INI CET Pharmacology

Sample Paper – 8

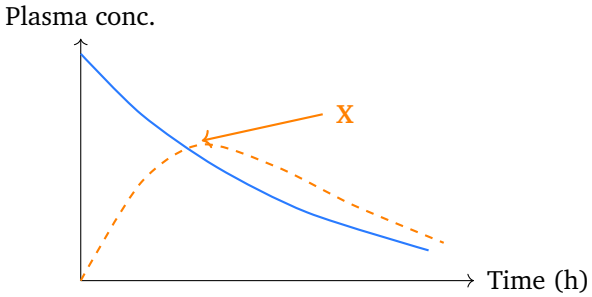
Duration: 14 Minutes **Maximum Marks: 15**

Instructions

- This paper contains **15** Multiple Choice Questions (Single Best Response), modelled on the Pharmacology content of **INI CET** (Institutes of National Importance Combined Entrance Test) conducted by AIIMS New Delhi.
- The **15-question** length matches the number of Pharmacology items you actually meet in the real 200-question paper.
- Each correct answer carries **+1 mark**. There is **negative marking of one-third (0.33) mark** for every incorrect answer; unattempted questions carry no penalty.
- Every question has **exactly one best answer**. Choose the single most appropriate drug, mechanism or clinical fact.
- Attempt this practice paper in one timed sitting of about **14 minutes**, the pace the real computer-based test demands.

General Pharmacology

Q1. The graph compares plasma drug concentration after two routes of administration. The dashed curve marked **X**, which starts from zero, rises to a delayed peak and then falls, represents drug given by which route?



(A) Intravenous bolus

(B) Oral

(C) A drug that is not absorbed at all

(D) Direct intra-arterial injection

Q2. Two brands of the same drug are said to be bioequivalent when they:

(A) Contain exactly the same inactive excipients

(B) Are manufactured by the same pharmaceutical company

(C) Cost the same amount per tablet

(D) Show no significant difference in the rate and extent of absorption (similar Cmax and AUC)

Q3. When a drug crosses a membrane by simple passive diffusion following first-order kinetics, the rate of absorption is:

(A) Directly proportional to the concentration gradient across the membrane

(B) Constant and completely independent of concentration

(C) Dependent on a saturable carrier protein

(D) Always faster than any intravenous route

Autonomic Nervous System

Q4. Clonidine, a centrally acting antihypertensive, lowers blood pressure mainly by:

(A) Stimulating central alpha-2 adrenergic receptors and reducing sympathetic outflow

(B) Blocking peripheral alpha-1 adrenergic receptors

(C) Selectively blocking beta-1 receptors in the heart

(D) Directly relaxing vascular smooth muscle through nitric oxide

Q5. Which centrally acting sympatholytic is regarded as a well-tried, preferred antihypertensive for use during pregnancy?

(A) Clonidine

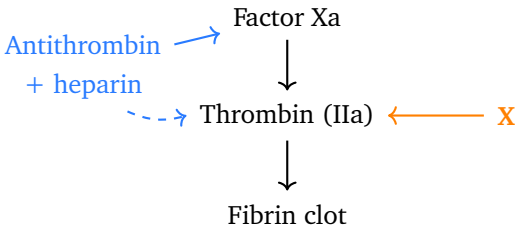
(B) Methyldopa

(C) Reserpine

(D) Sodium nitroprusside

Cardiovascular and Renal Pharmacology

Q6. In the coagulation schematic, the factor marked **X** (thrombin, IIa) is strongly inactivated when heparin binds antithrombin. Heparin therefore acts as an anticoagulant by:



(A) Activating antithrombin III, which then inhibits thrombin and factor Xa

(B) Antagonising the vitamin K dependent clotting factors

(C) Irreversibly inhibiting platelet cyclo-oxygenase

(D) Dissolving fibrin that has already formed

Q7. Oral warfarin therapy is monitored using which laboratory test?

(A) Activated partial thromboplastin time (aPTT)

(B) Bleeding time

(C) Prothrombin time expressed as the INR

(D) Platelet count

Q8. The specific antibody antidote used to rapidly reverse dabigatran, a direct thrombin inhibitor of the DOAC class, is:

(A) Protamine sulphate

(B) Vitamin K

(C) Fresh frozen plasma alone

(D) Idarucizumab

Central Nervous System Pharmacology

Q9. Levodopa is almost always combined with carbidopa in the treatment of Parkinson's disease because carbidopa:

(A) Itself crosses the blood-brain barrier and is converted to dopamine centrally

(B) Acts directly as a dopamine receptor agonist

(C) Blocks the central breakdown of dopamine by monoamine oxidase

(D) Inhibits peripheral dopa decarboxylase, so more levodopa reaches the brain with fewer peripheral side effects

