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June GCE 2000

1. (a) Three stage involved in the release from a molecule of glucose are glycolysis, citric acid cycle (Krebs cycle) and electron transport system. What are the main processes involved in each stage?

(b) Under what conditions will anaerobic respiration occur in;

(i) Yeast
(ii) A flowering plant
(iii) A mammal

(c) How does exercise improve an athlete's performance during training?

(11, 7,2 marks)
(Total = 20 marks)

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2. Discuss the application of biotechnology in

a) Drug production
b) Food production
C) Cell and tissue culture
d) Enzyme production and
e) Hormone production

(2, 8, 4,2,4 marks
(Total = 20 marks)

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3. (a) What s a cell?

(b)Describe how the structure of each the following is related to the functions performs.

(i)Parenchyma
(ii) A tracheid

(c) Why does specialization of some plant cells result in the lass of the ability to divide?

(4, 12, 4 marks)
(Total = 20 marks)

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4. (a) (i) Why is it necessary for a mammal to dispose of nitrogenous wastes?
(ii) Describe the process of urea formation in the liver.

(b) With the of a labeled diagram, explain how the structure of the mammalian kidney nephron is adapted to its functions.

(c) What is the importance of osmotic control?

(8, 9,3 marks
(Total = 20marks)

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5. Explain how carbon dioxide expired by a becomes fixed by green plants and ends up as a component of glycogen in a herbivore of the same species.

(Total= 20marks)

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6. (a) Draw and label a diagram of the human eye as seen in the vertical section.
(b) Explain the process of accommodation by which light from objects at different distances is brought to focus on the retina.
(c) Explain the trichromatic theory of color vision.

(6, 10,4 marks)
(Total =20 marks)

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7. (a) Why do multicellular organisms need a transport system?
(b) State three features shown by most circulatory systems
(c) With the aid of annotated diagrams, show the pattern of blood flow in
(i) Single circulation of bony fish
((ii) Double circulation if a mammal

(c) State two advantages of double circulatory system.

(53,3,12,2 maks)

(Total = 20marks)

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8. (a) What is pollution?
(b) Briefly describe the hazards of air and water pollution
(c) you have probably seen an illegal dumping ground in your tow. Describe the health hazards posed by such an environment to man.

<u>June GCE 2001</u>

1.The With respect to a ruminant , describe digestion in,
(i) The mouth
(ii) The stomach
(The intestine
(b) What is the importance of roughage in the gut?

(4,6,8 marks)
(Total= 20marks)

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2. The data below show the number of AIDS cases in a certain country by year from 1982 to 1989.

Year	Heterosexuals	Homosexuals	Total cases
1982	0	3	3
1983	1	23	26
1984	2	69	77
1985	3	152	159
1986	7	293	305
1987	26	494	648
1988	33	602	761
1989	64	654	851
Total	135	2290	2830

(a) (i) Use the data given in the table above to draw bar charts to illustrate the number of reported AUDS cases in that country for each risk group.

(ii) Calculate for homosexuals, the percentage of the total AIDS cases they represent for the years 192, 1984, 1989.

(b) The below show the total HIV positive cases in that same country for September 1989 based of figures from the Government ‘s diseases surveillance Centre.

Category	Total	Percentage total
Injecting drug users	1771	
Recipient of blood /blood products	1206	
Heterosexuals contact	714	
Child of HIV antibody positive/ at risk mother	136	
Male homosexuals /bisexual	5390	
Others/incomplete information	2001	

(i) Copy and complete the table above, converting the totals to percentage figure

(ii) In question ‘a’ you were given data concerning reported AIDS cases. Whereas un question ‘b’ the data concerns HIV positive cases. Explain why the later figures are much higher?

(iii) From your bar charts, comment the trends is the spread of HIV/AIDS and heterosexuals and homosexuals.

(iv) Suggest tow ways by which the country can prevent the spread of HIV/AIDS and heterosexuals.

(6,3,3,3,2 marks)
(Total = 20 marks)

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3. In guinea pigs (Cavia porcello), black coat colour is dominant to brown and short hair is dominant over long hair?
These characteristics are not linked. A breeder has only stocks of pure breeding short haired brawn and pure breeding short haired black guinea pigs.

(a) What do you understand by.

(i) Linked genes and
(ii) Pure breeding?

(b) Explain clearly the breeding programme to be following (using just TOW breeding steps) to obtain pure breeding long-haired black guinea pigs.

(c) Show how you will ascertain that you have obtained pure breeding long-haired, black guinea pigs.

