Bihar Public Service Commission

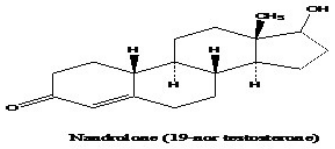
Drug Inspector Written (Objective) Competitive Examination (Advt. No. 09/2022)

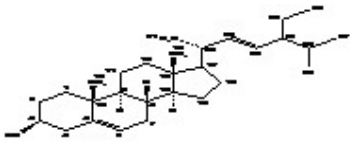
(Examination Date : 08.07.2023)

PROVISIONAL ANSWER KEY : Medicinal Chemistry (Paper-2, Unit I)

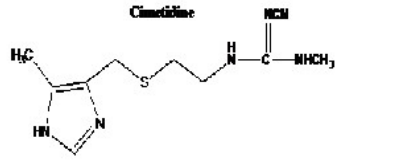
आयोग द्वारा उपलब्ध कराये गये उत्तर पूर्णतः औपबंधिक (**Provisional**) हैं। उपर्युक्त निर्धारित तिथि तक आपत्तिकर्त्ताओं से प्राप्त आपत्ति की गहन समीक्षा विषय विशेषज्ञों की समिति द्वारा की जायेगी और गहन समीक्षोपरान्त सभी प्रश्नों का अन्तिम आदर्श उत्तर तैयार किया जायेगा। विषय विशेषज्ञों की समिति द्वारा तैयार किये गये उक्त अन्तिम आदर्श उत्तर का आयोग द्वारा अनुमोदनोपरान्त उसके आधार पर ओ०एम०आर० उत्तर पत्रक (**OMR Answer Sheet**) का मूल्यांकन किया जायेगा।

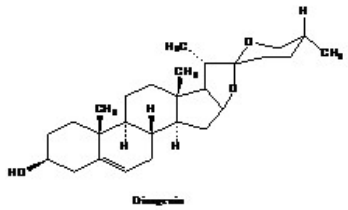
Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
1	C	9	D	25	A	33	B	**Reason:** The sex hormones androgens are derived from carbon -19 skeleton. Androgens are the original anabolic steroids. **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Steroids and related Drugs, Chapter-29, Pg- 466. b. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Steroids, Chapter-29, Pg-437.
2	C	10	D	26	A	34	B	**Reason:** Synthetic versions of the testosterone have more anabolic characteristics than androgenic properties. **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Steroids and related Drugs, Chapter-29, Pg- 466. b. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Steroids, Chapter-29, Pg-437.
3	A	11	B	27	C	35	D	**Reason:** The main actions of the Glucocorticoids (Corticosteroids) are the Immunosuppressive properties and the anti-inflammatory action. **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Steroids and related Drugs, Chapter-29, Pg- 476.

