

CUET (UG) — BIOLOGY MOCK TEST

OFFICIAL ANSWER SHEET WITH EXPLANATIONS

Total Questions: 40 | Total Marks: 200 | Maximum Score: 200 | Minimum Qualifying: 40%

This answer sheet is for evaluator use only. Do not distribute to candidates before the test.

QUICK ANSWER KEY

Q No.	Answer	Q No.	Answer	Q No.	Answer	Q No.	Answer
1	C	2	B	3	C	4	C
5	B	6	B	7	C	8	B
9	C	10	B	11	B	12	C
13	C	14	B	15	B	16	B
17	A	18	C	19	B	20	B
21	B	22	C	23	C	24	C
25	B	26	C	27	C	28	B
29	C	30	B	31	C	32	B
33	B	34	C	35	B	36	B
37	B	38	B	39	B	40	B

Mark Allocation	Correct Answer	Wrong Answer	Not Attempted
Marks	+5	-1	0

DETAILED EXPLANATIONS — SECTION WISE

Section A: Cell Biology & Biomolecules		
Q1.	Correct Answer: C) Mitochondria	Marks: +5
Which organelle is responsible for ATP synthesis in eukaryotic cells?	Explanation: Mitochondria perform oxidative phosphorylation via the electron transport chain to produce ATP — the primary energy currency of the cell.	

Q2.	Correct Answer: B) Singer and Nicolson	Marks: +5
The fluid-mosaic model of the plasma membrane was proposed by:	Explanation: Singer and Nicolson (1972) proposed the fluid-mosaic model, describing the membrane as a lipid bilayer with embedded proteins that move laterally.	
Q3.	Correct Answer: C) Protein synthesis	Marks: +5
Which of the following is NOT a function of smooth endoplasmic reticulum (SER)?	Explanation: Protein synthesis occurs on ribosomes attached to the rough ER (RER), not SER. SER is involved in lipid synthesis, steroid biosynthesis, and drug detoxification.	
Q4.	Correct Answer: C) Helicase	Marks: +5
The enzyme responsible for unwinding the DNA double helix during replication is:	Explanation: Helicase breaks the hydrogen bonds between complementary base pairs, unwinding the double helix to create the replication fork.	

Q5.	Correct Answer: B) Cellulose	Marks: +5
Which biomolecule serves as the primary structural component of the cell wall in plants?	Explanation: Cellulose, a polysaccharide made of β -1,4-linked glucose units, is the main structural component of the plant cell wall.	

Q6.	Correct Answer: B) $A + G = C + T$	Marks: +5
Chargaff's rules state that in DNA:	Explanation: Chargaff's rules: A pairs with T ($A=T$) and G pairs with C ($G=C$), so purines ($A+G$) equal pyrimidines ($C+T$) in any double-stranded DNA.	

Q7.	Correct Answer: C) tRNA	Marks: +5
Which type of RNA carries amino acids to the ribosome during translation?	Explanation: Transfer RNA (tRNA) acts as an adaptor molecule — its anticodon pairs with the mRNA codon while its 3' end carries the specific amino acid.	

Q8.	Correct Answer: B) Mitochondrial matrix	Marks: +5
The Krebs cycle (citric acid cycle) occurs in the:	Explanation: The Krebs cycle takes place in the mitochondrial matrix, where acetyl-CoA is oxidised to CO_2 while generating NADH, $FADH_2$, and ATP.	

Section B: Genetics & Evolution

Q9.	Correct Answer: C) 9:3:3:1	Marks: +5
A dihybrid cross between two heterozygous parents (AaBb × AaBb) gives a phenotypic ratio of:	Explanation: When both loci assort independently (Mendel's Law of Independent Assortment), the standard dihybrid ratio is 9:3:3:1 for two heterozygous parents.	
Q10.	Correct Answer: B) Beta-globin	Marks: +5
Sickle cell anemia is caused by a mutation in which gene?	Explanation: A single nucleotide substitution (GAG→GTG) in the beta-globin gene converts glutamic acid to valine, causing haemoglobin to polymerise under low-oxygen conditions.	
Q11.	Correct Answer: B) DNA → RNA → Protein	Marks: +5
Which of the following is the correct sequence of events in the Central Dogma?	Explanation: The Central Dogma (Francis Crick, 1958) states genetic information flows: DNA → (transcription) → RNA → (translation) → Protein.	

