P -1, Q-2, R-4, S-3
- (c) P -3, Q-1, R-2, S-4

Group II

Test organism for microbiological assay IP

- (1) *Pseudomonas aeruginosa*
- (2) *Mycobacterium segmatis*
- (3) *Bacillus subtilis*
- (4) *Saccharomyces cerevisiae*
- (b) P -4, Q-1, R-3, S-2
- (d) P -3, Q-1, R-2, S-4

Group-II

Drugs used in the treatment

- (1) Cyclosporin
- (2) Anthihistamines
- (3) Intravenous immunoglobulin
- (4) Glucocorticoids
- (b) P -4, Q-1, R-3, S-2
- (d) P -2, Q-3, R-4, S-1

DATA FOR Q.66-80 ARE BASED ON THE STATEMENT/ PROBLE.CHOOSE THECORRECT ANSWER FOR QUESTION FROM THE OPTION A,B,C AND D

COMMON DATA FOR QUESTIONS 66,67

A sample of Cinnamoman 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 xylemparenchyma

67. Volatile oil should not be less than

- (a) 0.05%
- (b) 0.20%
- (c) 0.50%
- (d) 1.00%

COMMON DATA FOR QUESTIONS 68, 69, 70

Choroactiacid and hydrazine are treated with X to get semicarbazido acetic acid in which ring closure takes place to 1-amino hydantoin. It is subsequently treated with 2-duacetoxy methyl-5-nitrofurantoin 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-nitrofurfuryl hydroxy)hydantoin
- (c) 1-(5-nitrofurfuryl amino)hydantoin
- (d) 1-(5-nitrofurfuryl nitro)hydantoin

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

- (a) Solid dispersion
- (b) Prodrug
- (c) Large cyrsalline form (Macrofantian)
- (d) Suspension



COMMON DATA FOR QUESTIONS 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) $-OH$

COMMON DATA FOR 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

COMMON DATA FOR QUESTIONS 76, 77, 78

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

76. The suitable filtration equipments is

- (a) Plate and frame filter press (b) Leaf filters
(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 (d) Horizontal evaporator

COMMON DATA FOR 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
- Side-chain cleavage in the conversion of cholesterol to steroid hormones.
 - The reduction of the thio-ester group to an alcohol in mevalonate biosynthesis.
 - 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
- Familial hypercholesterolemia
 - Vitamin K deficiency
 - Inflammation in the joints
 - Hepatic parenchymal diseases

LINKED ANSWER QUESTIONS : Q. 81a TO Q. 85b CARRY TWO MARKS EACH

Statements for linked Answer Questions 81a & 81b:

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

81a. The selective COX-2 inhibitor is

- Ketorolac
- Refecoxib
- Indomethacin
- Naproxen

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

- Antiallergic drugs
- Anxiolytic drugs
- Antihypertensive drugs
- Oral antidiabetic agents

Statement for Linked Answer Questions 82a & 82b:

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

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

- 0.0366 day⁻¹
- 0.0074 day⁻¹
- 0.0174 day⁻¹
- 0.0506 day⁻¹

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

- 9.4 days
- 19 days
- 47 days
- 4.7 days

Statement for Linked Answer Questions 83a & 83b

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

83a. The pungent principal present in it, is

- Zingiberol
- Zingiberene
- Gingerol
- Cineole

83b. It's decomposition product, on boiling with 2% KOH is

- Zingiberone
- Shogaol
- Gingedio
- Gingediol acetate

Statement for Linked Answer Questions 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.

84.a. 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 Questions 85a & 85b:

An organic compound 'X' has an absorption maximum at 217 nm. Its e_{max} is 16,000. The absorbance is 0.64 when the cell length is 1 cm.

85a. The molar concentration of 'X' is

- (a) 5×10^{-5} (b) 4×10^{-5} (c) 4×10^{-4} (d) 5×10^{-2}

85b. The molar weight is 56.06, its concentration in gms/ml is

- (a) 2.5×10^{-6} (b) 0.25×10^{-6} (c) 5×10^{-5} (d) 2.24×10^{-6}

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