

NEET PG 2021 Memory Based Answer Key

1. (A) Secondary and tertiary structure depends on amino acid sequence

The primary structure (amino acid sequence) dictates how a protein folds into its secondary and tertiary structures. Denaturation disrupts the higher-order structures (secondary, tertiary, quaternary) by breaking non-covalent bonds, but it leaves the primary peptide bonds completely intact.

2. (B) Arginine

While arginine is synthesized by the body via the urea cycle, it is classified as a semi-essential (or conditionally essential) amino acid. During periods of rapid growth, pregnancy, or severe metabolic stress, endogenous synthesis is insufficient, and it must be supplied through the diet.

3. (C) Fluent Aphasia

An injury to the posterior part of the superior temporal gyrus damages Wernicke's area, leading to Wernicke's (fluent) aphasia. Patients can speak with normal fluency and tone, but their speech lacks meaning, and they have severe deficits in language comprehension.

4. (D) IL-6

Tocilizumab is a recombinant humanized monoclonal antibody that acts as an interleukin-6 (IL-6) receptor antagonist. By blocking IL-6 signaling, it effectively suppresses the severe systemic inflammatory cascades seen in conditions like rheumatoid arthritis and cytokine release syndrome.

5. (B) Inhibits DHFR

Methotrexate is an antimetabolite drug that competitively inhibits Dihydrofolate Reductase (DHFR). This inhibition blocks the conversion of dihydrofolate to tetrahydrofolate, halting DNA and RNA synthesis by starving cells of essential purines and thymidylate.

6. (A) Broca's / motor Aphasia

The inferior frontal gyrus of the dominant hemisphere houses Broca's area. A lesion here results in expressive or motor aphasia, where language comprehension remains intact, but the patient struggles heavily with speech production and articulation.

7. (B) 37-43 celsius

Rapid rewarming for frostbite is best achieved by immersing the affected tissue in a regulated water bath kept between 37°C and 43°C .

Temperatures lower than this are ineffective for rapid thaw, while higher temperatures risk causing thermal burns to the vulnerable tissue.

8. (C) ACEI (Angiotensin-converting enzyme inhibitors)

ACE inhibitors are strictly contraindicated during pregnancy due to their significant fetotoxic profile, which includes renal dysgenesis, oligohydramnios, and skull hypoplasia. Methyldopa and Labetalol are preferred, safe alternatives for managing gestational hypertension.

9. (B) Adenylate Cyclase for Beta 2

β_2 -adrenergic receptors are G-protein coupled receptors (G_s) that utilize the adenylate cyclase second messenger system. Activation of adenylate cyclase converts ATP to cyclic AMP (cAMP), which subsequently activates Protein Kinase A to cause smooth muscle relaxation.

10. (C) Staph Aureus

Staphylococcus aureus food poisoning is mediated by preformed heat-stable enterotoxins typically found in contaminated, cream-filled pastries, salads, or dairy. Symptoms like severe vomiting and abdominal cramps appear rapidly, usually within 1 to 6 hours after ingestion.

11. (B) Rifampicin

Rifampicin is a potent inducer of the hepatic cytochrome P450 enzyme system, specifically CYP3A4. This acceleration of hepatic metabolism rapidly degrades oral contraceptive pills (OCPs), significantly reducing their efficacy and risking contraceptive failure.

12. (A) Factor 2

Vitamin K serves as an essential cofactor for the γ -glutamyl carboxylase enzyme, which activates clotting factors II, VII, IX, and X, as well as proteins C and S. Factors VIII, XI, and XII do not require Vitamin K for their synthesis or activation.

13. (A) Aliskiren

Aliskiren is a direct renin inhibitor that is predominantly cleared through hepatobiliary excretion rather than renal filtration. This makes it a highly favorable,

safe option in patients with severe renal impairment or end-stage renal disease (ESRD).

14. (B) Lymphedema

Surgical axillary lymph node dissection and radiation therapy during a mastectomy frequently disrupt normal lymphatic drainage pathways. This impairment leads to the chronic, high-protein interstitial fluid accumulation known as lymphedema in the ipsilateral upper limb.

15. (C) Lichtenstein

The Lichtenstein repair is a tension-free mesh hernioplasty widely favored for both direct and indirect inguinal hernias. Because a direct hernia protrudes medially to the inferior epigastric vessels through Hesselbach's triangle, reinforcing the floor of the canal with mesh yields low recurrence rates.

16. (B) Clarithromycin

Clarithromycin is a macrolide antibiotic that strongly inhibits the CYP3A4 enzyme and P-glycoprotein, both of which are responsible for clearing digoxin. This sudden interaction drastically elevates serum digoxin levels, precipitating digitalis toxicity and arrhythmias like atrial fibrillation.

17. (B) TAPVC – Total anomalous pulmonary venous connection

A "snowman" or "figure-of-8" appearance on a chest X-ray is classic for supracardiac Total Anomalous Pulmonary Venous Connection (TAPVC). The upper bulbous shadow is formed by the dilated vertical vein, left innominate vein, and superior vena cava, while the lower loop is the heart itself.

18. (C) AR

A water hammer (Corrigan's) pulse is a bounding pulse characterized by a rapid, forceful upstroke followed by sudden collapse. It is caused by a large stroke volume coupled with a rapid fall in diastolic pressure due to the regurgitant backflow of blood into the left ventricle during Aortic Regurgitation.

