

GAT GENERAL — PRACTICE SERIES

100 GAT General MCQs with Answers

Verbal Reasoning · Quantitative Reasoning · Analytical Reasoning ·
Medical & Biological Sciences

100

QUESTIONS

4

SECTIONS

100%

ANSWERED &
EXPLAINED

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100 multiple-choice questions across four sections, each with the correct answer highlighted and explained.

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Analogies and Relationships

1 Thrombosis : Blood :: Emphysema : ?

(A) Heart

(B) Lungs ✓

(C) Liver

(D) Kidneys

CORRECT ANSWER B) Lungs

Explanation: Thrombosis is a blood clot formation in blood vessels, while emphysema is a condition affecting the lungs.

2 Antibiotics : Bacteria :: Antivirals : ?

(A) Fungi

(B) Protozoa

(C) Viruses ✓

(D) Prions

CORRECT ANSWER C) Viruses

Explanation: Antibiotics target bacteria, while antivirals target viruses.

3 Neuron : Nervous System :: Nephron : ?

- ☐ A Digestive system
- ☐ B Respiratory system
- ☒ C Urinary system
- ☐ D Endocrine system

CORRECT ANSWER C) Urinary system

Explanation: Neurons are the functional units of the nervous system, while nephrons are the functional units of the kidneys in the urinary system.

4 Mutation : Genetics :: Inflammation : ?

- ☒ A Immunology
- ☐ B Cardiology
- ☐ C Neurology
- ☐ D Hematology

CORRECT ANSWER A) Immunology

Explanation: Mutation is a fundamental concept in genetics, while inflammation is a central process studied in immunology.

5 Hemoglobin : Oxygen :: Amylase : ?

- ☐ A Proteins
- ☐ B Lipids
- ☒ C Carbohydrates
- ☐ D Nucleic acids

CORRECT ANSWER C) Carbohydrates

Explanation: Hemoglobin binds and transports oxygen, while amylase breaks down carbohydrates.

Vocabulary and Word Meaning

6 "Idiopathic" refers to a disease or condition that:

- ☐ A Is communicable
- ☒ B Has no known cause
- ☐ C Is inherited
- ☐ D Is terminal

CORRECT ANSWER B) Has no known cause

Explanation: "Idiopathic" describes conditions that arise spontaneously with no identifiable cause.

7 "Palliative care" primarily focuses on:

- ☐ A Curing the disease
- ☐ B Preventing the disease
- ☒ C Relieving symptoms and stress
- ☐ D Diagnosing the disease

CORRECT ANSWER C) Relieving symptoms and stress

Explanation: Palliative care focuses on providing relief from symptoms and improving quality of life rather than curing the underlying condition.

8 The term "comorbidity" refers to:

- ☐ A The rate of death from a disease
- ☒ B The presence of two or more disorders in the same person
- ☐ C The transfer of disease between individuals
- ☐ D The return of symptoms after treatment

CORRECT ANSWER B) The presence of two or more disorders in the same person

Explanation: Comorbidity describes the simultaneous presence of two or more medical conditions in a patient.

9 "Homeostasis" is best defined as:

- ☐ A The study of genetic similarities
- ☒ B The regulation and maintenance of stable internal conditions ✓
- ☐ C The formation of blood cells
- ☐ D The movement of water across cell membranes

CORRECT ANSWER B) The regulation and maintenance of stable internal conditions

Explanation: Homeostasis refers to the maintenance of relatively stable internal physiological conditions despite external environmental changes.

10 "Nosocomial" infections are those that:

- ☐ A Have no symptoms
- ☒ B Are acquired in hospitals ✓
- ☐ C Are transmitted through insects
- ☐ D Cannot be treated with antibiotics

CORRECT ANSWER B) Are acquired in hospitals

Explanation: Nosocomial infections are those acquired during hospital stays or other healthcare facilities.

Reading Comprehension

PASSAGE

Recent advances in genetic engineering have enabled scientists to modify the genomes of various organisms with unprecedented precision. The CRISPR-Cas9 system, derived from bacterial immune mechanisms, has revolutionized this field by allowing researchers to target specific DNA sequences for editing. This technology holds promising applications in medicine, agriculture, and basic research. However, ethical concerns regarding its use in human germline modification have prompted calls for stringent

regulatory frameworks. Despite these concerns, clinical trials using somatic cell gene therapy for various genetic disorders are already underway.

11 According to the passage, CRISPR-Cas9 was originally found in:

- ☐ A Human cells
- ☐ B Plant cells
- ☒ C Bacteria
- ☐ D Viruses

CORRECT ANSWER C) Bacteria

Explanation: The passage states that the CRISPR-Cas9 system is "derived from bacterial immune mechanisms."

12 The main ethical concern mentioned in the passage relates to:

- ☐ A Agricultural applications
- ☒ B Human germline modification
- ☐ C Basic research protocols
- ☐ D Somatic cell therapy

CORRECT ANSWER B) Human germline modification

Explanation: The passage explicitly mentions "ethical concerns regarding its use in human germline modification."

13 Based on the passage, which application of genetic engineering is currently in clinical trials?

- ☐ A Human germline modification
- ☐ B Bacterial genome editing
- ☒ C Somatic cell gene therapy
- ☐ D Agricultural crop enhancement

CORRECT ANSWER C) Somatic cell gene therapy

Explanation: The passage states that "clinical trials using somatic cell gene therapy for various genetic disorders are already underway."

14 The passage suggests that CRISPR-Cas9 technology is characterized by its:

- ☐ A Low cost
- ☐ B Universal application
- ☒ C Precision
- ☐ D Safety

CORRECT ANSWER C) Precision

Explanation: The passage describes how the technology allows "researchers to target specific DNA sequences for editing," emphasizing its precision.

15 Which of the following best describes the tone of the passage?

(A) Highly critical

(B) Informative with balanced perspective ✓

(C) Enthusiastically supportive

(D) Deeply concerned

CORRECT ANSWER B) Informative with balanced perspective

Explanation: The passage presents both the promising applications and ethical concerns without strongly advocating for either position.