(2,14,4,marks)
(Total =20marks)

4. (a) Describe the role of

(i) Carbohydrates
(ii) Proteins and
(iii) Lids in the structure of plant and animal cells.

(b)How do antibiotic treat same bacterial diseases?

(16,4 marks)
(Total =20 marks

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5. (a) What is alternation of generation?
(b) Give an illustrated account of alternation of generation in the life cycle of a named fem.
(c) How does this life duffer from that of a moss?
(d) What is the importance of water this life cycle?

(4, 10,3,3,marks)
(Total =20marks)

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6. (a) Describe
(i) The production and
(ii) The removal of urea un mammals and ethanol in plants

(b)Explain why mammals produce large quantities of urine during fright

(16,4 marks)

(Total =20marks)

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7. (a) Explain the homeostatic principle

(b) What physiological events would you expect o take place in a diabetic after

(i) Injecting a small quantity of glucose into the blood stream

(ii) Eating a very salty meat

(8,12 marks)

(Total =20marks)

8.(a) State the main features of arthropods

(b) Explain why insects are so successful in their life on land.

(c) (i) State FIVE ways in which HIV/AIDS it transmission of HIV/AIDS?

(ii)Why are mosquitoes not likely for the transmission of HIV/ADIS?

(4,9,7 marks

(Total= 20marks)

<u>June GCE 2002</u>

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1. (a) Explain the role of the following in digestion in mammal
   (i) Salivary glands
   (ii) Oxyntic parietal cells.

(b)Describe the mechanism for the uptaque of glucose, fatty acids and glycerol in the ileum.

(5,10,5 marks)

(Total =20 marks)

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2. (a) What are the properties of the lungs that make it a good respiratory surface?

(b)How oxygen in the environment is made available to the cells of the following for energy production?

(i) An insect

(ii) A bony fish

(iii) Man

(4,16marks)

(Total= 20 marks)

3.(a) State two main ideas which Mendel developed from his study of peas.

(b) Illustrate the principle of crossover by reference to the behavior of a pain of homozygous chromosomes un drosophila carrying the athletes grey body and long wings (both dominant) and black body an vestigial wings (both recessive) during the formation of chiasm ate.

(c) A male Drosophila homozygous for grey body and long wings was crossed with a female homozygous for black body and vestigial wings All the off springs obtained possessed grey bodies and long wings. The F1 males were mated with females having the same genetic makeup as the following offspring.

965 Drosophila with grey bodies and long wings

206 Drosophila with black bodies and long wings
185 Drosophila with grey bodies and long wings
144 Drosophila with black bodies and long wings

(i) Using suitable symbols to represent the alleles of the gene involved n the experiment, explain the genotypes and the phenotypes of Drosophila in the parental generation, the F1 generation and offspring obtained the crossover value (COV) for the tow loci
(ii) involved Determine the crossover value for body colour and the wing size characteristics
(iii) What does this value indicate?

(4, 3, 13 marks)
(Total 20marks)

4.(a) Define the following ecological terms
(i) Edaphic factors
(ii) Succession
(iv) Microhabitat

(b)Using examples all chosen from the anyone of the following ecosystems,
Fresh water pond, a school garden or estuary, explain in detail the following
(i) Pyramid of energy
(ii) Ecological riche
(iii) Intraspecific competition
(iv) Decomposers.

(9,11 marks)
(Total = 20 marks)

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5. (a) Beans are a main source of protein to many people in Cameroon; discuss the following stage of development in the bean.
(i) Seed development
(ii) Dormant seed
(iii) Germination

(b)How will a famer in Anyalua ensure that a good variety of beans is maintained?

(16, 4 marks)
(Total 20marks)

6.

a) For pregnancy to occur, viable gametes must be available. Describe the gamete formation in Homo sapien.
b) Describe the disadvantages of tow methods of contraception
c) Discuss the possible problem a young girl of eleven years encounter if she gets pregnant.

(8,6,6,marks)
(Total = 20marks)

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7. (a) Explain why.
   (i) Xylem
   (ii) Phloems are referred to as compound tissues.
   (b)Pygmy Africana is a perennial whose back is used to treat prostate cancer in man How will you advise the villagers on the harvesting of this back so as to ensure greater conservation of trees?

(12,8 marks)
(Total 20 marks)

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8. (a) Using named examples, distinguish between the following.
   (i) Single and double circulation
   (ii) Open and close circulation
   (b)(i)what is HIV?
   (ii) How does HIV destroy the human immune system?

(12,8 marks)
(Total =20 marks)

JUNE GCE 2003

1. (a) How is the morphology and anatomy of the leaf adapted for photosynthesis?

