

# Synoptic Essay Titles

1. The functions of cell surface membranes
  - a. Control of substances entering and exiting the cell
    - i. Glucose absorption
    - ii. Osmosis
    - iii. Facilitated diffusion
    - iv. Nerve impulses
  - b. Chemical interface
    - i. Hormones – 2<sup>nd</sup> messenger
    - ii. Antibodies & Phagocytes
    - iii. Oestrogen & Transcription Factor
2. How the structure of cell organelles is related to their function
  - a. Nucleus
  - b. Mitochondrion
  - c. Chloroplast
  - d. Microvilli
  - e. Cell surface membrane
3. The process of diffusion and its importance in living organisms
  - a. Gas exchange in organisms
  - b. Digestion & Absorption
  - c. Nerve impulses
  - d. Synapses
  - e. Fick's Law
4. The difference ways in which organisms use ATP
  - a. Muscles
  - b. Glycolysis
  - c. Photosynthesis
  - d. 2<sup>nd</sup> Messenger Model
  - e. Hydrolysis
  - f. Active Transport
  - g. Codensation
5. How the structure of cells is related to their function

- a. Neurones
  - b. Muscle
  - c. Red blood cells
  - d. Palisade cells
  - e. Epithelial cells
  - f. Bacterial cells
  - g. Pacinian corpuscle
  - h. Optic receptors
6. The structure and function of carbohydrates
- a. Control of blood glucose levels
  - b. Polysaccharides
    - i. Starch
    - ii. Glycogen
    - iii. Cellulose
  - c. Respiration
  - d. Carbon Cycle
  - e. Digestion
7. How bacteria affect human lives
- a. Pathogens
    - i. Tuberculosis
    - ii. Cholera
    - iii. Antibiotic resistance
  - b. Gene technology
  - c. Decomposers
8. The biological importance of water
- a. Plants
    - i. Cohesion-tension & Transpiration
    - ii. Water uptake by roots
    - iii. Xerophytic adaptations
    - iv. Photosynthesis
  - b. Osmosis
    - i. Blood glucose levels
    - ii. Water potentials around plant and animal cells

- iii. Cystic fibrosis
  - iv. Osmotic Lysis (antibiotics)
  - v. Cholera
- c. Hydrolysis
  - i. Digestion
  - ii.  $\text{ATP} \rightarrow \text{ADP} + \text{P}_i$
- d. Respiration

9. The way in which different species of organisms differ from each other

- a. Genetics
- b. Cellular
  - i. Plant cells vs Animal Cells
  - ii. Eukaryotic cells vs Prokaryotic cells
- c. Coordination
  - i. Nervous systems
  - ii. Hormonal systems/plant growth factors
- d. Gas exchange mechanisms

10. Describe how the structures of different polymers are related to their functions

- a. Polynucleotides
  - i. DNA
  - ii. tRNA
  - iii. mRNA
- b. Polysaccharides
  - i. Starch
  - ii. Glycogen
  - iii. Cellulose
- c. Phospholipids
- d. Proteins
  - i. Enzymes
  - ii. Protein channels
  - iii. Fibrous proteins

11. Why offspring produced by the same parents are different in appearance

- a. Recessive/dominant alleles
- b. Phenotype alters
- c. Meiosis
  - i. Crossing over
  - ii. Independent segregation
- d. Mutations
- e. Conjugation

12. The importance of hydrogen bonds in living organisms

- a. DNA
  - i. Replication
  - ii. Hybridisation
  - iii. Translation
- b. Proteins
  - i. Cellulose
  - ii. Tertiary and secondary structure
- c. Cohesion-tension theory

13. The movement of substances within living organisms

- a. Digestion
- b. DNA
- c. Nerve impulses
- d. Circulation
- e. Auxins

14. How the structure of proteins is related to their functions

- a. Protein channels
- b. Actin & Myosin
- c. Collagen
- d. Enzymes
- e. Hormones
- f. Antibodies

15. The process of osmosis and its importance to living organisms

- a. Osmotic lysis
- b. Cystic Fibrosis & Cholera
- c. Animal cells

- d. Blood glucose
- e. Root hair cells

16. Energy transfers which take place inside living organisms

- a. Blood circulation
- b. Respiration
- c. Active transport
- d. Digestion
- e. Photosynthesis

17. The transfer of energy within and between organisms

- a. Gas exchange
- b. Carbon Cycle
- c. Respiration
- d. Photosynthesis
- e. Digestion
- f. Food chains and trophic levels

18. Inorganic ions include those of sodium, phosphorus and hydrogen. Describe how these and other inorganic ions are used in living organisms

- a. Phosphate
  - i. Phospholipids
  - ii. Phosphorylation
  - iii. ATP
  - iv. Nucleotides
- b. Iron
  - i. Haemoglobin
- c. Hydrogen
  - i. Digestion
  - ii. Photosynthesis & Respiration
- d. Sodium
  - i. Nerve impulses
  - ii. Co-transport
- e. Calcium
  - i. Muscle contraction
  - ii. Synapses

19. The effect of temperature and the processes which occur in them

- a. Adaptations
- b. Ecto therms vs Endotherms
- c. Nerve impulses
- d. Enzyme action

20. The effect of ecological conditions on the distribution of organisms

- a. Ecological niches
- b. Temperature
  - i. Global warming
- c. Succession
- d. Adaptation
- e. Predation
- f. Speciation

21. Cycles in biology

- a. Carbon cycle
- b. Nitrogen cycle
- c. Polymerase chain reaction
- d. Heart cycle
- e. Oestrous cycle
- f. Cell cycle & mitosis
- g. Homeostatic cycles
  - i. Body temperature
  - ii. Heart rate
  - iii. Blood Glucose

22. The ways in which behavioural responses help to maintain organisms in favourable environments

- a. Reflex arcs
- b. Kineses
- c. Tropisms
- d. Taxes

23. Hormonal control

- a. Blood glucose control
  - i. Insulin

- ii. Adrenalin
  - iii. Glucagon
- b. Oestrous cycle
- c. Plant growth factors

24. How nitrogen-containing substances are made available to and are used by living organisms

- a. Haber process
  - i. Fertilisers – eutrophication
- b. Proteins
- c. Nitrogen cycle
- d. Organic bases

25. Carbon dioxide in organisms and ecosystems

- a. Global warming
- b. Respiration
- c. Photosynthesis
- d. Carbon cycle
- e. Ventilation and circulation

26. Negative feedback and its importance in biology

- a. Control of heart rate
- b. Temperature control
- c. Oestrous cycle
- d. Blood glucose levels
- e. Stabilising selection

27. Condensation and hydrolysis and their importance in biology

- a. Digestion
- b. Polymerisation
- c. Hydrolysis of ATP
- d. Glucose blood levels
- e. Synaptic transmission