Sentence Completion

16 Despite the patient's _____ symptoms, the diagnosis remained _____ until further tests could be conducted.

(A) obvious...confirmed

(B) vague...certain

(C) typical...unclear ✓

(D) severe...tentative

CORRECT ANSWER C) typical...unclear

Explanation: This creates a logical relationship where despite having symptoms that typically indicate a certain condition, the diagnosis couldn't be definitively made without additional testing.

- 17 The medical student was _____ by the complexity of the case, yet her _____ approach to diagnosis impressed her supervisors.

A overwhelmed...methodical ✓

- B intrigued...careless
C unconcerned...thoughtful
D motivated...disorganized

CORRECT ANSWER A) overwhelmed...methodical

Explanation: This creates a coherent contrast between feeling challenged by the complexity but still maintaining a systematic approach.

- 18 The effectiveness of vaccines depends on _____ immunity, wherein protection extends even to unvaccinated individuals when a _____ percentage of the population is immunized.

- A acquired...minimal
B natural...variable
C herd...sufficient ✓
D passive...declining

CORRECT ANSWER C) herd...sufficient

Explanation: The sentence describes herd immunity, which requires a sufficient percentage of the population to be vaccinated to protect those who aren't.

19 The researcher's hypothesis seemed _____ until experimental evidence _____ validated her theoretical framework.

A sound...eventually ✓

B flawed...surprisingly

C traditional...inevitably

D controversial...never

CORRECT ANSWER A) sound...eventually

Explanation: This creates a logical progression from theoretical soundness to eventual experimental validation.

20 The physician recommended a more _____ treatment regimen after the patient showed _____ response to the standard protocol.

A conservative...robust

B aggressive...minimal ✓

C standard...typical

D temporary...dramatic

CORRECT ANSWER B) aggressive...minimal

Explanation: A minimal response to the standard treatment would logically lead to recommending a more aggressive alternative approach.

Antonyms

21 "Acute" is most nearly the opposite of:

☐ A Obtuse

☒ B Chronic ✓

☐ C Severe

☐ D Painful

CORRECT ANSWER B) Chronic

Explanation: In medical terminology, "acute" refers to conditions with sudden onset and short duration, while "chronic" refers to long-lasting conditions.

22 "Benign" is most nearly the opposite of:

☐ A Friendly

☐ B Simple

☒ C Malignant ✓

☐ D Beneficial

CORRECT ANSWER C) Malignant

Explanation: In medical contexts, "benign" describes non-cancerous growths, while "malignant" describes cancerous ones.

23 "Proximal" is most nearly the opposite of:

A Distal ✓

B Central

C Adjacent

D Interior

CORRECT ANSWER A) Distal

Explanation: "Proximal" means situated nearer to the center or point of attachment, while "distal" refers to positions farther away.

24 "Hypertrophy" is most nearly the opposite of:

A Normality

B Hyperplasia

C Atrophy ✓

D Growth

CORRECT ANSWER C) Atrophy

Explanation: "Hypertrophy" refers to the enlargement of an organ or tissue, while "atrophy" refers to wasting or a decrease in size.

25 "Symbiotic" is most nearly the opposite of:

- ☐ A Harmonious
- ☐ B Parasitic
- ☐ C Mutualistic

☒ D Antagonistic ✓

CORRECT ANSWER D) Antagonistic

Explanation: "Symbiotic" describes a mutually beneficial relationship between different organisms, while "antagonistic" describes a relationship characterized by opposition or conflict.

Basic Mathematics

- 26 If a patient's blood pressure drops by 15% to 119 mm Hg, what was the original blood pressure?

A 140 mm Hg ✓

B 134 mm Hg

C 145 mm Hg

D 137 mm Hg

CORRECT ANSWER A) 140 mm Hg

Explanation: If x is the original blood pressure, then $x - 0.15x = 119$, so $0.85x = 119$, and $x = 119/0.85 = 140$.

- 27 A drug has a half-life of 8 hours. If a patient receives a 100 mg dose, approximately how much remains in the system after 24 hours?

A 33.3 mg

B 25 mg

C 12.5 mg ✓

D 50 mg

CORRECT ANSWER C) 12.5 mg

Explanation: After 24 hours, that's $24/8 = 3$ half-lives. So the amount remaining is $100 \times (1/2)^3 = 100 \times 1/8 = 12.5$ mg.

- 28 In a study, the ratio of participants who experienced side effects to those who didn't was 3:7. If 300 people participated in the study, how many experienced side effects?

A 90 ✓

B 210

C 100

D 70

CORRECT ANSWER A) 90

Explanation: The ratio 3:7 means 3 parts out of 10 total parts experienced side effects. So, $\frac{3}{10} \times 300 = 90$ participants.

- 29 A solution contains 2% concentration of medication. How many milliliters of this solution would contain 30 mg of the medication?

A 1.5 mL ✓

B 15 mL

C 150 mL

D 1,500 mL

CORRECT ANSWER A) 1.5 mL

Explanation: A 2% solution contains 2 g (2,000 mg) per 100 mL, which equals 20 mg/mL. To obtain 30 mg: $30 \text{ mg} \div 20 \text{ mg/mL} = 1.5 \text{ mL}$.

- 30 A hospital administered 850 COVID-19 tests last week. If the false negative rate is 2% and the false positive rate is 3%, what is the maximum number of tests that could have given incorrect results?

A 25

B 43

C 50

D 85

CORRECT ANSWER B) 43

Explanation: Maximum incorrect results would be all false negatives and all false positives combined, which is $2\% + 3\% = 5\%$ of all tests. 5% of $850 = 42.5$, rounded to 43.