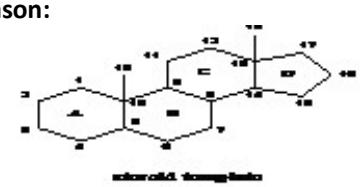
Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								b. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Steroids, Chapter-29, Pg-445.
4	C	12	D	28	A	36	B	**Reason: Absence of l9-methyl group**  Nandrolone (19-nor testosterone) **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Steroids and related Drugs, Chapter-29, Pg- 470. b. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Steroids, Chapter-29, Pg-441.
5	B	13	C	29	D	37	A	**Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Opioid Analgesics, Chapter-10, Pg- 120.
6	C	14	D	30	A	38	B	**Reason:** Methadone in its racemic form is very much used clinically as an analgesic. It posesses antitussive activity also. It has been found that the (+)-isomers of methadone and isomethadone are extremely potent antitussive with very little analgesic activity, whereas the (-)-isomers possess both potent antitussive and analgesic actions. **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Opioid Analgesics, Chapter-10, Pg- 127.
7	C	15	A	31	B	39	C	**Reference:** Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Chapter-25 Steroid Hormones and Therapeutically Related Compounds, Pg-836.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
8	C	16	A	32	B	40	C	**Reason:** Consumption of steroids increase body hair in women other than desired therapeutic effects **Reference:** Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Chapter Steroids
9	D	17	D	33	D	41	D	**Reason:** Angiotensin II plays a primary role in regulating aldosterone secretion. Upon stimulation by the renin–angiotensin system, aldosterone is secreted by the adrenal cortex and elicits its effects at various sites, including the nephrons. It is responsible for the reabsorption of sodium into the bloodstream. This results in increased levels of sodium in the plasma, which in turn result in increased blood volume and vascular resistance. If aldosterone levels in the body become too high, then symptoms such as elevated blood pressure or heart failure (formally classified as CHF) can occur. **Reference:** Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Drugs acting on the Renal System, Chapter-18, Pg-645
10	B	18	C	34	D	42	A	**Reason:** There are known several sterols which occur in plants. Stigmasterol and phytosterol are the principal phytosterols. Stigmasterol is a C-29 sterol obtained from soya and calabar bean oil. It is used for the production of progesterone. The structure is as follows:  **Reference:** Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Ed (2012), Steroids and related drugs, Chapter-29, Pg- 445.
11	C	19	D	35	A	43	B	**Reason:** Generally Histamine receptor antagonists are used primarily for the symptomatic relief of hypersensitivity (allergic) reactions such as urticaria and angioedema, rhinitis and conjunctivitis.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								Reference: Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Antihistamines, Chapter-20, 3rd Edition (2012), Pg- 265
12	C	20	D	36	A	44	B	**Reason:-** The poppy plant ***Papaver somniferum*** contains over 25 alkaloids. These alkaloids can be classified structurally as those having partially reduced phenanthrene skeleton and those containing the benzylisoquinoline system. The main phenanthrene alkaloids are : Morphine (10%) Codeine (0.5%) **Thebaine (0.2%)** The benzylisoquinolone members are: Papaverine (1%) Noscapine (narcotine) (6%) Reference: 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Opioid Analgesics, Chapter-10, 3rd Edition (2012), Pg-109. 2. K D Tripathi "Essentials of Medicinal Pharmacology" 8th edition () Opioid Analgesics and Antagonists, Chapter-34, Pg- 497.
13	D	21	A	37	B	45	C	**Reason:** The side effect nausea is associated with second generation antihistamines.
14	A	22	B	38	C	46	D	**Reason: Diphenhydramine (**β-dimethylaminoethylbenzhydryl**)** is the first aminoalkyl ether introduced in 1946. **Reference:** Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Antihistamines, Chapter-20, Pg- 267.
15	B	23	C	39	D	47	A	**Reason:** As all the other options belong to first generation Antihistamines: **Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Antihistamines, Chapter-20, Pg- 265.