   (b)Outline the mechanism of Carbon dioxide fixation (dark reaction) in ca plants
   (c) Why is it more advantageous to grow C4 plants than C3 plants?

(8,10,2 marks)
(Total = 20 marks)

2. (a) Discuss four mechanisms by which roots take up water and mineral salts from the.
   (b) How are these substances distributed to all parts of the plant?
   (c) How do xerophytes limit the loss of water from the arid parts?

(8,8,4 marks)
(Total = marks)

3. (a) Distinguish excretion and osmoregulation

   (b)Make a large labeled diagram of the mammalian nephron
   (c) On the basis of structure in relation to function, describe the following processes;
   (i) Ultra-filtration
   (ii) Selective reabsorption

(2,5,13 marks)
(Total = 20 marks)

4.(a) What do you understand by genetic engineering?
(b)Briefly outline the stages of genetic engineering of bacteria
(c) In man, the gene for hemophilia, (h) is sex- linked and recessive to the gene or normal
Blood clotting (H) Using appropriate notations
Make crosses with following phonotypic pairs indicating the expected phonotypic and genotypic ratio resulting from the crosses.
(i) Hemophilia woman with normal man
(ii) Normal woman (heterozygous) with hemophilia man.
(iii) Normal woman (homozygous) with hemophilia man.

(5,6,9 marks)
(Total = 20 marks)

5.Briefly examine the following ecological concepts.
(i) Water cycle
(ii) Trophic level
(iii) Land pollution

(b)How can our land be conserved to ensure greater survival of species?

(15,5 marks)
(Total =20 marks)

6. (a)Explain the role of the following in digestion in mammal
   (i) Salivary glands
   (ii) Oxyntic or parietal cells
   (b)Describe the mechanism for the uptake of glucose and amino acids in the ileum of Mammals.

(15,5 marks)
(Total =20 marks)

7.(a) What de you understand by isometrics and algometric growth?
(b) Explain the following terms as used in growth.
(i) Growth curve
(ii) Growth rate
(iii) Relative growth rate.
(c) What problems are encountered when measuring un a multicellular organism ?

(2,12,6 marks)
(Total =20 marks)

8.Write short notes on the following:
(i) Counter –current multiplier principle
(ii) Oxygen debit
(iii) All-or-nothung law
(iv) Sinaptuc transmission

(15,5 marks)
(Total =20 marks)

JUNE GCE 2004

1. (a) Describe how plants aruse by asexual reproduction.
   (b)Which of the following types of organisms do you expect to exhibit the greatest genetic variability and why?
   (i) Sexuality reproduction
   (ii) Asexual reproducing
   (iii)Self-fertilizing

(12,8 marks)

(Total = 20marks)

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2. (a) What is meant by.
   (i) Homeostasis
   (ii) Osmoregulation
   (b)Explain the part played by each of the following in homeostasis.
   (i) Insulin and glucagon
   (ii) Antiduretic hormone

(iii) Fibrinogen

(4,16 marks)
(Total = 20 marks)

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3. (a) Make a large fully labeled diagram of the mammalian skin as seen in the vertical section.

(b)Explain how the skin is adapted to perform its functions

(8,12 marks)
(Total = 20 marks)

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4. (a) Heredity is always associated with;
   (i) Cell nucleus
   (ii) Chromosome
   (iii) DNA.
   Describe in each, an evidence to support this
   (b)(i)What are the principal requirements of genetic materials?
   (ii)How does the DNA molecule satisfy such requirements?

(8,12 marks)
(Total = 20 marks)

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5. (a) Define species
   (b)Briefly account for the appearance on new species in a given population. Use specific examples to illustrate your answer.
   (c)Explain why closely related species may unable to interbreed successfully

(8,12 marks)
(Total = 20 marks)

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6. (a)State the different types of grass exchange systems in mammals.
   (b)With the aid of diagram, describe how the lungs function in ventilation.
   (c)How is this ventilation controlled?

(6,9,7 marks)
(Total = 20 marks)

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7. (a) Make a labeled diagram of the chloroplast as seen under the electron microscope.
   (b)Name four photosynthetic pigments in plants.
   (c) Describe the part played by chlorophyll in the light stage of photosynthesis

(8,12 marks)
(Total = 20 marks)

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8. (a) Make a large fully labeled drawing to show the structure of a mammalian heart.
(b)(i) What do you understand by the cardiac cycle?
(ii) How is the cardiac cycle brought about?
(c) State how a continuous circulation of blood is maintained in a mammal.