Data Interpretation

Use the following table showing blood test results for questions 31-34:

Parameter	Patient Value	Reference Range
Hemoglobin	10.5 g/dL	12.0-16.0 g/dL
WBC	12,500/ μ L	4,500-11,000/ μ L
Platelets	145,000/ μ L	150,000-450,000/ μ L
Glucose	180 mg/dL	70-99 mg/dL
Creatinine	1.2 mg/dL	0.7-1.3 mg/dL

31 How many parameters are within normal reference range?

A 1 ✓

B 2

C 3

D 4

CORRECT ANSWER A) 1

Explanation: Only creatinine (1.2 mg/dL) falls within its reference range of 0.7-1.3 mg/dL.

32 By what percentage is the patient's hemoglobin below the minimum reference value?

A 10.5%

B 12.5% ✓

C 14.0%

D 35.0%

CORRECT ANSWER B) 12.5%

Explanation: The minimum reference value is 12.0 g/dL. The patient's value is 10.5 g/dL, which is 1.5 g/dL below the minimum: $(1.5/12.0) \times 100\% = 12.5\%$ below.

33 Which parameter shows the greatest percentage deviation from the midpoint of its reference range?

- ☐ A Hemoglobin
- ☐ B WBC
- ☐ C Platelets

☒ D Glucose ✓

CORRECT ANSWER D) Glucose

Explanation: Hemoglobin midpoint: $(12+16)/2 = 14$; deviation = $(14-10.5)/14 = 25\%$. WBC midpoint: $(4,500+11,000)/2 = 7,750$; deviation = $(12,500-7,750)/7,750 = 61.3\%$. Platelets midpoint: $(150,000+450,000)/2 = 300,000$; deviation = $(300,000-145,000)/300,000 = 51.7\%$. Glucose midpoint: $(70+99)/2 = 84.5$; deviation = $(180-84.5)/84.5 = 113\%$. Glucose has the greatest percentage deviation.

34 If the patient's white blood cell (WBC) count decreases by 18%, will it fall within the normal range?

- ☐ A Yes
- ☒ B No ✓
- ☐ C It will be exactly at the upper limit
- ☐ D Cannot be determined

CORRECT ANSWER B) No

Explanation: An 18% decrease would make the WBC count $12,500 \times 0.82 = 10,250/\mu\text{L}$, which is still below the upper limit of the normal range ($11,000/\mu\text{L}$).

Data Interpretation (continued)

Use the following graph showing COVID-19 vaccination rates by age group for questions 35-38:

(Bar graph of vaccination rates by age group: 15-24 (60%), 25-34 (75%), 35-44 (82%), 45-54 (88%), 55-64 (92%), 65+ (95%))

35 Which age group has a vaccination rate closest to the overall average rate?

A 15-24

B 25-34

C 35-44



D 45-54

CORRECT ANSWER C) 35-44

Explanation: The average vaccination rate across all groups is $(60+75+82+88+92+95)/6 = 82\%$, which matches the 35-44 age group's rate.

36 If a community has 50,000 people distributed equally across these age groups, approximately how many people in the 25-34 age group are unvaccinated?

A 2,083



B 3,125

C 6,250

D 12,500

CORRECT ANSWER A) 2,083

Explanation: With equal distribution, each age group has $50,000/6 \approx 8,333$ people. In the 25-34 group with a 75% vaccination rate, 25% are unvaccinated: $8,333 \times 0.25 \approx 2,083$ people.

37 The difference in vaccination rates between which two consecutive age groups is the largest?

A Between 15-24 and 25-34 ✓

B Between 25-34 and 35-44

C Between 35-44 and 45-54

D Between 55-64 and 65+

CORRECT ANSWER **A) Between 15-24 and 25-34**

Explanation: The differences between consecutive groups are: 15-24 to 25-34: 15%; 25-34 to 35-44: 7%; 35-44 to 45-54: 6%; 45-54 to 55-64: 4%; 55-64 to 65+: 3%. The largest difference is 15%, between the 15-24 and 25-34 age groups.

38 If a new policy increases vaccination rates by 5 percentage points in each age group, what would be the new overall average vaccination rate?

A 82%

B 85%

C 87% ✓

D 92%

CORRECT ANSWER **C) 87%**

Explanation: New rates would be 65%, 80%, 87%, 93%, 97%, and 100%. The average would be $(65+80+87+93+97+100)/6 = 87\%$.

39 In a genetic disorder that follows Mendelian inheritance, two heterozygous carriers have a child. What is the probability that the child will be affected by the disorder?

A 100%

B 75%

C 50%

D 25%

CORRECT ANSWER D) 25%

Explanation: For a recessive disorder with two heterozygous parents ($Aa \times Aa$), the possible offspring genotypes are AA , Aa , Aa , and aa , with only aa being affected. Thus, the probability is $1/4$ or 25%.

40 A drug has a 70% chance of causing nausea and a 50% chance of causing headache. If these side effects occur independently, what is the probability that a patient will experience both?

A 35%

B 85%

C 20%

D 120%

CORRECT ANSWER A) 35%

Explanation: For independent events, $P(A \text{ and } B) = P(A) \times P(B) = 0.7 \times 0.5 = 0.35$, or 35%.

41 In a clinical trial of 500 patients, 75 developed a specific side effect. What is the 95% confidence interval for the proportion of patients who develop this side effect? (Use $CI = p \pm 1.96 \times \sqrt{p(1-p)/n}$)

A 0.15 ± 0.022

B 0.15 ± 0.031 ✓

C 0.15 ± 0.075

D 0.15 ± 0.15

CORRECT ANSWER B) 0.15 ± 0.031

Explanation: $p = 75/500 = 0.15$; $SE = \sqrt{0.15 \times 0.85/500} \approx 0.016$; $95\% CI = 0.15 \pm 1.96 \times 0.016 = 0.15 \pm 0.031$.

42 A diagnostic test has a sensitivity of 95% and a specificity of 90%. If the prevalence of the disease in the population is 20%, what is the positive predictive value of the test?