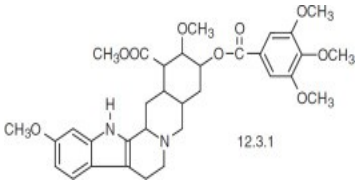
Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								2. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Histamine and Antihistaminic Agents, Chapter-23, Pg-753
16	D	24	A	40	B	48	C	**Reason:** Some of the antihistamines have antiemetic properties and are used to control nausea and vomiting such as motion sickness and irradiation sickness. **Reference:** Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Antihistamines, Chapter-20, 3rd Ed, Pg- 266.
17	A	25	B	41	C	49	D	**Reason:-**  2-cyano-1-methyl-3-[2-(5-methylimidazo-4-ylmethylthio)-ethyl]guanidine **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry"3rd Edition (2012), Chapter-20, Antihistamines, Pg-282. b. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Chapter-10, Antihistamines and antiulcer agents, Pg-160.
18	A	26	B	42	C	50	D	**Reason:** Long term Antihistamine use increases risk of heart diseases but no effect on liver, cancer and brain. **Reference:** a. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry"3rd Edition (2012), Chapter-20, Antihistamines. b. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Chapter-10, Antihistamines and antiulcer agents.
19	A	27	B	43	C	1	D	**Reason:** The sedative effects of anihistamines synergises when given along with barbiturates, alcohol, narcotic analgesics, and other depressants.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								Reference: 1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Chapter-23 Histamine and Antihistamine Agents, Pg-741. 2. K D Tripathi "Essentials of Medicinal Pharmacology" 8th edition (2019) Ethyl and Methyl Alcohols, Chapter-28, Pg- 180, 419.
20	B	28	C	44	A	2	B	**Reason:** Fexofenadine by the name of Allegra is available over the counter. **Reference:** 1. Webmed.com 2. Mayo clinic
21	D	29	A	45	B	3	C	**Reason:** As H1 receptor blockers are used for the treatment of urticaria, seasonal rhinitis and other drug reactions and Histamine H2 receptor antagonists are used for the treatment of gastric ulcers. **Reference:** 1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Chapter-23 Histamine and Antihistamine Agents, Pg-741.
22	C	30	D	46	A	4	B	**Reason:** Diosgenin is a sapogenin in which the rings are joined at 22 carbon in spiroketal fashion.  **Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Steroids and Related Drugs, Chapter-29, 3rd Edition (2012), Pg- 447.
23	B	31	C	47	D	5	A	**Reason:** Buspirone is a Atypical anxiolytic and a partial 5- HT1A receptor agonist. It is lacking in sedative properties and has less abuse potential. Out of the given options, Buspirone (Option B) is the only anxiolytic drug which does not cause drowsiness whereas option (A): Diazepam causes drowsiness.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								Reference: 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Psychoactive Drugs, Chapter-12 3rd Edition (2012), Pg-177. 2. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Cardiovascular Agents, Chapter-19, Pg-443
24	C	32	D	48	A	6	B	**Reason:** Loratadine binds to H1 histamine receptors found on the surface of epithelial cells, endothelial cells, eosinophils, neutrophils, airway cells, and vascular smooth muscle cells among others. H1 histamine receptors fall under the wider umbrella of G-protein coupled receptors, and exist in a state of equilibrium between the active and inactive forms. Histamine binding to the H1-receptor facilitates cross linking between transmembrane domains III and V, stabilizing the active form of the receptor. On the other hand, antihistamines bind to a different site on the H1 receptor favouring the inactive form. Hence, loratadine can more accurately be classified as an "inverse agonist" as opposed to a "histamine antagonist", and can prevent or reduce the severity of histamine mediated symptoms. **Reference:** 1. Church DS, Church MK. Pharmacology of antihistamines. World Allergy Organ J. 2011 Mar;4(3 Suppl):S22-7. doi: 10.1097/WOX.0b013e3181f385d9. PMID: 23282332; PMCID: PMC3666185.
25	C	33	D	49	A	7	B	**Reason:**  **Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Psychoactive Drugs,

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								Chapter-12 3rd Edition (2012), Pg- 177. 2. V. Alagarsamy "Textbook of Medicinal Chemistry" Steroids, Chapter-10,4th edition (2022), Vol-2, CBS Publisher & Distributors Pvt. Ltd, Pg-194.
26	C	34	D	50	A	8	B	**Reason:** Verapamil is antihypertensive agents belonging to the Calcium Channel Blockers category and Class IV agent of antiarrhythmic agents. Verapamil major effect is on the slow Ca^{+2} channel. The result is a slowing of AV conduction and the sinus rate. This inhibition of the action potential inhibits one limb of the reentry circuit believed to underlie most paroxysmal supraventricular tachycardias that use the AV node as a reentry point. It is categorized as a class IV antiarrhythmic drug (see "Classes of Antiarrhythmic Drugs" later in this chapter). Hemodynamically, verapamil causes a change in the preload, afterload, contractility, heart rate, and coronary blood flow. The drug reduces systemic vascular resistance and mean blood pressure, with minor effects on cardiac output. **Reference:** Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Cardiovascular Agents, Chapter-19, Pg-624
27	B	35	C	1	D	9	A	**Reference:** 1. V. Alagarsamy "Textbook of Medicinal Chemistry" Antianginals, Chapter-43, 4th edition (2022), Vol-1, CBS Publisher & Distributors Pvt. Ltd, Pg-648.
28	C	36	D	2	A	10	B	**Reason:-** Labetalol (Normodyne, Trandate, others), a phenylethanolamine derivative, is representative of a class of drugs that act as competitive blockers at α-1, β-1, and β-2-receptors. It is a more potent -blocker than -blocker. Because it has two asymmetric carbon atoms (1 and 1), it exists as a mixture of four isomers. It is this mixture that is used clinically in treating hypertension. The different isomers, however, possess different α- and β-blocking activities.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								Reference: 1. Wilson and Gisvold's "Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Adrenergic Agents, Chapter-16, Pg-624.
29	A	37	B	3	C	11	D	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Steroids and related Drugs, Chapter-29, 3rd Edition (2012), Pg- 441.
30	D	38	D	4	D	12	D	**Reference:** 1. William O. Foye, "Principles of Medicinal Chemistry" Adrenergic Drugs, Chapter-18, 1st Edition (1995), Pg-357.
31	A	39	B	5	C	13	D	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Nonsteroidal, Antiinflammatory Agents and Analgesics-Antipyretics, Chapter-21, 3rd Edition (2012), Pg- 307. 2. K D Tripathi "Essentials of Medicinal Pharmacology" 8th edition (2022) Prostaglandins Leukotrienes (Eicosanoids) and Platelet Activating Factor, Chapter-13, Pg- 221.
32	A	40	B	6	C	14	D	**Reason:** As β_1 adrenoreceptor agonist are responsible for the increase in heart rate and force of contraction so the agonist will be used in the treatment of cardiogenic shock. **Reference:** 1. V. Alagarsamy "Textbook of Medicinal Chemistry" Autonomic Nervous System, Chapter-34, 4th edition (2022), Vol-1, CBS Publisher & Distributors Pvt. Ltd, Pg-448.
33	B	41	C	7	D	15	A	**Reason:** The L-type calcium channel, acted on by calcium channel blockers. The specific Ca^{+2} channel antagonists verapamil, nifedipine, and diltiazem interact at specific sites on the calcium channel protein to produce antihypertensive effects. **Reference:** 1. Wilson and Gisvold's "Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Cardiovascular