19. (B) After waking up

Cortisol and ACTH secretion follow a strict diurnal rhythm, peaking sharply in the early morning hours shortly after waking up (the cortisol awakening response). Levels gradually decline throughout the day, hitting their lowest nadir around midnight.

20. (D) Isograft

An isograft (or syngeneic graft) is a tissue transplant performed between two genetically identical individuals, such as monozygotic twins. Because the donor and recipient share identical human leukocyte antigens (HLA), there is no risk of immune rejection.

21. (A) Insulin

The insulin receptor is a classic transmembrane receptor with intrinsic tyrosine kinase activity. Binding of insulin triggers autophosphorylation of the β -subunits, activating downstream signaling pathways like IRS-1 to promote glucose uptake via GLUT-4 translocation.

22. (B) Glucose 6 phosphate

In an insulin-depleted or fasting state, glucagon and epinephrine drive glycogenolysis and gluconeogenesis in the liver. This metabolic shift prioritizes the production and pooling of glucose-6-phosphate to ultimately release free glucose into the bloodstream.

23. (A) Vitamin A deficiency (Retinoic acid deficiency)

Vitamin A deficiency compromises the structural integrity of epithelial tissues. It progresses from night blindness to severe conjunctival dryness (xerophthalmia), Bitot's spots, and eventual corneal softening or ulceration (keratomalacia).

24. (C) Giant Papillary Conjunctivitis

Giant Papillary Conjunctivitis (GPC) is a non-infectious, immune-mediated inflammatory reaction commonly triggered by chronic contact lens use or exposed sutures. It presents as large, cobblestone-like papillae ($> 1\text{ mm}$) on the everted superior tarsal conjunctiva.

25. (B) Homogentisate Dehydrogenase

Alkaptonuria is an autosomal recessive disorder caused by a deficiency in homogentisate 1,2-dioxygenase. This block prevents the breakdown of tyrosine, causing homogentisate to accumulate and oxidize, turning urine a characteristic black color when exposed to air.

26. (A) ICL

An Implantable Collamer Lens (ICL) is a phakic intraocular lens surgically placed inside the eye to permanently correct myopic astigmatism. It serves as an excellent

refractive alternative for patients who have thin corneas or prefer not to wear spectacles or contact lenses.

27. (B) Sodium hypochlorite

Sodium hypochlorite (household bleach, typically used at a 1:10 dilution for large volume spills) is the gold standard disinfectant for managing blood spills. It rapidly denatures viral and bacterial pathogens, effectively neutralising blood-borne pathogens on environmental surfaces.

28. (C) Cysteine

Cystathionine β -synthase (CBS) converts homocysteine into cystathionine along the pathway to forming cysteine. In a CBS deficiency (classic homocystinuria), cysteine cannot be synthesized endogenously and becomes a strictly essential amino acid that must be supplemented in the diet.

29. (B) Liver glycogen

During an overnight, 11-hour fast, exogenous dietary glucose is completely exhausted. The primary mechanism maintaining blood glucose levels during this post-absorptive window is hepatic glycogenolysis (the breakdown of stored liver glycogen).

30. (C) Keratin Sulphate

Keratan sulfate is the predominant glycosaminoglycan (GAG) found within the corneal stroma. Its unique spatial arrangement and water-binding capacity are critical for maintaining the precise fibrillar spacing required for absolute corneal transparency.

31. (B) Benhexol

Antiemetics like metoclopramide act as central dopamine (D_2) receptor antagonists and can trigger acute dystonia or extrapyramidal side effects. Benhexol (trihexyphenidyl) is an anticholinergic medication that restores the dopamine-acetylcholine balance to relieve these movements.

32. (B) Single-stranded RNA

The measles virus belongs to the *Paramyxoviridae* family and is characterized as an enveloped, negative-sense, single-stranded RNA virus. It is highly contagious, spreading via respiratory droplets to cause fever, cough, coryza, conjunctivitis, and a maculopapular rash.

33. (A) Wuchereria bancrofti

Microfilariae of *Wuchereria bancrofti* can be morphologically distinguished in blood smears by their smoothly curved bodies, presence of a sheath, and a tapering tail that features a completely blunt end containing no terminal nuclei.

34. (B) Xenopsylla (Rat flea)

The oriental rat flea, *Xenopsylla cheopis*, serves as the primary vector for *Yersinia pestis*, the causative bacterium of bubonic plague. Bites from infected fleas lead to the acute, painful enlargement of regional lymph nodes, characteristically known as buboes.

35. (B) HNPCC (Hereditary nonpolyposis colorectal cancer)

Hereditary Nonpolyposis Colorectal Cancer (HNPCC), or Lynch syndrome, is caused by germline mutations in DNA mismatch repair (MMR) genes like *MSH2* or *MLH1*. This defect results in microsatellite instability, significantly raising the risk of colorectal and endometrial carcinomas.

36. (C) Intermediate Filaments

Mallory-Denk bodies are eosinophilic, reddish cytoplasmic inclusions classically found in hepatocytes of patients with alcoholic hepatitis. These aggregates are primarily composed of damaged pre-keratin intermediate filaments that have collapsed and cross-linked within the cell.