A 95%

B 68% ✓

C 79%

D 30%

CORRECT ANSWER B) 68%

Explanation: $PPV = (Sensitivity \times Prevalence) / [(Sensitivity \times Prevalence) + (1-Specificity) \times (1-Prevalence)] = (0.95 \times 0.20) / [(0.95 \times 0.20) + (0.10 \times 0.80)] = 0.19/0.27 \approx 0.70$, closest to 68%.

43 In a normal distribution with a mean of 120 mg/dL and standard deviation of 10 mg/dL for blood glucose levels, what percentage of values fall between 100 and 140 mg/dL?

A 68%

B 95%



C 99.7%

D 75%

CORRECT ANSWER B) 95%

Explanation: 100 mg/dL is 2 standard deviations below the mean, and 140 mg/dL is 2 standard deviations above. In a normal distribution, values within 2 standard deviations of the mean account for approximately 95% of all values.

44 A randomized controlled trial shows that a new drug reduces cholesterol by an average of 25 mg/dL with a p-value of 0.03. This means:

A The drug reduces cholesterol by exactly 25 mg/dL in all patients

B There is a 3% chance the drug is effective

C There is a 3% probability that the observed effect occurred by chance



D 97% of patients responded to the treatment

CORRECT ANSWER C) There is a 3% probability that the observed effect occurred by chance

Explanation: A p-value of 0.03 indicates that there is a 3% probability that the observed effect (or a more extreme effect) would occur if the null hypothesis (no effect) were true.

45 In a study of 500 patients, the correlation coefficient between blood pressure and body mass index (BMI) was found to be $r = 0.65$. Which statement is correct?

- ☐ A Higher BMI causes higher blood pressure
- ☐ B 65% of patients with high BMI had high blood pressure
- ☒ C There is a moderately strong positive relationship between BMI and blood pressure ✓
- ☐ D 65% of the variation in blood pressure can be explained by BMI

CORRECT ANSWER

C) There is a moderately strong positive relationship between BMI and blood pressure

Explanation: A correlation coefficient of 0.65 indicates a moderately strong positive relationship between the two variables. (Note: the coefficient of determination, $r^2 = 0.4225$, would mean about 42% of the variation is explained — not 65% — so option D is incorrect, and correlation alone does not establish causation, ruling out option A.)

Algebra and Functions

46 If a bacterial population doubles every 30 minutes, how many bacteria will be present after 4 hours if the initial population is 500?

- ☐ A 32,000
- ☐ B 64,000
- ☒ C 128,000 ✓
- ☐ D 256,000

CORRECT ANSWER

C) 128,000

Explanation: In 4 hours, there are 8 doubling periods (4 hours / 30 minutes). So the final population is $500 \times 2^8 = 500 \times 256 = 128,000$.

- 47 A patient is prescribed a medication that decays exponentially in the bloodstream according to the function $C(t) = 100e^{(-0.2t)}$, where C is the concentration in mg/L and t is time in hours. What is the concentration after 5 hours?

A 36.8 mg/L ✓

B 20.0 mg/L

C 13.5 mg/L

D 9.1 mg/L

CORRECT ANSWER A) 36.8 mg/L

Explanation: $C(5) = 100e^{(-0.2 \times 5)} = 100e^{-1} = 100/e \approx 100/2.718 \approx 36.8$ mg/L.

- 48 The pH of a solution is given by $\text{pH} = -\log[\text{H}^+]$. If a solution has an $[\text{H}^+]$ concentration of 3.2×10^{-4} mol/L, what is its pH?

A 3.2

B 3.5 ✓

C 4.0

D 3.8

CORRECT ANSWER B) 3.5

Explanation: $\text{pH} = -\log(3.2 \times 10^{-4}) = -[\log(3.2) + \log(10^{-4})] = -(0.505 - 4) \approx 3.5$.

49 The relationship between drug dosage (D) in mg and plasma concentration (C) in $\mu\text{g/mL}$ follows the equation $C = 0.04D - 0.3$. What dosage is needed to achieve a plasma concentration of $2.5 \mu\text{g/mL}$?

A 62.5 mg

B 70.0 mg

C 88.0 mg

D 100.0 mg

CORRECT ANSWER B) 70.0 mg

Explanation: $2.5 = 0.04D - 0.3$; $2.8 = 0.04D$; $D = 2.8/0.04 = 70 \text{ mg}$.

50 If the body mass index (BMI) is calculated as weight (kg) divided by height squared (m^2), what is the BMI of a person weighing 81 kg with a height of 1.8 m?

A 25.0

B 24.6

C 25.3

D 25.7

CORRECT ANSWER A) 25.0

Explanation: $\text{BMI} = 81 / (1.8)^2 = 81 / 3.24 = 25.0$.

Logical Deduction

- 51 If all cancers involve abnormal cell division, and some forms of abnormal cell division are caused by viral infections, which conclusion must be true?

- (A) All cancers are caused by viral infections
- (B) Some viral infections cause cancer ✓
- (C) Abnormal cell division always leads to cancer
- (D) No cancers are caused by factors other than viral infections

CORRECT ANSWER B) Some viral infections cause cancer

Explanation: If some forms of abnormal cell division are caused by viral infections, and all cancers involve abnormal cell division, then it follows that some viral infections cause cancer.

- 52 A condition is associated with symptoms X, Y, and Z. A patient shows symptoms X and Y but not Z. Which conclusion is most valid?

- (A) The patient definitely has the condition
- (B) The patient definitely does not have the condition
- (C) The patient may have the condition ✓
- (D) The patient has a different condition with similar symptoms

CORRECT ANSWER C) The patient may have the condition

Explanation: Since the condition is associated with symptoms X, Y, and Z, but not all symptoms must be present for diagnosis, the patient showing X and Y may have the condition even without symptom Z.

53 If medication A is contraindicated with medication B, and medication B is contraindicated with medication C, which of the following must be true?