Q10. After years of levodopa therapy, a patient develops abrupt, unpredictable swings between mobility and sudden immobility. This complication is known as the:

(A) On-off phenomenon

(B) First-dose hypotension

(C) Serotonin syndrome

(D) Neuroleptic malignant syndrome

Chemotherapy

Q11. A patient taking metronidazole develops flushing, throbbing headache, nausea and palpitations shortly after drinking alcohol. This disulfiram-like reaction occurs because metronidazole:

(A) Increases the rate of alcohol absorption from the gut

(B) Blocks central dopamine receptors

(C) Inhibits aldehyde dehydrogenase, so acetaldehyde accumulates

(D) Displaces alcohol from plasma protein binding sites

Q12. Which drug is a broad-spectrum anthelmintic that acts by binding parasitic beta-tubulin and blocking the worm's glucose uptake?

(A) Metronidazole

(B) Chloroquine

(C) Albendazole

(D) Amphotericin B

Q13. Metronidazole is regarded as a drug of choice for which of the following infections?

(A) Falciparum malaria

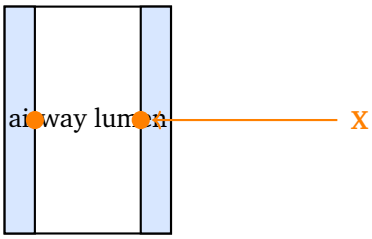
(B) Amoebiasis and giardiasis

(C) Roundworm (Ascaris) infestation

(D) Tuberculosis

Autacoids, Endocrine and Miscellaneous

Q14. In the airway schematic, the drug marked **X** binds the beta-2 receptors on bronchial smooth muscle (blue bands) and produces rapid bronchodilation, acting as a quick reliever in an acute asthma attack. This drug is:



beta-2 receptors on bronchial smooth muscle (blue bands)

(A) Inhaled budesonide

(B) Salbutamol

(C) Montelukast

(D) Sodium cromoglycate

Q15. Which of the following is used mainly as a long-term controller (preventer) rather than an acute reliever in the management of bronchial asthma?

(A) Salbutamol

(B) Injectable adrenaline

(C) Inhaled corticosteroid such as budesonide

(D) Ipratropium bromide given for sudden breathlessness

Detailed Solutions

Q1.

Solution

Concept – shape of the concentration-time curve: The route controls how fast drug enters blood.

Step 1 – read curve X: Curve X begins at zero, meaning no drug is in blood at time zero.

Step 2 – interpret the rise: It climbs slowly to a delayed peak, because the drug must first be absorbed across the gut wall.

Step 3 – match the route: A lag, a gentle absorption phase and a delayed peak are the signature of the **oral** route.

Why the other options are wrong:

- A, intravenous bolus: gives the solid curve that starts at the highest value at time zero and only falls.
- C, not absorbed: the curve would stay flat at zero.
- D, intra-arterial: also delivers drug directly into blood, without an absorption lag.

Final Answer: Oral route $\Rightarrow$ B

Answer: (B) Go Back to Q1

Q2.

Solution

Concept – meaning of bioequivalence: It compares how two products behave in the body.

Step 1 – define the term: Two brands are **bioequivalent** when they deliver the same active drug at the same rate and to the same extent.

Step 2 – name the measures: This is judged by comparing peak concentration (Cmax) and total exposure (area under the curve, AUC).

Step 3 – conclude: If Cmax and AUC show no significant difference, the products are bioequivalent.

Why the other options are wrong:

- A, same excipients: bioequivalent brands often use different excipients.

- B, same company: the manufacturer is irrelevant to bioequivalence.
- C, same cost: price has nothing to do with drug behaviour in the body.

Final Answer: Similar rate and extent of absorption $\Rightarrow$ D

Answer: (D) Go Back to Q2

Q3.

Solution

Concept – first-order absorption: Passive diffusion depends on the gradient.

Step 1 – state the rule: In first-order kinetics, the rate of transfer is **proportional to the concentration gradient** across the membrane.

Step 2 – explain: A larger difference in concentration between the two sides drives a faster rate of diffusion.

Step 3 – note the fraction: A constant fraction, not a constant amount, is absorbed per unit time.

Why the other options are wrong:

- B, constant rate: that describes zero-order kinetics, not first-order.
- C, saturable carrier: describes carrier-mediated (facilitated or active) transport.
- D, faster than intravenous: impossible, since the intravenous route places drug straight into blood.

Final Answer: Proportional to the concentration gradient $\Rightarrow$ A

Answer: (A) Go Back to Q3

Q4.

Solution

Concept – centrally acting sympatholytics: Clonidine works inside the brainstem.

