

NAME: STREAM:

SIGNATURE: COMBINATION:

P530/1

BIOLOGY PAPER 1

(THEORY)

TIME: $2\frac{1}{2}$ HOURS

PRE-REGISTRATION EXAMINATION

S.6 BIOLOGY PAPER ONE

(THEORY)

2HOURS 30 MINUTES

Instructions

- ❖ Attempt all questions in section A and B.
- ❖ Answers to section A must be filled in boxes on the right-hand side.
- ❖ Answers to section B must be written in the spaces of the question paper provided.

SECTION A (40 MARKS)

1. Which of the following physical properties of water make it a good habitat for exotherms?
 - A. Latent heat for vaporization
 - B. Latent heat of fusion
 - C. High boiling point
 - D. High specific capacity
2. A strand of messenger RNA is made up of 174 nitrogen bases. How many amino acids will be present in the polypeptide chain formed from this RNA?
 - A. 27
 - B. 44
 - C. 58
 - D. 87
3. In plants, the growth substances which interact to cause cell enlargement are?
 - A. Ethylene and abscisic acid
 - B. Cytokinins and ethylene
 - C. Gibberellins and auxins
 - D. Cytokinins and abscisic acid

4. Which of the following is the main difference between fungi and plants?
A. Fungi are heterotrophic while plants are autotrophic.
B. Plant cells contain plastids while those of fungi do not.
C. Fungi produce asexually while plants produce sexually.
D. Fungi cells are not divided unlike those in plants.
5. After an action potential, repolarization of the membrane begins by
A. Entry of sodium ions into the cell.
B. Sodium ions diffusing out of the cell.
C. Entry of potassium ions into the cell.
D. Potassium ions diffusing out of the cell.
6. The resolving power of a microscope is the
A. Ability of the microscope to distinguish fine detail.
B. Clarity of the image formed by the microscope.
C. Number of the image is magnified by the objective lens.
D. Power of the microscope to focus very small objects.
7. Which one of the following does not have an effect on a non-competitive inhibition?
A. Temperature change.
B. P^H change.
C. Enzyme concentration.
D. Substrate concentration.
8. Large steroid molecules diffuse easily through surface membranes because the membranes;
A. Consist of non-polar molecules.
B. Are semi-permeable.
C. Are freely permeable.
D. Are made of polysaccharides.
9. Which part of the vestibular apparatus responds to the vertical movement of the head?
A. Vestibular canal
B. Saccule
C. Utricle
D. Semi-circular canal
10. Which one of the following ecological pyramids may be used to determine productivity in an ecosystem?
A. Pyramids of energy
B. Pyramids of biomass
C. Pyramids of numbers
D. Pyramids of productivity
11. In an endergonic reaction, the products of the reaction contain
A. More energy than the reactants and energy is released.
B. Less energy than the reactants and energy is absorbed.
C. More energy than the reactants and energy is supplied.
D. Less energy than the reactants and energy is released.

19. A nerve cell sends messages to other cells by means of a special transmitter substance. Membrane enclosed vesicles containing transmitter molecules fuse with nerve cells plasma membrane then open releasing the transmitter substance into the environment outside the nerve cell. This is an example of
- A. Exocytosis B. Endocytosis C. Active transport D. Facilitated diffusion
20. In a DNA molecule, the sugars
- A. Bond covalently to phosphate groups
B. Bond covalently to nitrogen bases
C. Bond to nitrogen bases by hydrogen bonds
D. Bond to both phosphate groups and nitrogenous bases by covalent bonds
21. Which one of the following glands is compound saccular?
- A. Mammary gland C. Sweat gland
B. Sebaceous gland D. Gastric gland
22. In which one of the following parts of the cell does most production of ATP occur?
- A. Matrix of mitochondrion
B. Cristae of mitochondrion
C. Cytoplasm of cell
D. Outer membrane mitochondrion
23. Microtubules are made of
- A. Collagen B. Myosin C. Actin D. Tubulin
24. The hydrophobic part of phospholipids molecules is?
- A. Polar
B. Non polar
C. The head region
D. Towards the outside of the cell membrane
25. A high concentration of potassium ions outside the neurone
- A. Polarizes the neurone
B. Inhibits release of a transmitter substance
C. Has no effect on the amplitude of the action potential
D. Produces a high action potential
26. Impulses transmission in mammals is usually faster than it is in amphibians because:
- A. The distance between the nodes of Ranvier in mammals is shorter
B. Axons in amphibians lack myelin sheath
C. Mammals usually have higher body temperature
D. Mammals have a smaller surface area to volume ratio
27. The substance that lowers the surface tension in alveoli to ease their flexing during ventilation movement of the chest is?
- A. Surfactant C. Mucus
B. Lymph D. Tissue fluid