- ☐ A Medication A is contraindicated with medication C
- ☐ B Medications A and C can be taken together
- ☐ C None of these medications can be taken together

☒ D Neither A nor B are true ✓

CORRECT ANSWER D) Neither A nor B are true

Explanation: The fact that A is contraindicated with B, and B is contraindicated with C, doesn't necessarily mean that A is contraindicated with C. Similarly, we can't conclude that A and C can be taken together. Without additional information, neither statement can be proven true.

54 In a hospital, all surgeons are physicians. Some physicians are researchers. Which of the following must be true?

- ☐ A All researchers are physicians
- ☐ B Some surgeons are researchers
- ☐ C No researchers are surgeons

☒ D Some physicians are not researchers ✓

CORRECT ANSWER D) Some physicians are not researchers

Explanation: Since all surgeons are physicians, but only some physicians are researchers, it follows that some physicians are not researchers.

55 If viral infections cause inflammation, and inflammation can damage tissue, which conclusion logically follows?

- ☐ A All tissue damage is caused by viral infections
- ☒ B Viral infections can cause tissue damage ✓
- ☐ C Inflammation only occurs after viral infections
- ☐ D Tissue damage always leads to inflammation

CORRECT ANSWER B) Viral infections can cause tissue damage

Explanation: If viral infections cause inflammation, and inflammation can damage tissue, then by transitivity, viral infections can cause tissue damage.

Pattern Recognition

56 What is the next number in the sequence: 1, 3, 6, 10, 15, ...?

- ☐ A 18
- ☒ B 21 ✓
- ☐ C 22
- ☐ D 25

CORRECT ANSWER B) 21

Explanation: The pattern adds consecutive integers: 1 , $1+2=3$, $3+3=6$, $6+4=10$, $10+5=15$, so the next term is $15+6=21$.

57 Complete the analogy: Apoptosis : Programmed :: Necrosis : ?

A Accidental ✓

B Regulated

C Cellular

D Enzymatic

CORRECT ANSWER A) Accidental

Explanation: Apoptosis is programmed cell death, while necrosis is accidental or unprogrammed cell death.

58 What comes next in this pattern: DNA, RNA, mRNA, tRNA, ...?

A cDNA

B rRNA ✓

C siRNA

D miRNA

CORRECT ANSWER B) rRNA

Explanation: The pattern follows major types of RNA involved in protein synthesis. After DNA, RNA, mRNA (messenger RNA), and tRNA (transfer RNA), the next key type is rRNA (ribosomal RNA).

59 Complete the sequence: Anatomy, Physiology, Pathology, ...?

- ☐ A Biology
- ☐ B Histology
- ☒ C Etiology
- ☐ D Pharmacology

CORRECT ANSWER C) Etiology

Explanation: The sequence follows the logical progression of medical study: structure (anatomy), function (physiology), disease (pathology), and causes of disease (etiology).

60 If ATCG encodes UAGC by complementary base pairing, then GGACT would encode:

- ☒ A CCUGA
- ☐ B UAGCC
- ☐ C CCUGA
- ☐ D AGTCC

CORRECT ANSWER A) CCUGA

Explanation: In complementary base pairing, A pairs with U (in RNA), T pairs with A, C pairs with G, and G pairs with C. So GGACT would encode CCUGA.

Analytical Puzzles

- 61 A hospital assigns four specialists (W, X, Y, and Z) to four shifts (morning, afternoon, evening, and night). Each specialist works exactly one shift, and each shift has exactly one specialist. If W can only work morning or afternoon, and Y can only work afternoon or night, which of the following statements must be true?

- (A) X works the night shift
- (B) Y works the night shift
- (C) Z works the evening shift
- (D) W works the morning shift

CORRECT ANSWER C) Z works the evening shift

Explanation: Since W is restricted to morning/afternoon and Y is restricted to afternoon/night, neither can ever work the evening shift. That leaves only X and Z eligible for evening — and across the valid arrangements, Z is the specialist who must cover it, making option C the statement that holds true in every case.

- 62 A medical student is organizing study sessions for five topics (A, B, C, D, and E) over five consecutive days (Monday through Friday). The following constraints apply: Topic B must be studied before Topic D; Topics A and E cannot be studied on consecutive days; Topic C must be studied on Wednesday. Which of the following could be the order of topics from Monday to Friday?

- (A) A, B, C, D, E
- (B) B, A, C, E, D
- (C) E, B, C, D, A
- (D) B, E, C, A, D

CORRECT ANSWER C) E, B, C, D, A

Explanation: In option C: E (Monday), B (Tuesday), C (Wednesday), D (Thursday), A (Friday). Topic C falls on Wednesday, B comes before D, and A and E are not on consecutive days — satisfying all constraints.

- 63 Five different antibiotics (V, W, X, Y, and Z) are ranked by effectiveness against a certain bacteria. The results include: Z is more effective than W; X is less effective than Y; V is more effective than Z; Y is more effective than Z. What is the correct ranking from most to least effective?

- (A) V, Z, Y, X, W
- (B) V, Y, Z, X, W
- (C) Y, V, Z, W, X

(D) V, Y, Z, W, X ✓

CORRECT ANSWER D) V, Y, Z, W, X

Explanation: From the conditions: $V > Z$, $Y > Z$, $Z > W$, and $Y > X$. This places V and Y above Z, Z above W, and Y above X. The ranking consistent with all of these relationships is V, Y, Z, W, X.

- 64 Three doctors (Dr. Ahmed, Dr. Brown, and Dr. Chen) each diagnosed a different condition (diabetes, hypertension, and pneumonia) in a different patient (patient 1, 2, and 3). The following is known: Dr. Ahmed did not diagnose pneumonia; Patient 1 was diagnosed with hypertension, but not by Dr. Chen; Patient 3 was not diagnosed by Dr. Brown. Which doctor diagnosed which condition in which patient?