(6,10,4 marks)
(Total = 20 marks)

JUNE GCE 2005

1. (a) Explain how the electron microscope has contributed to the existing knowledge of the cell.

(b) Describe the fluid mosaic model of the plasma membrane.
(c) How is the structure of the membrane suited for the movement of the substances in and out of the cell?

(5,10,5 marks)
(Total = 20 marks)

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2. (a)What are the properties of a respiratory surface?
(b)How does oxygen from the atmosphere reach the cells of,
(i) An insect
(ii) A teleost fish and
(iii) A mammal

(6,10,4 marks)
(Total = 20 marks)

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3. Most organisms carry out either autotrophic or heterotrophic nutrition.
(a) Distinguish between these two forms of nutrition.
(b) A lady ate a piece of fatty pork on Christmas day. Describe the process of digestion and absorption of the pork.
(c) Explain why lipids are suitable storage compounds in living organisms.

(8,8,4 marks)

(Total = 20 marks)

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4. (a) (i)Give an illustrated account of the life cycle of a named Fillicynophyta
(ii) Outline the role of dry and wet conditions in the life cycle above.
(b) Why do you consider the filicynophyta as a intermediary group of plants?

(16,4 marks)
(Total = 20 marks)

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5. (a) Describe what you understand by the following:
(i)Pyramid of biomass
(ii) Ecological climax

(b)What part do the following play in an ecosystem?
(i)Saprophytic fungi
(ii) Herbivores
(iii) Carnivores

(c) Why is it important to conserve ecosystems?

(6,10,4 marks)
(Total = 20 marks)

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6. (a)Make a large labeled drawing f the Human Immunodeficiency Virus (HIV) as seen under the electron microscope.
(b) (i) Briefly outline the mode of replication of the virus un humans.
(c) How may HIV/AIDS be;
(i) Spread
(ii) Perverted

(5,5,4,6 marks)
(Total = 20 marks)

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7. (a) Make a large fully labeled drawing to show the structure of a mammalian heart.
(b) (i) what do you understand by the cardiac cycle
(ii)How is the cycle brought about?
(c) Sate how a continuous circulation of blood is maintained in a mammal.

(6,10,4 marks)
(Total = 20 marks)

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8 .Write short notes on the following
(i) All- or-nothing law
(ii) Synaptic transmission
(iii) Counter current multiplier
(iv) Photoperiods' in flowering plants

(5,4 marks)

(Total = 20 marks)

JUNE GCE 2006

1. (a) On the basis of structure only, differentiate between a bacterial cell and a chlorenchyma cell as revealed by the electron microscope.

   (b) how is the light microscope different from an electron microscope?

   (c)Describe the structure of the compact bone in relation to its function as revealed by the light microscope.

   (5,5,10 marks)
   (Total = 20 mark

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2. (a) Enzyme activity is influenced by the protein nature of enzymes. Describe four factors which show the influence of protein nature of enzymes on enzymes' activity.

   (b)Explain the role of enzymes in cell metabolism. Illustrate your answer with specific examples.

   (c) What is the importance of DNA in the production of an enzyme?

   (8,8,4 marks)
   (Total = 20 mark

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3. (a) Describe briefly how human/ related activities affect the following

   (i) Ozone depletion
   (ii) Eutrophication
   (iii) Global deforestation
   (iv) Over fishing

   (b) How can you ensure that the clean-up campaigns un our cities are more effective?

   (16,4 marks)
   (Total = 20 mark

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4. (a) What is meant by:

   (i) Action spectrum
   (ii) Absorption spectrum?

   (b)Discuss how changes in;
   (i) Temperature
   (ii) Light intensity

(iii) Carbon dioxide concentration
Would affect rice production in one –acre plot.

(c) Differentiate between C_3 and $C_{4\ plants}$

(4,10,6 marks)
(Total = 20 mark

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5. (a) Distinguish between Nervous and Hormonal control in a mammal.
(b)Explain the following:
(i) Nervous transmission across a synapse
(ii) Role of hormones in the control of the menstrual cycle.

(5,6,9 marks)
(Total = 20 mark

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6. (a) What are the characteristics of a respiratory surface?

(c) Describe the mechanism involved in the ventilation movements of the following animals.

(i) A bony fish
(ii) A young boy of 16 years

(c) How do the plant structures;
(i) Stomata
(ii) Lenticels

(4,8,8 marks)
(Total = 20 mark

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7. Distinguish between the following pairs of genetic terms;
(i) Complete dominance and incomplete dominance
(ii) Sex determination and sex –linkage.

(b) In rabbits, black fur us dependent on a dominant allele B and brown fur on a recessive allele. Normal fur length is determined by a dominant allele R and short fur length (rex) by a recessive allele r.

