Biology HL P1 TZ2

2006 May

School Level 12th IB Diploma

Programme

Board Exam

International Baccalaureate (IB

Board)

Solved

IB DIPLOMA PROGRAMME
PROGRAMME DU DIPLÔME DU BI
PROGRAMA DEL DIPLOMA DEL BI

M06/4/BIOLO/HPM/ENG/TZ2/XX+

22066013

BIOLOGY
HIGHER LEVEL
PAPER 1

Thursday 4 May 2006 (afternoon)

1 hour

INSTRUCTIONS TO CANDIDATES

- Do not open this examination paper until instructed to do so.
- Answer all the questions.
- For each question, choose the answer you consider to be the best and indicate your choice on the answer sheet provided.

1. If a cell plate is beginning to form and nuclei are re-forming at opposite ends of a cell, what kind of cell is this?

A. An animal cell in prophase

B. A plant cell in prophase

C. An animal cell in telophase

D. A plant cell in telophase

2. The width of a human hair is 0.1 mm. What is the width in μm?

A. 10 μm

B. 100 μm

C. 1000 μm

D. 10 000 μm

3. What process involves the movement of solvent through a semi-permeable membrane from a region of low solute concentration to a region of high solute concentration?

A. Active transport

B. Osmosis

C. Simple diffusion

D. Facilitated diffusion

4. Which of the following is an organic compound found in both plant and animal cells?

A. Cellulose

B. Carbonate

C. Water

D. Pyruvate

5. Which of the following features are correct for hydrogen bonding?

I. It is involved in the cohesion of water.

II. It results in the thermal properties of water.

III. It is a bond within the water molecule.

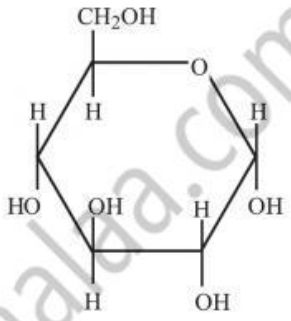
A. I and II only

B. II and III only

C. I and III only

D. I, II and III

6.



Which of the following terms correctly describe(s) the molecule above?

I. Monosaccharide

II. Glucose

III. Component of triglyceride

A. I only

B. I and II only

C. II and III only

D. I, II and III

7. What is a role of carbohydrates in animal cells?

A. As channels for passive transport

B. As enzymes

C. As energy storage

D. As components of the animal cell wall

8. Which property of water is most important to plants living below the surface of water?

A. Cohesion

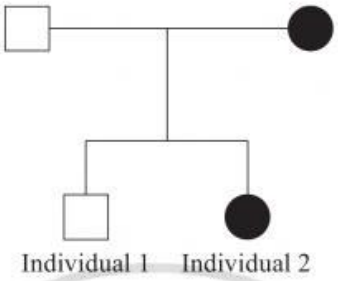
B. Oxygen solubility

C. Surface tension

D. Transparency

The following information refers to questions 9 and 10.

Hypophosphataemia is a disorder involving poor re-absorption of phosphate from glomerular filtrate in humans. It shows a sex-linked dominant pattern of inheritance as illustrated in the following pedigree.



Key:

□ = unaffected male ● = affected female

9. Which row in the table identifies the genotypes of individuals 1 and 2?

	Individual 1	Individual 2
A.	X^HX^h	X^HY
B.	X^hY	X^HX^H
C.	X^hY	X^HX^h
D.	unaffected	affected

10. Which characteristic could be used to diagnose hypophosphataemia?

A. Low levels of phosphate in the blood

B. Low levels of phosphate in the urine

C. Raised levels of phosphate in the filtrate leaving the Bowman's capsule

D. Higher levels of ADH in the blood

11. What is the genetic cross called between an individual of unknown genotype and an individual who is homozygous recessive for a particular trait?

A. Test-cross

B. Hybrid cross

C. Dihybrid cross

D. F_1 cross

12. What is the usual cause of Down's syndrome?

A. 21 pairs of chromosomes

B. Trisomy 21

C. Non-disjunction of sex chromosomes

D. Fertilization of the egg by two sperm

13. Which of the following conditions has been treated by gene therapy?

A. Emphysema

B. SCID

C. Coronary heart disease

D. Colon cancer

14. Which enzyme is used to produce complementary DNA (cDNA) from mRNA?

A. Restriction endonuclease

B. Reverse transcriptase

C. DNA ligase

D. RNA primase

15. Why is it possible for a gene from one organism to be introduced and function in a different organism?

A. All organisms are made of cells.

B. All organisms have nuclei.

C. The genetic code is universal.

D. All organisms have ribosomes.

16. Natural selection is based on which of the following?

I. Variation exists within populations.

II. There is differential reproductive success within populations.

III. Individuals must adapt to their environment.

A. I only

B. I and II only

C. II and III only

D. I, II and III

17. For the following 10 measurements 4, 5, 5, 6, 6, 6, 6, 7, 7, 8 the mean value is 6. What is the best estimate of the standard deviation?

A. 8

B. 6

C. 3

D. 1

18. Which of the following represents a kingdom?

A. Eukaryote

B. Viruses

C. Protoctista

D. Mammals

19. Which of the following statements describe a "population"?

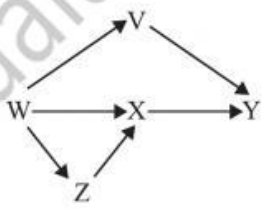
A. All the autotrophs and heterotrophs living in a certain area

B. Individuals belonging to the same species in a certain area

C. Two geographically isolated groups belonging to the same species

D. A group of different species living in the same area at the same time

20. The diagram below is a food web and each letter represents a species.



Which is the best prediction about biomass?