Q12.	Correct Answer: C) No evolutionary forces act	Marks: +5
According to Hardy-Weinberg equilibrium, allele frequencies remain constant when:	Explanation: H-W equilibrium holds only when the population is large, randomly mating, and free from mutation, selection, gene flow, and genetic drift.	
Q13.	Correct Answer: C) Charles Darwin	Marks: +5
The theory of Natural Selection was proposed by:	Explanation: Charles Darwin (1859) proposed natural selection in 'On the Origin of Species' — individuals with favourable heritable traits survive and reproduce more successfully.	
Q14.	Correct Answer: B) 45, X	Marks: +5
Which chromosome abnormality causes Turner's syndrome?	Explanation: Turner's syndrome (45, X or 45, XO) results from monosomy of the X chromosome. Affected females show short stature, gonadal dysgenesis, and infertility.	
Q15.	Correct Answer: B) Palindromic sequences	Marks: +5
Restriction endonucleases cut DNA at specific sequences called:	Explanation: Restriction endonucleases recognise short palindromic sequences (e.g. GAATTC for EcoRI) and cut the DNA at or near these sites — essential tools in recombinant DNA technology.	

Q16.	Correct Answer: B) Kary Mullis	Marks: +5
The process of polymerase chain reaction (PCR) was invented by:	Explanation: Kary Mullis invented PCR in 1983 (Nobel Prize 1993). PCR exponentially amplifies a target DNA sequence using thermostable Taq polymerase through repeated denaturation, annealing, and extension cycles.	

Section C: Plant & Animal Physiology

Q17.	Correct Answer: A) Transpiration	Marks: +5
The process by which plants lose water vapour through stomata is called:	Explanation: Transpiration is the evaporative loss of water from aerial parts of plants, primarily through stomata. It drives the ascent of water through the xylem.	

Q18.	Correct Answer: C) Ethylene	Marks: +5
Which plant hormone promotes fruit ripening?	Explanation: Ethylene (a gaseous hormone) promotes fruit ripening, leaf abscission, and senescence. It is used commercially to ripen fruits during transport.	

Q19.	Correct Answer: B) Chloroplast	Marks: +5
The site of photosynthesis in a plant cell is:	Explanation: Chloroplasts contain thylakoid membranes (light reactions) and stroma (Calvin cycle / dark reactions), making them the organelle where photosynthesis occurs.	

Q20.	Correct Answer: B) Three alleles	Marks: +5
The ABO blood group system is controlled by:	Explanation: The ABO locus has three co-dominant/recessive alleles: I^A , I^B , and i , giving four blood groups (A, B, AB, O) — a classic example of multiple allelism.	
Q21.	Correct Answer: B) Xylem	Marks: +5
The conducting tissue responsible for transporting water and minerals from roots to leaves is:	Explanation: Xylem (comprising vessels and tracheids) conducts water and dissolved minerals upward from roots to aerial parts, primarily driven by transpiration pull.	
Q22.	Correct Answer: C) Adrenaline (Epinephrine)	Marks: +5
Which hormone is primarily responsible for the 'fight or flight' response?	Explanation: Adrenaline (epinephrine), secreted by the adrenal medulla, triggers increased heart rate, dilated pupils, and blood glucose rise — preparing the body for rapid action.	

Q23.	Correct Answer: C) Nephron	Marks: +5
The functional unit of the kidney responsible for urine formation is the:	Explanation: Each nephron consists of the glomerulus, Bowman's capsule, proximal and distal convoluted tubules, and the loop of Henle — together performing filtration, reabsorption, and secretion.	
Q24.	Correct Answer: C) Fallopian tube (oviduct)	Marks: +5
In humans, fertilisation normally occurs in the:	Explanation: Fertilisation occurs in the ampulla of the fallopian tube (oviduct). The resulting zygote travels to the uterus for implantation over 5–7 days.	
Section D: Ecology & Environment		
Q25.	Correct Answer: B) Commensalism	Marks: +5
The relationship where one organism benefits and the other is neither harmed nor benefited is called:	Explanation: Commensalism: one species benefits (+) and the other is unaffected (0), e.g. epiphytic orchids on tree branches.	