(i) Work out the F_2 generation of a cross between a homozygous black Rabbit with a normal fur length and brown Rex Rabbit.
(ii) What proportion of the normal black F_2 rabbits from the cross above may be? Expected to be homozygous for both gene pairs?
(iii)Work out a test cross of the $F_{1.}$

(8,12, marks)

(Total = 20 mark

8.Mscle action, ciliary action and amoeboid action are very important processes in the life of mammal.
Discuss how far this statement is true.

(10,6,4 marks)
(Total = 20 mark

JUNE GCE 2007

1. (a) State why lower organism as protozoan lack a defined respiratory media.

   (b) (i) Compare the properties of air and water as respiratory media.

   (ii)Name any three respiratory with their corresponding metals and state a group of animals in which each pigment is found.
   (Present your answer is a tabular form)

(c) Describe how ventilation is controlled in mammals' e g man.

(2,8,10 marks)
(Total = 20 mark

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2. Use specific examples to illustrate the meaning of the following terms
   (i) Energy flow through an ecosystem
   (ii) Acid rain
   (iii) Global warming and
   (iv) Endangered species

(5,4 marks)
(Total = 20 mark

3.(a)Explain the meaning the following using specific examples
   (i) Enzyme repression
   (ii) Enzyme induction

(b)Explain why protein synthesis through enzyme repression and enzyme induction is described as a feedback process (or cellular homeostasis).
(c) Describe the feedback control of protein synthesis by a regulator gene.

(6,4,10 marks)

(Total = 20 mark

4.(a) Sate Mender's second law.
(b) Explain what us meant by recombinant
(c) A homozygous purple flower short stemmed plant was a homozygous red flower , long stemmed plant and the F1 phenotypes had purple flower and short stems.
When the F1 generation was test crossed with a double recessive plant, the following progeny were produced.
52 purple flower short stem
47 purple flower short stem
49 red flower short stem
45 red flower short stem
Explain these results ful
.

(3,3,14 marks)
(Total = 20 mark

5.(a)Compare and contrast the features of annelids and arthropods
(b) (i) Distinguish between a holometabolous lifecycle and a holometabolous lifecycle.
(iii)Give tow advantages of a life cycle that incorporates metamorphosis

(c) Using a precise example of an insect, briefly describe complete metamorphosis

(6,2,4,8 marks)
(Total = 20 mark

6.(a)Briefly explain the mechanism of the following processes giving example of where they occur

(i) Diffusion

(ii) Active transport

(iii) Pinocytosis

(iv) Phagocytosis

(b) (i) List the factors that affect the rate of diffusion
(ii) Suggest why active transport is affected by oxygen concentration and diffusion is not.

(4,4,4,2,3,3 marks)
(Total = 20 mark

7.(a) What are the differences between endocrine and nervous systems?

(b) Draw a well labeled diagram of the longitudinal section of the human brain and state the functions of its main parts.

(c) State how nervous impulses may be impaired.

(5,13,2 marks)
(Total = 20 mark

8.(a) State the differences between the following .

(i) Chromosomes and germ mutations.

(ii) Somatic and germ mutation

(b) Describe five mechanisms by which mutations may occur.

(6,14 marks)
(Total = 20 mark

<u>JUNE GCE 2008</u>

1. (a) Give an account of the chemical nature and variety of carbohydrates.

(b) Outline the role of carbohydrates in the life a plant

(c) With the aid of simple illustrations, describe the primary, secondary and tertiary. Structure of protein.

(10,4,6marks)
(Total = 20 mark

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2. (a) What is translocation?

(b) How are organic substance transported in plants?
(c) How may radioactive tracers be used to demonstrate translocation in the phloem?

(3,12,5 marks)
(Total = 20 mark

3.(a) What are the major features of each the phases of mitosis?

(b) Name one tissue in the human body and one flowering plant where you expect to find cells dividing by mitosis.
(c) Outline the major differences between mitosis and mitosis.

(12,2,6 marks)
(Total = 20 mark

4.(a) Explain the importance of symbiotic bacteria
(i) Leguminous plants
(ii) The alimentary canal of ruminants.
(b) Describe how the teeth of a herbivore are adapted to its diet.

(15,5 marks)
(Total = 20 mark

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5. (a) Draw a large labelled diagram of a single striated fibre as seen under an electron microscope

(b) write short notes on the biological significance of the following with respect to locomotion in animals
i. cartilage
ii. joints
iii. tendons and ligarments.