28. Which of the following applies to the cones of the retina? They
- A. Contain rhodopsin pigment
 - B. Show much retinal convergence
 - C. Perceive dim light
 - D. Show visual acuity
29. The tissue that provides mechanical support in a young stem is?
- A. Xylem
 - B. Parenchyma
 - C. Sclerenchyma
 - D. Collenchyma
30. The starch component that forms the blue-black colour with iodine solution is?
- A. Amylose
 - B. Amylopectin
 - C. Amylase
 - D. Pectin
31. Which of the following is not found in xylem tissue?
- A. Companion cell
 - B. Fibres
 - C. Sclereids
 - D. Vessels and tracheids
32. Protein synthesis occurs in the
- A. Nucleus where DNA codes for amino acids
 - B. Nucleus where the tRNA codes for amino acids
 - C. Cytoplasm where the ribosomes code for amino acids
 - D. Cytoplasm where mRNA codons pair with tRNA anticodons
33. Which of the following is false about man-made ecosystem?
- A. Is largely non-cyclical
 - B. Is stable
 - C. Use too much input energy
 - D. Is dependent on the natural ecosystem
34. With which structure is the auditory nerve associated?
- A. Organ of corti
 - B. Ossicles
 - C. Tympanic membrane
 - D. Eustachian tube
35. The autonomic nervous system is made up of
- A. The CNS and peripheral system
 - B. Somatic and skeletal system
 - C. Efferent and afferent system
 - D. Sympathetic and parasympathetic system

36. In which of the following does salutatory conduction occur?
- A. Thin nerve fibres
 - B. Thick nerve fibres
 - C. Myelinated fibres
 - D. Non myelinated fibres
37. Hypothalamus secretions are conveyed to the posterior lobe of pituitary gland via one of the following.
- A. Portal blood vessel
 - B. Capillary network
 - C. Nerve fibre
 - D. Pituitary stalk
38. Which one of these explains why some seeds when exposed to red light of wave length 660nm are able to germinate?
- A. Pr absorbs far red light and is converted to Pfr that then promotes germination
 - B. Pr absorbs red light and is converted to Pfr that promotes germination
 - C. Red light is converted into far red light to promote germination
 - D. Pfr absorbs far red light and it then promotes germination
39. The following are chain termination codons except;
- A. UAA
 - B. UAG
 - C. UGA
 - D. UAC
40. Canaliculi are located in.
- A. Spongy bone tissue
 - B. Cartilage
 - C. Blood tissue
 - D. Compact bone

SECTION B (60 MARKS)

41. According to the fluid –mosaic model of cell membrane structure, the unit membrane is a dynamic structure composed of several components:

(a) Name the component of the membrane

(i) Which is fluid in consistency (01 mark)

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(ii) That forms a mosaic (01 mark)

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(iii) The accounts for its specificity (01mark)

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(b) State two major functions of the cell membrane to the cell. (02 marks)

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(c) List three ways in which active transport is different from the process of diffusion across a cell membrane. (03 marks)

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(d) State two ways in which facilitated transport differs from active transport across a cell membrane. (02 marks)

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42. (a) Clearly give the meaning of the following. (06 marks)

(i) Greenhouse effect.

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(ii) Eutrophication.

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(iii) Environmental resistance.

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(iv) Carrying capacity

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(b) Suggest the dangers that increased amounts of greenhouse gases in the atmosphere are likely to produce. (04 marks)

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43. (a) State three differences between nervous hormonal communication. (03 marks)

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(b) What is the function of the black pigment which occurs in the choroid layer of the eye. (02 marks)

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(c) Explain the human eyes ability to

(i) See high of low intensity

(02½ marks)

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(ii) See in great detail in bright light.

(02½ marks)

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44. A farmer sprayed his crop of beans with insecticide five times during a growing season. A scientist sampled the population of blackfly on the crop shortly after each splaying had been completed. The results of the investigation are shown in the table below.

Number of spraying	1	2	3	4	5
Number of blackfly per m^3	20	45	100	205	410

(a) Explain the results obtained by the scientist.

(03 marks)

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(b) If this farmer continues to use the insecticide for a number of years, what would be the effect on the environment?

(03 marks)

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(c) What are advantages of biological pest control over chemical control?

(04 marks)

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45. (a) (i) State two similarities between chloroplasts and mitochondria.
(02 marks)

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(ii) Mention 3 differences between chloroplasts and mitochondria.
(03 marks)

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(b) Explain the following observations as applied to the electron microscope

(i) It has a higher resolving power than light microscope. (02 marks)

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(ii) Only dead specimen can be viewed. (02 marks)

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46. (a) Define the following terms related to protein synthesis.

(i) Transcription. (02 marks)

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(ii) Translation. (02 marks)

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(b) Outline the features of the genetic code. (03 marks)

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(d) Describe the structure of tRNA.

(05 marks)

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END