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								Agents, Chapter 19, Pg-623. 2. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Cardiovascular Agents, Chapter-22, 3rd Edition (2012), Pg- 322.
34	Deleted	42	Deleted	8	Deleted	16	Deleted	**Reference: Option (B)** and **Option (C)** are both the correct answers. As options are overlapping so the question may be deleted.  12.3.1 **Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Cardiovascular Agents, Chapter-22, 3rd Edition (2012), Pg-349. 2. R.S. Vardanyan, V.J. Hruby,in Synthe sis of Essential Drugs, 2006.
35	A	43	B	9	C	17	D	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Nonsteroidal, Anti-inflammatory Agents and Analgesics-Antipyretics, Chapter-21, 3rd Edition (2012), Pg- 293.
36	D	44	A	10	B	18	C	**Reference:** The class III drugs possess diverse pharmacological properties but they all share the capacity to prolong the duration of cardiac action potential. Amiodarone is one such drug. It was approved in 1986. **Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Cardiovascular Agents, Chapter-22, 3rd Edition (2012), Pg- 330.
37	C	45	D	11	A	19	B	**Reference:** 1. V. Alagarsamy "Textbook of Medicinal Chemistry" Narcotic Analgesics, Chapter-29, 4th edition (2022), Vol-1, CBS Publisher & Distributors Pvt. Ltd, Pg-337.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
								2. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Opioid Analgesics, Chapter-10, 3rd Edition (2012), Pg- 108.
38	D	46	D	12	D	20	D	**Reference** 1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Prostaglandins, Leukotrienes, and Essential Fatty Acids, Chapter-26, Pg-869. 2. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Prostaglandins and other Eicosanoids, Chapter-28, 3rd Edition (2012), Pg- 435-436.
39	A	47	B	13	C	21	D	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Cardiovascular Agents, Chapter-22, 3rd Edition (2012), Pg-318. 2. Wilson and Gisvold's "Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Cardiovascular Agents, Chapter 19, Pg-620.
40	C	48	D	14	A	22	B	**Reference:** 1. V. Alagarsamy "Textbook of Medicinal Chemistry" Narcotic Analgesics, Chapter-29, 4th edition (2022), Vol-1, CBS Publisher & Distributors Pvt. Ltd, Pg-258. 2. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India, Narcotic Analgesics, Chapter-7, Pg-96.
41	C	49	A	15	B	23	C	**Reference:** 1. Grzegorz W. Przybyła, Konrad A. Szychowski, Jan Gmiński, "Paracetamol – An old drug with new mechanisms of action" *Clinical and Experimental Pharmacology and Physiology*, Wiley Science. Accepted: 2 August 2020. DOI: 10.1111/1440-1681.13392 2. Samir S Ayoub, "Paracetamol (acetaminophen): A familiar drug with an unexplained mechanism of action" *Temperature* 2021, VOL. 8(4,) 351–371 https://doi.org/10.1080/23328940.2021.1886392