(5,15 marks)
(Total = 20 marks)

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7. (a) What is homeostasis?

(b) Describe the homeostasis control of salt and water balance in a named.

(i) Mammal
(ii) Fresh water fish
(iii) Terrestrial insect

(c) What factors determine the efficiency of a homeostatic control system?

(3,14,3 marks)
(Total = 20 mark

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7. (a) Define an ecosystem

(b) List the components of an ecosystem you have studied
(c) Trace the possible interrelationships that may exist between organism.
(d)Why is it not advisable to bill living things indiscrimately?

(3,5,10,2 marks)
(Total = 20 mark

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8 .(a) A male butterfly homozygous for brown caloured body and normal antennae was crossed With a female homozygous for black body and forked antennae. All the off springs obtained possessed brown bodies and normal antennae.
When the F1 males were mated with females having the female parent's genetic make-up, they produced the following off springs:
230 files with brown bodies and normal antennae
20 files with brown bodies and forked antennae
18 files with brown bodies and normal antennae
236 files with brown bodies and forked antennae
Using suitable symbols, explain these crosses giving the genotypes, phenotypes and proportions of these in the parents and offspring.
(b) What is the crossover value for the two characteristics involved?

(16,4 marks)
(Total = 20 mark

<u>JUNE GCE 2009</u>

1. (a) Why are tissues fixed, sectioned and stained before being viewed under a microscope?

   (b) Show how the structures of;

   (i) Mitochondria
   (ii) Chloroplast are adapted to their functions

(c) State the main differences between plant and animals cells.

(3,11,6 marks)
(Total = 20 mark

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2. In birds and mammals, the body temperature must be kept constant as well as other substances such as blood sugar, mineral salts and water .

   (a) Why these substances must each be kept constant?

   (b) Describe how each of them is controlled so as maintain a steady state in these organism.

(12,18 marks)
(Total = 20 mark

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3. (a) Xylem and phloem are tissues concerned with the translocation of inorganic and organic materials.

For each tissue, describe the possible transport or translocation mechanism involved and comment on any structural adaptation that might be specially related to transport or translocation.

(b)Sate briefly why large amounts of water are required by most plants.

(c) Outline the properties of water which make it very important to plants.

(10,6,4 marks)
(Total = 20 mark

4.(a) What is a gene?

(b)Describe the process of protein synthesis

(c)How is protein synthesis controlled?

(6,8,6 marks)
(Total = 20 mark

5.A alternate mechanism for fixing carbon dioxide occurs during photosynthesis in some plants called C_4 plants. These plants process a leaf structure which enables them carry out their functions properly.

(a) Water are C_4 plants? Give two examples.

(b) (I) describe the structure of the leaf of C_4 plants which makes it adapted to this type of CO_2 fixation.

(ii)What is the significance of the C_4 pathway?

(c)What would be the effect of increasing oxygen concentration on;

(i) C_4 photosynthesis

(ii) C_4 photosynthesis

(3,16,7 marks)
(Total = 20 mark

6.(a)What do you understand by alternation of generation?

(b)Draw the life lifecycle of the fern and explain how it exhibits alternation of generation.

(c) Why is water necessary for the lifecycle of the fem?

(8,8,4 marks)
(Total = 20 mark

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7. The population of industrialized regions such as Douala are exposed a lot of environmental hazards.

Identify four of these hazards and explain how influence the population.

(Total = 20 mark

8.(a)Explain the following terms as used in genetic showing how each deviates from the normal mendelian crosses.

(i) Linkage

(ii) Co-dominance

(iii) Epitasis

(b) In cats the grain in enclosed by the flower called lull. Two pure breeding varieties of oat plants, one black lulled and the other white lulled were crossed All F1 individuals were all grey lulled.

When they were seifed, the following results were obtained.

Black lulled = 418

Grey lulled = 106

White lulled = 36

Using suitable letters to represent the alleles, make this cross using a pun net square. How does this radio deviate from the expected Mendelion ratios?

(c) Outline precisely the problems involved in measuring growth in multicellular organism.

(8, 8,4 marks)

(Total = 20 mark

JUNE GCE 2010

1. Write short notes on.
   (a) Binomial system of nomenclature
   (b) Reasons for classification
   (c) Biological classification
   (d) Taxonomic hierarchy

(5,4 marks)
(Total = 20 mark

---

2. (a) Discuss the role extra embryonic membranes in the development of the foetus

   (b)What are the functions of the placenta?
   (c) Explain how the drinking of alcohol by a pregnant woman may harm the unborn baby

(7,5,8 marks)
(Total = 20 mark

3.(a) Describe fully how mammalian blood picks up and transport respiratory gases.