A. The biomass of X is more than the biomass of W.

B. The biomass of X is less than the biomass of Y.

C. The biomass of V + X + Z is equal to the biomass of W.

D. The biomass of Y is less than the biomass of Z.

21. Which of the following changes occur with the onset of exercise?

A. Increase in pH of blood

B. Increase in rate of cellular respiration

C. Decrease in rate of contraction of the diaphragm

D. Decrease in carbon dioxide concentration of the blood

22. In which part of the digestive system is most water re-absorbed?

A. The kidneys

B. The stomach

C. The small intestine

D. The large intestine

23. Which of the following is part of the process of ventilation?

A. Changes in the volume of the thoracic cavity

B. Exchange of gases across the surface of the alveoli

C. Exchange of gases across the surface of capillaries

D. Cellular respiration

24. Which of the following occur(s) at birth in the mother's body?

I. Increase in oxytocin

II. Increase in uterine contractions

III. Increase in levels of progesterone

A. I only

B. I and II only

C. II and III only

D. I, II and III

25. Which of the following is regulated by positive feedback?

A. Blood sugar

B. Temperature

C. Oxytocin levels

D. Progesterone levels

26. Which of the following is a secondary sexual characteristic in human females?

A. Increasing relative width of hips

B. Presence of mammary glands

C. Presence of a uterus

D. Presence of a bladder

27. According to the induced fit model of enzyme function, which of the following statements is correct?

A. Active sites on enzymes are specific to a single substrate.

B. The shape of the active site can be changed by the binding of an allosteric inhibitor.

C. The binding of the substrate changes the shape of the active site slightly.

D. Competitive inhibitors can change the shape of enzymes.

28. Which of the following statements about pyruvate is true?

A. It contains less energy than glucose per molecule.

B. Every molecule of glucose is converted to one molecule of pyruvate.

C. Pyruvate is produced in the mitochondria.

D. Under aerobic conditions, pyruvate is converted to lactate.

29. At which stage of photosynthesis is light involved most directly?

A. Reduction of $NADP^+$ to $NADPH_2$

B. Chemiosmosis

C. The synthesis of chlorophyll

D. The photoactivation of chlorophyll

30. During which process are oxygen molecules directly involved during cellular respiration?

A. Glycolysis

B. Krebs cycle

C. Oxidation of pyruvate to acetyl CoA

D. Accepting electrons at the end of the electron transport chain

31. Which of the following is/are necessary to produce monoclonal antibodies?

I. Tumour cells

II. Plasma (B) cells

III. Macrophages

A. II only

B. I and II only

C. II and III only

D. I, II and III

32. In which of the following structures does meiosis take place?

A. Epididymis

B. Prostate gland

C. Testis

D. Seminal vesicle

33. Membrane proteins are critical components of nerve function.

Which process in nerves does **not** require a membrane protein?

A. Diffusion of neurotransmitter

B. Active transport of sodium

C. Propagation of an action potential

D. Binding of neurotransmitter

34. Which of the following has vascular tissue?

A. Algae

B. Chlorophyta

C. Bryophyta

D. Angiospermophytes

35. What treatment is most likely to lead to germination?

A. Soaking the seeds in a solution of gibberellins

B. Increasing CO_2 concentration

C. Increasing light intensity

D. Dehydrating the seeds

36. Which of the following explains clonal selection?

A. Memory cells are present at birth.

B. Antigens activate specific immune responses.

C. The body selects which antigens it will respond to.

D. People with similar genes respond to antigens in a similar way.

37. Where is an anti-codon located?

A. tRNA

B. mRNA

C. DNA

D. Ribosomes

38. Which human trait shows a pattern of polygenic inheritance?

A. ABO blood type

B. Sickle cell anemia

C. Skin colour

D. Co-dominant alleles

39. All seven of the characteristics of pea plants studied by Mendel displayed independent assortment. What does this necessarily indicate?

A. The seven different pairs of alleles were on the same chromosome.

B. The seven different pairs of alleles behaved as if they were on different chromosomes.

C. Each parent had two alleles for each trait, but gave only one to the progeny.

D. All seven pairs of alleles were on a single set of homologous chromosomes.

40. If the haploid number of an organism is 8, how many different varieties of gametes are possible, not considering the effects of crossing over?

A. 16

B. 64

C. 128

D. 256

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MARKSCHEME

MAY 2006

BIOLOGY

Higher Level

Paper 1

2 pages

1.	D	16.	B	31.	B	46.	–
2.	B	17.	D	32.	C	47.	–
3.	B	18.	C	33.	A	48.	–
4.	D	19.	B	34.	D	49.	–
5.	A	20.	D	35.	A	50.	–
6.	B	21.	B	36.	B	51.	–
7.	C	22.	D	37.	A	52.	–
8.	D	23.	A	38.	C	53.	–
9.	C	24.	B	39.	B	54.	–
10.	A	25.	C	40.	D	55.	–
11.	A	26.	A	41.	–	56.	–
12.	B	27.	C	42.	–	57.	–
13.	B	28.	A	43.	–	58.	–
14.	B	29.	D	44.	–	59.	–
15.	C	30.	D	45.	–	60.	–