Q26.	Correct Answer: C) Carbon dioxide	Marks: +5
Which gas is primarily responsible for the greenhouse effect?	Explanation: CO ₂ (along with CH ₄ , N ₂ O, and H ₂ O vapour) absorbs outgoing infrared radiation and re-radiates it, warming Earth's surface — the greenhouse effect.	
Q27.	Correct Answer: C) Upright	Marks: +5
The pyramid of energy in an ecosystem is always:	Explanation: The pyramid of energy is always upright because energy is lost (≈90%) at each trophic level (10% law / Lindeman's efficiency); it can never be inverted.	
Q28.	Correct Answer: B) Are rich in endemic species and face high habitat loss	Marks: +5
Biodiversity hotspots are regions that:	Explanation: A biodiversity hotspot (Norman Myers, 1988) must have ≥1,500 endemic vascular plant species and have lost ≥70% of its original habitat. India has 4 hotspots.	
Q29.	Correct Answer: C) Chlorofluorocarbons (CFCs)	Marks: +5
Ozone depletion in the stratosphere is mainly caused by:	Explanation: CFCs release chlorine radicals under UV radiation that catalytically destroy ozone molecules (Cl + O ₃ → ClO + O ₂), thinning the protective ozone layer.	
Q30.	Correct Answer: B) Directional change in community structure over time	Marks: +5
The concept of 'ecological succession' refers to:	Explanation: Ecological succession is a predictable, directional change in species composition and community structure over time, from pioneer species to a stable climax community.	

Q31.	Correct Answer: C) National Park	Marks: +5
Which of the following is an example of in-situ conservation?	Explanation: In-situ conservation protects species in their natural habitat (national parks, wildlife sanctuaries, biosphere reserves). Ex-situ conservation (zoos, seed banks) occurs outside natural habitats.	

Q32.	Correct Answer: B) Nitrogen and phosphorus	Marks: +5
Eutrophication is caused by an excess of which nutrients in water bodies?	Explanation: Excessive nitrogen and phosphorus (from agricultural runoff and sewage) cause algal blooms (eutrophication), depleting dissolved oxygen and causing hypoxic dead zones.	

Section E: Biotechnology & Human Health

Q33.	Correct Answer: B) Hepatitis B	Marks: +5
The first recombinant DNA vaccine approved for humans was against:	Explanation: The recombinant hepatitis B vaccine (Recombivax HB) was the first recombinant DNA vaccine for humans, approved by the FDA in 1986.	

Q34.	Correct Answer: C) Beta-carotene (pro-Vitamin A)	Marks: +5
Golden Rice is a genetically modified variety enriched with:	Explanation: Golden Rice was engineered to express beta-carotene in the endosperm by introducing genes from daffodil and a bacterium, addressing Vitamin A deficiency.	
Q35.	Correct Answer: B) Human immunodeficiency virus (HIV)	Marks: +5
The causative agent of AIDS is:	Explanation: HIV is a retrovirus that infects and destroys CD4 ⁺ T-helper cells, progressively impairing the immune system and leading to AIDS.	
Q36.	Correct Answer: B) Antigens or antibodies	Marks: +5
ELISA (Enzyme-Linked Immunosorbent Assay) is used to detect:	Explanation: ELISA uses enzyme-linked antibodies to detect and quantify antigens (e.g. viral proteins) or antibodies in patient samples — widely used in HIV diagnosis and pregnancy tests.	
Q37.	Correct Answer: B) Oncomouse	Marks: +5
Which of the following is a transgenic animal?	Explanation: Oncomouse (Harvard mouse) was the first patented transgenic animal, engineered with a human oncogene to study cancer. Dolly was a clone, not transgenic.	
Q38.	Correct Answer: B) Typhoid fever	Marks: +5
The Widal test is used to diagnose:	Explanation: The Widal test detects agglutinating antibodies against <i>Salmonella typhi</i> (O and H antigens) in patient serum, confirming typhoid fever infection.	

Q39.	Correct Answer: B) Altering genes in non-reproductive body cells	Marks: +5
Soma tic gene t herap y invo lves:	Explanation: Somatic gene therapy corrects defective genes in non-reproductive (somatic) cells of a patient — changes are not heritable. Germ-line therapy would pass modifications to offspring.	
Q40.	Correct Answer: B) Inhibiting cell wall synthesis	Marks: +5
The a ntibiot ic pen icillin i nhibit s bact eria by:	Explanation: Penicillin inhibits transpeptidase (penicillin-binding proteins), preventing cross-linking of peptidoglycan chains — this weakens the bacterial cell wall, causing lysis.	

— End of Answer Sheet —