(c) Describe the part played by hormones and nervous system in controlling heartbeat

(10,10 marks)
(Total = 20 mark

4.(a) Define pollution
(b) Describe briefly the hazards of water and air pollution
(c) Describe the health hazards that can be posed by an illegal dumping ground in Cameroon

(2,8,10 marks)
(Total = 20 mark

5.(a) How is metabolism controlled

(b) What properties enable enzyme to be used as catalyst?
(c) What advantages do organic catalyst have over inorganic catalyst?

(10,5,5 marks)
(Total = 20 mark

---

6. (a) (i) What are recombinant DNA molecules?
(ii) Illustrate the process by which recombinant DNA molecules are usually constructed

(b) (i) What problems may arise if you were trying to produce a eukaryotic protein a bacterial cell?

(ii) How can some of these problems be solved?

(10,10 marks)
(Total = 20 mark

7.(a) Explain the following terms.
(i) Photosynthesis.
(ii) Compensation point.
(iii) A limiting factor
(b) Briefly explain how these named can be limiting in the process of photosynthesis.
(c) Distinguish C_3 and C_4 plants

(10,10 marks)
(Total = 20 mark

8.(a)Explain the meaning of the following terms as used genetics

(i) Homogametic
(ii) Autosomes
(iii) Sex-linked traits

(b) (i) A normal woman has a colour blind daughter. What is her genotype and that of her Husband with respect to this gene?
Explain your answer.

(ii)Could this couple have a normal daughter and a normal son?
What are the probabilities?
Explain your answer, giving reasons.

(c)Why is x-linkage more common than y-linkage in humans?

(6,11,3 marks)
(Total = 20 mark

JUNE GCE 2011

1. (a) Describe the Watson and Crick structure of DNA .
(b) Give five structural differences between DNA and RNA
(c) Explain the following terms as applied in DNA replication
(i) Template
(ii) Semi-conservative replication
(iii) Continuous replication
(iv) Discontinuous replication

(2,5,2,2,2,2 marks)
(Total = 20 mark

---

2. (a) Define the following terms.

(i) Excretion
(ii) Osmoregulation

(b) (i) State the waste products of metabolism in vertebrates
(ii) Give their origin
(iii) List the structures responsible for their elimination.

(4,7,9 marks)
(Total = 20 mark

3. (a) What is tissue respiration?

(b) Tissue respiration is characterized by aerobic and anaerobic processes. List the processes, indicating which is energy is released from glucose in anaerobic conditions.

(2,5,13 marks)
(Total = 20 mark

4. (a) Using suitable examples, differentiate between the following :

(i) Antigen and antibody
(ii) Active and passive immunity
(iii) Natural and artificial immunity
(iv) Endocrine and exocrine glands.

(b) (i) What role played by phagocytes and lymphocytes in defending the body against pathogens?

(ii) Explain why some people suffer from allergies.

(8,12 marks)
(Total = 20 mark

5. (a) Give an illustrated account of tissue fluid and lymph formation.

(b) How do these fluid differ from and resemble blood?

(c) A person cuts his foot and the wound goes septic. Within a short time, his groin furts. What explanation can be given for this pain?

(10,6,4 marks)
(Total = 20 mark

6. (a) Using specific examples differentiate between the following:

(i) Ecosystem and habitat
(ii) Population and community
(iii) Gross primary productivity and not primary productivity

(b) What are the role bacteria in the cycling of nitrogen in the ecosystem?

(12,8 marks)
(Total = 20 mark

7. (a) What are the characteristics properties of hormones?

(b) Using specific examples of hormones, briefly explain how hormones enter their target cells and exert their effects.

(c) Explain the roles of the following hormones in growth and development:

(i) Thyroxin
(ii) Growth hormone
(iii) Juvenile hormone

(4,8,8 marks)
(Total = 20 mark

---

8. (a) Using suitable examples, differentiate between the following:

(i) Genotype and phenotype
(ii) Complete dominance and co dominance
(iii) Gene and allele
(iv) Homologous and homozygous

(b) The gene for bleeders, hemophilia is ex-linked. The gene is recessive.
Choosing suitable symbols, write down all possible genotypes for a main and a woman.

(c) A couple both normal have a hemophilic child. Explain how this can happen and what must be the sex of the child.

(10,5,5 marks)
(Total = 20 mark

JUNE GCE 2012

1. (a) What is asexual reproduction?

(b) (i) Using named examples, describe; budding. Parthenogenesis and cloning as methods of asexual reproduction in animals.

