📘 OCR A Biology – Paper 3 (H420/03)

✅ Top “Must-Write” Scoring Phrases (2017–2024)

Paper 3 = application, practical design, evaluation, calculations, extended responses.

Grouped by recurring examiner language.

🧪 Practical Skills & Experimental Design

1. Large(r) sample size
2. More representative of the population
3. Random sampling
4. Stratified sampling
5. Control variable
6. Standardised method
7. Reduce random error
8. Calculate a mean
9. Identify anomalies / outliers
10. Repeat measurements
11. Aseptic technique
12. Sterilise equipment
13. Use sterile agar
14. Serial dilution
15. Multiply by dilution factor

📊 Statistical & Mathematical Language

16. Student’s t-test (unpaired)
17. Comparing two means
18. Chi-squared test
19. Degrees of freedom
20. Null hypothesis can be rejected
21. Significant at p = 0.05

22.Not significant at p = 0.01

23.Difference is not due to chance

24.Use standard form

25.Correct number of significant figures

🧬 Genetics & Molecular Biology (Applied Context)

26.Mutation produces new alleles

27.Regulatory gene controls expression

28.Structural gene codes for protein

29.Allele frequency increases

30.Natural selection

31.Selection pressure

32.Greater reproductive success

33.Beneficial allele passed to offspring

34.DNA fragments separated by electrophoresis

35.Use fluorescent / radioactive probes

🦠 Microbiology & Immunology

36.Weakened / inactivated pathogen

37.Antigen present on pathogen

38.Memory cells produced

39.Secondary immune response

40.Opsonin

41.Agglutinin

42.Anti-toxin

43.Autoimmune response

44.Intracellular enzyme

45.Damage to tissue indicated

🌱 Ecology & Sampling

46.More representative sampling

47.Avoid bias

48.Stratified sampling across habitats

49.Use transects

50.Quadrats placed randomly

51.Species richness

52.Percentage threat

53.Human exploitation

54.Climate change impact

55.Habitat degradation

🧠 Physiology & Control Systems (Often Extended Response)

56.Negative feedback

57.Osmoreceptors detect low water potential

58.ADH released from posterior pituitary

59.Increases permeability via aquaporins

60.Sodium ions actively transported

61.Water moves by osmosis

62.Spindle fibres shorten

63.Chromosomes condense

64.Chromatids separate

65.Cytokinesis

🚫➡️✅ Paper 3 Non-Scoring → Scoring Phrases

(What students write vs what actually earns marks)

🧪 Practical Design

❌ “Make it more accurate.”
✅ Increase sample size to make results more representative.

❌ “Repeat the experiment.”
✅ Repeat measurements at the same concentration and calculate a mean.

❌ “Control variables.”
✅ Keep temperature constant using a thermostatically controlled water bath.

❌ “Be careful.”
✅ Cut away from the body to avoid injury.

❌ “Use sterile technique.”
✅ Sterilise equipment to prevent contamination.

📊 Statistics

❌ “There is a difference.”
✅ The difference is significant at $p = 0.05$.

❌ “It proves the hypothesis.”
✅ The null hypothesis can be rejected.

❌ “It’s significant.”
✅ The calculated χ^2 value is greater than the critical value.

❌ “They are similar.”
✅ There is no significant difference between the means.

❌ “Use a t-test.”
✅ Use an unpaired t-test to compare two means.

🧬 Extended Response / Application

❌ “It evolved.”
✅ Selection pressure increased frequency of beneficial alleles.

❌ “It adapts.”
✅ Individuals with the advantageous allele had greater reproductive success.

❌ “Gene changes.”
✅ Mutation in regulatory gene alters expression of structural gene.

❌ “The enzyme helps.”
✅ Acts as a cofactor to assist enzyme function.

❌ “The immune system remembers.”
✅ Memory cells are produced during the primary response.

🌱 Ecology & Evaluation

❌ “Small sample.”
✅ The sample size is too small to be representative of the population.

❌ “It’s biased.”
✅ Sampling was not random and may introduce bias.

❌ “Climate change is important.”
✅ Climate change accounts for a lower percentage threat compared to habitat loss.

❌ “More reliable.”
✅ Repeats reduce random error and improve reliability.

🎯 Paper 3 Examiner Pattern (2017–2024)

Paper 3 consistently:

- Rewards structured practical improvements
- Demands named statistical tests
- Requires explicit p-value reference
- Penalises vague “more accurate / more reliable”
- Expects control variables to be named
- Rewards mechanism in extended answers
- Requires structured evaluation (supports / does not support)