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
42	D	50	A	16	B	24	C	**Reference:** 1. K D Tripathi "Essentials of Medicinal Pharmacology" 8th edition (2022) Prostaglandins, Leukotrienes (Eicosanoids) and Platelet Activating Factor, Chapter-13, Pg- 199.
43	D	1	A	17	B	25	C	**Reference:** 1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Prostaglandins, Leukotrienes, and Essential Fatty Acids, Chapter-26, Pg-870 2. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Prostaglandins and other Eicosanoids, Chapter-28, 3rd Edition (2012), Pg- 435-436.
44	C	2	D	18	A	26	B	**Reference:** 1. K D Tripathi "Essentials of Medicinal Pharmacology" 8th edition (2022) Prostaglandins, Leukotrienes (Eicosanoids) and Platelet Activating Factor, Chapter-13, Pg- 199. 2. Samir S Ayoub, "Paracetamol (acetaminophen): A familiar drug with an unexplained mechanism of action" *Temperature* 2021, VOL. 8(4,) 351–371 https://doi.org/ 10.1080/23328940.2021.1886392
45	A	3	B	19	C	27	D	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Cardiovascular Agents, Chapter-22, 3rd Edition (2012), Pg- 313. 2. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Cardiovascular Agents, Chapter-19, Pg-645.
46	B	4	C	20	D	28	A	**Reason:** The main pharmacological actions of Morphine are analgesia, cough suppression, reduced g.i.t motility and it causes dependence as well tolerance. But it is not a convulsant. **Reference:** 1. K. D. Tripathi "Essentials of Medicinal Pharmacology" 8th edition (2022) Opioid Analgesics and Antagonists, Chapter-34, Pg- 498.

Series-A		Series-B		Series-C		Series-D		Remarks
Question No.	Answer	Question No.	Answer	Question No.	Answer	Question No.	Answer	
47	D	5	A	21	B	29	C	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Hypnotics and Sedatives, Chapter-8, 3rd Edition (2012), Pg- 95.
48	B	6	C	22	D	30	A	**Reference:** 1. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Analgesics, Chapter-24, Pg-786.
49	B	7	C	23	D	31	A	**Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Opioid Analgesics, Chapter-10, 3rd Edition (2012), Pg- 110.
50	B	8	C	24	A	32	B	**Reference:** Pethidine is also known as meperidine used for the relief of most types of moderate to severe acute pain and is not used for the relief of cough or diarrhoea, unlike Morphine. **Reference:** 1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", Opioid Analgesics, Chapter-10, 3rd Edition (2012), Pg- 120. 2. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Analgesics, Chapter-24, Pg-786

All Books for Reference:

1. Harkishan Singh and V. K. Kapoor, "Medicinal and Pharmaceutical Chemistry", 3rd Edition (2012), Vallabh Prakashan, GT Karnal Road, India
2. Wilson and Gisvold's Textbook of Organic Medicinal and Pharmaceutical Chemistry 12th Edition (2011), Lippincott Williams & Wilkins at 530 Walnut Street, Philadelphia.
3. D. Sriram, P. Yogeeswari, "Medicinal Chemistry" Second Edition (2010), Pearson Education India.
4. V.Alagarsamy " Textbook of Medicinal Chemistry" 4th edition (2022), Vol-1, CBS Publisher & Distributors Pvt. Ltd.
5. V.Alagarsamy " Textbook of Medicinal Chemistry" 4th edition (2022), Vol-2, CBS Publisher & Distributors Pvt. Ltd.
6. K D Tripathi "Essentials of Medicinal Pharmacology" 8th edition (2019) Jaypee Brothers Medical Publishers (P) Ltd, Bangladesh.
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