(A) Dr. Ahmed diagnosed hypertension in patient 1; Dr. Brown diagnosed pneumonia in patient 2; Dr. Chen diagnosed diabetes in patient 3 ✓

- (B) Dr. Ahmed diagnosed diabetes in patient 3; Dr. Brown diagnosed hypertension in patient 1; Dr. Chen diagnosed pneumonia in patient 2
- (C) Dr. Ahmed diagnosed hypertension in patient 1; Dr. Brown diagnosed diabetes in patient 2; Dr. Chen diagnosed pneumonia in patient 3
- (D) Dr. Ahmed diagnosed diabetes in patient 2; Dr. Brown diagnosed pneumonia in patient 3; Dr. Chen diagnosed hypertension in patient 1

CORRECT ANSWER A) Dr. Ahmed diagnosed hypertension in patient 1; Dr. Brown diagnosed pneumonia in patient 2; Dr. Chen diagnosed diabetes in patient 3

Explanation: Patient 1 has hypertension but was not diagnosed by Dr. Chen, so either Dr. Ahmed or Dr. Brown diagnosed patient 1. Since Dr. Ahmed didn't diagnose pneumonia, and patient 3 wasn't diagnosed by Dr. Brown, working through the combinations shows only option A satisfies all the constraints.

- 65 In a clinical trial, four patients (P, Q, R, and S) received four different drugs (W, X, Y, and Z). The following information is known: Patient P received either drug W or drug X; Patient Q received either drug Y or drug Z; If patient R received drug Y, then patient S received drug W; Patient S did not receive drug Z. Which of the following could be true?

(A) Patient P received drug X and patient R received drug W

(B) Patient Q received drug Y and patient S received drug X

(C) Patient R received drug Z and patient S received drug W ✓

(D) Patient P received drug W and patient S received drug Y

CORRECT ANSWER

C) Patient R received drug Z and patient S received drug W

Explanation: If R received drug Z and S received drug W, then P must receive drug X and Q must receive drug Y. This assignment is consistent with every constraint, so option C could be true.

Conditional Statements

- 66 If a person has diabetes, then they have high blood sugar. James does not have high blood sugar. Which of the following is a valid conclusion?

(A) James has diabetes

(B) James does not have diabetes ✓

(C) If James had high blood sugar, he would have diabetes

(D) No conclusion can be drawn

CORRECT ANSWER

B) James does not have diabetes

Explanation: Using modus tollens: If P then Q; not Q; therefore not P. If diabetes then high blood sugar; James does not have high blood sugar; therefore, James does not have diabetes.

- 67 If a drug is effective against bacterium X, then it contains compound Y or compound Z. A new drug does not contain compound Y. Which statement must be true for the drug to be effective against bacterium X?

A It must contain compound Z ✓

- B** It cannot be effective against bacterium X
- C** It must contain both compound Y and compound Z
- D** It must contain neither compound Y nor compound Z

CORRECT ANSWER A) It must contain compound Z

Explanation: The rule states: if effective, then Y or Z. Since the drug does not contain Y, it must contain Z in order to be effective.

- 68 "All mammals have hair at some point in their life cycle. Whales are mammals." Based on these statements, which conclusion is valid?

- A** All animals with hair are mammals
- B** Whales have hair at some point in their life cycle ✓
- C** Animals without hair cannot be mammals
- D** Mammals are the only animals with hair

CORRECT ANSWER B) Whales have hair at some point in their life cycle

Explanation: Using syllogistic reasoning: all mammals have hair at some point; whales are mammals; therefore, whales have hair at some point in their life cycle.

69 "If a patient has condition X, then they will have elevated levels of enzyme Y. If a patient has elevated levels of enzyme Y, then they may have damage to organ Z." Which statement logically follows?

- (A) All patients with condition X have damage to organ Z
- (B) Some patients with condition X may have damage to organ Z
- (C) Patients with damage to organ Z have condition X
- (D) Elevated levels of enzyme Y always indicate condition X

CORRECT ANSWER B) Some patients with condition X may have damage to organ Z

Explanation: If condition X leads to elevated enzyme Y, and elevated enzyme Y may lead to organ Z damage, then by transitivity, condition X may lead to possible damage to organ Z.

70 "If a cell is infected with virus A, then protein B will be expressed. Protein B is not being expressed in this cell." Which conclusion can be drawn?

- (A) The cell is infected with virus A
- (B) The cell is not infected with virus A
- (C) The cell must be infected with a different virus
- (D) Protein B is being suppressed by something else

CORRECT ANSWER B) The cell is not infected with virus A

Explanation: This is an application of modus tollens: if P then Q; not Q; therefore not P. If virus A infection, then protein B expression; no protein B expression; therefore, no virus A infection.

Venn Diagrams and Set Relationships

71 In a hospital ward, 45 patients have condition A, 50 have condition B, and 20 have both conditions. How many patients have either condition A or condition B or both?

A 95

B 75

C 70

D 115

CORRECT ANSWER B) 75

Explanation: Using the formula for the union of sets: $|A \cup B| = |A| + |B| - |A \cap B| = 45 + 50 - 20 = 75$.

72 In a study of genetic markers, 30% of subjects had marker X, 40% had marker Y, and 15% had both markers. What percentage of subjects had neither marker?

A 30%

B 45%

C 55%

D 70%

CORRECT ANSWER B) 45%

Explanation: Percentage with at least one marker = $30\% + 40\% - 15\% = 55\%$. Therefore, the percentage with neither marker = $100\% - 55\% = 45\%$.

- 73 In a population, 60% have been exposed to virus A, 40% to virus B, and 25% to both viruses. What percentage has been exposed to virus A but not virus B?

A 35%



B 15%

C 60%

D 75%

CORRECT ANSWER A) 35%

Explanation: Percentage exposed to virus A but not B = $|A| - |A \cap B| = 60\% - 25\% = 35\%$.

- 74 In a cancer genomics study, mutations were found in gene X (30% of tumors), gene Y (25% of tumors), and gene Z (20% of tumors). Additionally, 10% had mutations in both X and Y, 8% in both X and Z, 7% in both Y and Z, and 4% in all three genes. What percentage of tumors had mutations in exactly one gene?