Step 1 – name the target: Clonidine stimulates **central alpha-2 adrenergic receptors** in the vasomotor centre.

Step 2 – trace the effect: Alpha-2 stimulation reduces the sympathetic outflow leaving the brainstem.

Step 3 – result: Less sympathetic drive lowers heart rate, cardiac output and

peripheral resistance, so blood pressure falls.

Why the other options are wrong:

- B, peripheral alpha-1 block: that is the action of prazosin, not clonidine.
- C, beta-1 block: that describes atenolol and similar beta-blockers.
- D, direct nitric oxide: that is the mechanism of nitrates and nitroprusside.

Final Answer: Central alpha-2 stimulation $\Rightarrow$ A

Answer: (A) Go Back to Q4

Q5.

Solution

Concept – antihypertensive in pregnancy: Safety data guide the choice.

Step 1 – name the drug: Methyldopa, an alpha-2 agonist converted centrally to methylnoradrenaline, is a long-used, well-tried antihypertensive in pregnancy.

Step 2 – reason: It has the longest safety record and does not harm fetal growth.

Why the other options are wrong:

- A, clonidine: effective but limited by rebound hypertension and less pregnancy data.
- C, reserpine: causes depression and nasal stuffiness, and is largely obsolete.
- D, sodium nitroprusside: reserved for hypertensive emergencies and risks fetal cyanide toxicity.

Final Answer: Methyldopa $\Rightarrow$ B

Answer: (B) Go Back to Q5

Q6.

Solution

Concept – mechanism of heparin: Heparin needs a natural cofactor.

Step 1 – read the schematic: Heparin binds **antithrombin III** and greatly speeds its inactivation of thrombin (the factor marked X) and factor Xa.

Step 2 – consequence: With thrombin blocked, fibrinogen is not converted to fibrin, so no clot forms.

Step 3 – clinical link: This action is immediate and is monitored by the aPTT.

Why the other options are wrong:

- B, vitamin K antagonism: that is the mechanism of warfarin.
- C, platelet cyclo-oxygenase: that describes aspirin.
- D, dissolving formed fibrin: that is fibrinolysis by streptokinase or alteplase.

Final Answer: Activates antithrombin III $\Rightarrow$ A

Answer: (A) Go Back to Q6

Q7.

Solution

Concept – monitoring anticoagulants: Each drug has its own test.

Step 1 – name the test: Warfarin is monitored by the **prothrombin time, reported as the INR**.

Step 2 – reason: Warfarin lowers the vitamin K dependent factors (II, VII, IX, X), and the prothrombin time is most sensitive to factor VII in the extrinsic pathway.

Step 3 – target: A typical therapeutic INR is about 2 to 3.

Why the other options are wrong:

- A, aPTT: this is used to monitor unfractionated heparin.
- B, bleeding time: reflects platelet function, not warfarin effect.
- D, platelet count: unaffected by warfarin.

Final Answer: Prothrombin time / INR $\Rightarrow$ C

Answer: (C) Go Back to Q7

Q8.

Solution

Concept – reversing a DOAC: Each anticoagulant has a specific antidote.

Step 1 – match dabigatran: Dabigatran is a direct thrombin inhibitor, and its specific reversal agent is **idarucizumab**, a monoclonal antibody fragment.

Step 2 – action: Idarucizumab binds dabigatran tightly and neutralises its anticoagulant effect within minutes.

Why the other options are wrong:

- A, protamine sulphate: reverses heparin, not dabigatran.

- B, vitamin K: reverses warfarin.
- C, fresh frozen plasma alone: a nonspecific measure, not the specific antidote.

Final Answer: Idarucizumab ⇒ D

Answer: (D) Go Back to Q8

Q9.

Solution

Concept – why carbidopa is added: The problem is peripheral conversion.

Step 1 – state the issue: Given alone, most levodopa is converted to dopamine in the periphery by dopa decarboxylase, causing nausea and hypotension and leaving little to reach the brain.

Step 2 – name carbidopa's action: Carbidopa **inhibits peripheral dopa decarboxylase** but does not cross the blood-brain barrier.

Step 3 – result: More levodopa survives to enter the brain, where it is converted to dopamine, and peripheral side effects fall.

Why the other options are wrong:

- A, crosses into brain: carbidopa deliberately does not cross the blood-brain barrier.
- B, dopamine agonist: that describes drugs such as bromocriptine or pramipexole.
- C, blocks central MAO: that is the action of selegiline.

Final Answer: Inhibits peripheral dopa decarboxylase ⇒ D

Answer: (D) Go Back to Q9

Q10.

Solution

Concept – long-term levodopa complications: Chronic therapy brings response fluctuations.