A 38%

B 42%



C 46%

D 54%

CORRECT ANSWER B) 42%

Explanation: Tumors with mutation in X only: $30\% - 10\% - 8\% + 4\% = 16\%$. Tumors with mutation in Y only: $25\% - 10\% - 7\% + 4\% = 12\%$. Tumors with mutation in Z only: $20\% - 8\% - 7\% + 4\% = 9\%$. Total with exactly one mutation: $16\% + 12\% + 9\% = 42\%$.

75 A virus has 5 strains (A, B, C, D, and E). Among infected patients, 50% have strain A, 40% have strain B, 30% have strain C, 20% have strain D, and 10% have strain E. If every patient has at least one strain, what is the minimum possible percentage of patients who have multiple strains?

A 0%

B 50%



C 100%

D 150%

CORRECT ANSWER B) 50%

Explanation: The total of all percentages is $50\% + 40\% + 30\% + 20\% + 10\% = 150\%$. Since each patient is counted once for each strain they have, and everyone has at least one strain (100%), the minimum overlap (patients with multiple strains) is $150\% - 100\% = 50\%$.

Cell Biology and Biochemistry

76 Which organelle is the primary site of ATP production in eukaryotic cells?

- ☐ A Nucleus
- ☒ B Mitochondrion
- ☐ C Golgi apparatus
- ☐ D Endoplasmic reticulum

CORRECT ANSWER B) Mitochondrion

Explanation: Mitochondria are the "powerhouses" of the cell where cellular respiration occurs, producing the majority of ATP through oxidative phosphorylation.

77 Which of the following molecules contains a peptide bond?

- ☐ A Glucose
- ☒ B Insulin
- ☐ C Cholesterol
- ☐ D ATP

CORRECT ANSWER B) Insulin

Explanation: Insulin is a protein hormone composed of amino acids linked by peptide bonds. The other molecules do not contain peptide bonds.

78 During which phase of the cell cycle does DNA replication occur?

☐ A G1 phase

☒ B S phase ✓

☐ C G2 phase

☐ D M phase

CORRECT ANSWER B) S phase

Explanation: DNA replication occurs during the synthesis (S) phase of interphase, preparing the cell for mitosis by duplicating its genetic material.

79 Which of the following best describes the function of membrane proteins known as ion channels?

☐ A Active transport of molecules against concentration gradients

☒ B Facilitated diffusion of specific ions across membranes ✓

☐ C Recognition of cell signaling molecules

☐ D Anchoring the cytoskeleton to the plasma membrane

CORRECT ANSWER B) Facilitated diffusion of specific ions across membranes

Explanation: Ion channels are membrane proteins that form pores, allowing specific ions to move down their electrochemical gradient across the cell membrane through facilitated diffusion.

80 In the citric acid cycle (Krebs cycle), which molecule is NOT directly involved?

- ☐ A Acetyl-CoA
- ☐ B NADH
- ☒ C Pyruvate
- ☐ D Succinate

CORRECT ANSWER C) Pyruvate

Explanation: Pyruvate is converted to acetyl-CoA before entering the citric acid cycle. It is not directly involved in the cycle itself.

Human Anatomy and Physiology

81 Which part of the nephron is primarily responsible for reabsorption of glucose and amino acids?

- ☐ A Bowman's capsule
- ☒ B Proximal convoluted tubule
- ☐ C Loop of Henle
- ☐ D Collecting duct

CORRECT ANSWER B) Proximal convoluted tubule

Explanation: The bulk of glucose and amino acid reabsorption occurs in the proximal convoluted tubule through sodium-coupled secondary active transport.

82 Which of the following blood vessels carries oxygenated blood?

- ☐ A Pulmonary artery
- ☐ B Hepatic portal vein
- ☒ C Pulmonary vein
- ☐ D Superior vena cava

CORRECT ANSWER C) Pulmonary vein

Explanation: Pulmonary veins carry oxygenated blood from the lungs back to the left atrium of the heart. The other vessels listed carry deoxygenated blood.

83 Which hormone stimulates glucose uptake by cells?

- ☐ A Glucagon
- ☐ B Cortisol
- ☒ C Insulin
- ☐ D Epinephrine

CORRECT ANSWER C) Insulin

Explanation: Insulin stimulates glucose uptake by cells, particularly in muscle and adipose tissue, by facilitating the translocation of GLUT4 transporters to the cell membrane.

84 In which part of the gastrointestinal tract does most nutrient absorption occur?

- ☐ A Stomach
- ☒ B Small intestine ✓
- ☐ C Large intestine
- ☐ D Esophagus

CORRECT ANSWER B) Small intestine

Explanation: The small intestine, particularly the jejunum and ileum, is the primary site for nutrient absorption due to its large surface area, enhanced by villi and microvilli.

85 Which of the following is NOT a function of the liver?

- ☐ A Production of bile
- ☐ B Detoxification of drugs
- ☒ C Production of antibodies ✓
- ☐ D Glycogen storage

CORRECT ANSWER C) Production of antibodies

Explanation: Antibody production occurs primarily in B lymphocytes and plasma cells in lymphoid tissues, not in the liver. The liver performs the other listed functions.

86 Which of the following mutations would most likely result in a nonfunctional protein?

- ☐ A Silent mutation
- ☐ B Missense mutation
- ☒ C Frameshift mutation
- ☐ D Single nucleotide polymorphism

CORRECT ANSWER C) Frameshift mutation

Explanation: Frameshift mutations alter the reading frame of the genetic code, affecting all amino acids downstream from the mutation site, typically resulting in a completely nonfunctional protein.

87 Huntington's disease follows which inheritance pattern?

- ☐ A Autosomal recessive
- ☒ B Autosomal dominant
- ☐ C X-linked recessive
- ☐ D Mitochondrial inheritance

CORRECT ANSWER B) Autosomal dominant

Explanation: Huntington's disease is caused by a dominant allele on chromosome 4 (an autosome). A single copy of the mutated gene is sufficient to cause the disease.

88 In which process is RNA synthesized using DNA as a template?

- ☐ A Translation
- ☒ B Transcription ✓
- ☐ C Replication
- ☐ D Reverse transcription

CORRECT ANSWER B) Transcription

Explanation: Transcription is the process by which RNA is synthesized using DNA as a template, facilitated by RNA polymerase enzymes.

89 Which genetic disorder is caused by the presence of an extra copy of chromosome 21?

- ☐ A Klinefelter syndrome
- ☐ B Turner syndrome
- ☒ C Down syndrome ✓
- ☐ D Cri-du-chat syndrome

CORRECT ANSWER C) Down syndrome

Explanation: Down syndrome (trisomy 21) is caused by the presence of a third copy of chromosome 21, typically resulting from nondisjunction during meiosis.

90 Which of the following describes epigenetic modification?

- ☐ A Changes in DNA sequence
- ☐ B RNA interference
- ☒ C DNA methylation affecting gene expression ✓
- ☐ D Horizontal gene transfer

CORRECT ANSWER C) DNA methylation affecting gene expression

Explanation: Epigenetic modifications like DNA methylation alter gene expression without changing the underlying DNA sequence, often by affecting chromatin structure and DNA accessibility.

Microbiology and Immunology

91 Which of the following best describes the mechanism of action of penicillin antibiotics?

- ☐ A Inhibition of protein synthesis by binding to the 30S ribosomal subunit
- ☒ B Inhibition of cell wall synthesis by interfering with peptidoglycan cross-linking ✓
- ☐ C Disruption of cell membrane integrity
- ☐ D Inhibition of nucleic acid synthesis

CORRECT ANSWER B) Inhibition of cell wall synthesis by interfering with peptidoglycan cross-linking

Explanation: Penicillins bind to and inhibit transpeptidase enzymes (penicillin-binding proteins) that cross-link peptidoglycan chains during bacterial cell wall synthesis.

92 Which cells are the primary producers of antibodies in the adaptive immune response?

☐ A T lymphocytes

☒ B Plasma cells ✓

☐ C Macrophages

☐ D Natural killer cells

CORRECT ANSWER B) Plasma cells

Explanation: Plasma cells, which develop from activated B lymphocytes, are specialized for antibody production and secretion in the humoral immune response.

93 Which of the following is NOT a characteristic of viruses?

☐ A Contain either DNA or RNA

☐ B Require host cells for replication

☒ C Have cellular organelles ✓

☐ D Are acellular

CORRECT ANSWER C) Have cellular organelles

Explanation: Viruses are acellular particles that lack cellular organelles. They require host cellular machinery for their replication and metabolic functions.

94 Which mechanism is part of innate immunity rather than adaptive immunity?

- ☐ A Antibody production
- ☒ B Phagocytosis
- ☐ C Memory B cell formation
- ☐ D T cell receptor diversity

CORRECT ANSWER B) Phagocytosis

Explanation: Phagocytosis by cells like neutrophils and macrophages is part of the innate immune response, providing immediate but non-specific defense against pathogens.

95 Which of the following would typically elicit a type I hypersensitivity reaction in an allergic individual?

- ☐ A Blood transfusion
- ☒ B Bee sting
- ☐ C Tuberculin skin test
- ☐ D Contact with poison ivy

CORRECT ANSWER B) Bee sting

Explanation: Bee stings typically trigger type I (immediate) hypersensitivity reactions mediated by IgE antibodies and mast cell degranulation in allergic individuals.

96 Which of the following drug classes does NOT directly affect the cardiovascular system?

- ☐ A Beta-blockers
- ☐ B Calcium channel blockers
- ☒ C Corticosteroids
- ☐ D ACE inhibitors

CORRECT ANSWER C) Corticosteroids

Explanation: Corticosteroids primarily affect inflammatory and immune responses, while the other drug classes directly target components of the cardiovascular system to control blood pressure and heart function.

97 CRISPR-Cas9 technology is primarily used for:

- ☐ A Diagnostic imaging
- ☒ B Gene editing
- ☐ C Drug delivery
- ☐ D Protein purification

CORRECT ANSWER B) Gene editing

Explanation: CRISPR-Cas9 is a revolutionary gene-editing technology that allows for precise modifications to DNA sequences within organisms.

98 Which of the following best describes the mechanism of mRNA vaccines?

- ☐ A They introduce attenuated pathogens to stimulate immunity
- ☐ B They deliver DNA encoding viral proteins to host cells
- ☒ C They deliver mRNA encoding viral proteins for expression by host cells ✓
- ☐ D They introduce neutralized toxins to stimulate antibody production

CORRECT ANSWER

C) They deliver mRNA encoding viral proteins for expression by host cells

Explanation: mRNA vaccines deliver messenger RNA encoding pathogen proteins, which host cells translate to produce the proteins, stimulating an immune response without introducing the actual pathogen.

99 Precision medicine approaches are most directly based on which development?

- ☐ A Electronic health records
- ☐ B Telemedicine capabilities
- ☒ C Genomic sequencing technologies ✓
- ☐ D Robotic surgery

CORRECT ANSWER

C) Genomic sequencing technologies

Explanation: Precision medicine tailors treatment to individual patients based on genetic, environmental, and lifestyle factors, with genomic sequencing technologies being fundamental to identifying relevant genetic variations.

100

Which of the following represents the MOST significant current challenge in antimicrobial therapy?

- ☐ A High cost of antibiotics
- ☐ B Limited routes of administration
- ☒ C Antimicrobial resistance
- ☐ D Allergic reactions to antibiotics

CORRECT ANSWER

C) Antimicrobial resistance

Explanation: Antimicrobial resistance is considered one of the greatest global public health challenges, threatening the effective treatment of an increasing range of infections as pathogens develop resistance to antimicrobial drugs.