Step 1 – name the phenomenon: Abrupt swings between mobility (on) and sudden immobility (off) are the **on-off phenomenon**.

Step 2 – explain: It reflects fluctuating brain dopamine as the disease advances

and levodopa's short action becomes unpredictable.

Why the other options are wrong:

- B, first-dose hypotension: an early effect of alpha-blockers such as prazosin.
- C, serotonin syndrome: caused by excess serotonergic drugs, not levodopa.
- D, neuroleptic malignant syndrome: linked to dopamine-blocking antipsychotics or abrupt levodopa withdrawal.

Final Answer: On-off phenomenon ⇒ A

Answer: (A) Go Back to Q10

Q11.

Solution

Concept – metronidazole and alcohol: The interaction mimics disulfiram.

Step 1 – name the enzyme: Metronidazole **inhibits aldehyde dehydrogenase**, the enzyme that clears acetaldehyde.

Step 2 – trace the reaction: When alcohol is taken, acetaldehyde accumulates and causes flushing, headache, vomiting and palpitations.

Step 3 – advice: Patients are warned to avoid alcohol during, and for a few days after, metronidazole.

Why the other options are wrong:

- A, faster alcohol absorption: not the mechanism of the reaction.
- B, dopamine block: unrelated to the alcohol interaction.
- D, protein displacement: does not explain acetaldehyde build-up.

Final Answer: Inhibits aldehyde dehydrogenase ⇒ C

Answer: (C) Go Back to Q11

Q12.

Solution

Concept – anthelmintic mechanism: Benzimidazoles target the worm's cytoskeleton.

Step 1 – name the drug: Albendazole is a broad-spectrum benzimidazole anthelmintic.

Step 2 – state the mechanism: It binds parasitic beta-tubulin, blocks microtubule assembly and prevents the worm's glucose uptake, starving it of energy.

Why the other options are wrong:

- A, metronidazole: an antiprotozoal and antianaerobic, not an anthelmintic.
- B, chloroquine: an antimalarial.
- D, amphotericin B: an antifungal.

Final Answer: Albendazole $\Rightarrow$ C

Answer: (C) Go Back to Q12

Q13.

Solution

Concept – clinical uses of metronidazole: It targets anaerobes and certain protozoa.

Step 1 – match the infection: Metronidazole is a drug of choice for **amoebiasis and giardiasis**, as well as trichomoniasis and anaerobic infections.

Step 2 – explain: Its nitro group is reduced inside the parasite to reactive intermediates that damage microbial DNA.

Why the other options are wrong:

- A, falciparum malaria: treated with artemisinin combinations, not metronidazole.
- C, roundworm: treated with albendazole or mebendazole.
- D, tuberculosis: treated with rifampicin, isoniazid and companions.

Final Answer: Amoebiasis and giardiasis $\Rightarrow$ B

Answer: (B) Go Back to Q13

Q14.

Solution

Concept – the quick reliever in asthma: Beta-2 agonists open the airway fast.

Step 1 – identify X: The drug marked X binds **beta-2 receptors** on bronchial smooth muscle.

Step 2 – trace the effect: Beta-2 stimulation raises cyclic AMP, relaxes the smooth

muscle and rapidly widens the airway.

Step 3 – name the drug: A short-acting beta-2 agonist that does this is **salbutamol**, the classic reliever in an acute attack.

Why the other options are wrong:

- A, budesonide: an inhaled corticosteroid used as a controller, with a slow anti-inflammatory action.
- C, montelukast: a leukotriene antagonist used for prevention, not quick relief.
- D, sodium cromoglycate: a mast-cell stabiliser used prophylactically.

Final Answer: Salbutamol $\Rightarrow$ B

Answer: (B) Go Back to Q14

Q15.

Solution

Concept – reliever versus controller: Controllers reduce underlying inflammation.

Step 1 – name the controller: An **inhaled corticosteroid** such as budesonide is the mainstay long-term controller in asthma.

Step 2 – explain: It suppresses airway inflammation over days to weeks, cutting the frequency and severity of attacks, but does not relieve a sudden attack.

Why the other options are wrong:

- A, salbutamol: a short-acting reliever, not a controller.
- B, injectable adrenaline: an emergency rescue in severe attacks and anaphylaxis.
- D, ipratropium for sudden breathlessness: used as a reliever, particularly in COPD, not as the daily preventer.

Final Answer: Inhaled corticosteroid $\Rightarrow$ C

Answer: (C) Go Back to Q15

Answer Key

Q	Ans	Q	Ans	Q	Ans	Q	Ans	Q	Ans
1	B	2	D	3	A	4	A	5	B
6	A	7	C	8	D	9	D	10	A
11	C	12	C	13	B	14	B	15	C