(ii) Why do most animals not reproduce asexually?

(c) Differentiate between sexual and asexual reproduction.

(9,3,5 marks)
(Total = 20 mark

---

2. The metabolism of cells is made up of thousands of different reactions whose direction is not random.

(a) What role is played by enzymes in maintaining this regulation,
(b) (i) What is an active site,
(iii) What possible events at the active site enhance the reaction,

(10,10 marks)
(Total = 20 mark

---

3. (a) What is meant by ecosystem?

(b)Define the following terms as used in ecological studies

(i) Ecological niche
(ii) Trophic level
(iii) Biological control

(c) How are detritivores and decomposers significant in an ecosystem?

(13,13,4 marks)
(Total = 20 mark

---

4. (a) (i) What is immunity?

(ii)Distinguish between passive and active immunity
(c) Describe the role played by

(i) Leucocytes and
(ii) Antibodies in the immune system.

(2,8,6,4 marks)

(Total = 20 mark

---

5. (a) are the principal characteristic of genetic materials?

(b) How does the DNA molecules satisfy such characteristics?

(c) How does HIV destroy the human immune system?

(4,8,8 marks)
(Total = 20 mark

---

6. (a) Distinguish between hormonal and nervous coordination

(b) Writhe short on each of the following:

(i) Resting potential
(ii) All-or-Nothing Law
(iii) Speed of transmission of impulses
(iv) Synaptic transmission

(4,5 marks)
(Total = 20 mark

---

7. (a) Give an account for factors that may affect the affinity of hemoglobin of oxygen.

(b) How is it possible for hemoglobin to carry oxygen carbon dioxide?

(c) (i) Why is carbon monoxide toxic,

(ii)What is meant by chloride schist?

(7,7,3,3 marks)
(Total = 20 mark

---

8. (a) Explain the meaning of the following terms:

(i) Heterosomes
(ii) Heterogametic
(iii) Genetically empty chromosomes

(b) Colour blindness in humans is sex-linked and controlled by a recessive gene. A colour blind female is crossed with a normal male.

What phenotype do you expect among the offspring of crosses between?

(i) The F1 female and a male of the genotype as her father

(ii) A F1 male and a female of the genotype as his mother?

(2,2,2,7,7 marks)
(Total = 20 mark

JUNE GCE 2013

1. Conifers are non-flowering plants which bear seeds during reproduction.

   (a) State three ways in which these plants have advanced more than non-seed-bearing plants
   (b) Explain how bearing plants are adapted to life on land
   (c) How do confers differ from flowering plants?

(3,8,9 marks)
(Total = 20 mark

---

2. (a) Explain what is meant by:

   (i) Homeostasis
   (ii) Negative feedback mechanism in living organisms

(b) Describe how variations in plasma glucose concentration are adjusted in mammals.

(8,12 marks)
(Total = 20 mark

---

3. (a) (i) List the components of blood

   (iii) What are the main functions of mammalians blood?
   (b) A nursery school girl aged 4 years old sustained a wound while playing with her mates during break in the school garden.
   Outline the process that will occur to prevent this girt from bleeding to death.
   (c) How is CO; carried by blood?

(9,5,6 marks)
(Total = 20 mark

---

4. (a) Describe the different stages involved in the birth of a mammal.
   (b) Discuss the role of hormones in birth and lactation
   (c) Explain the effect of cigarette smoking by a pregnant woman on her unborn child

(7,7,6 marks)
(Total = 20 mark

---

5. (a) What is meant by carrying capacity of a habitat?
   (b) Discuss the ways in whish

   (i) Competition
   (ii) Predation
   (iii) Parasitism and disease limit the size of natural population

(c) How can a biotic factors affect the size of population?

(2,9,9 marks)
(Total = 20 mark

---

6. (a) Explain the following as used in genetics:

   (i) Linkage and sex-linkage
   (ii) Sex-determination in man.

(b) In apes the shape of snout is controlled by a sex-linked gene. Sexe is determined the same way as in humans.
The genes for long snout is dominant over short snout, but when present together , a cleft snout is formed using suitable letters for the gene.

(i) Determine the genotype of,
A female ape with a cleft snout?
A male ape with a snout,
A male ape with long snout and
A female ape with a long snout.

(ii) Show how the expected genotype and phenotypic probabilities of the baby apes will come about when a male ape with long snout is mated with a cleft snout female ape.

(10,10 marks)
(Total = 20 mark

---

7. (a) How do enzymes catalyze reactions?

   (b) Describe and explain the effect of temperature on enzyme activity.
   (c) Describe the stages that are involved in producing bacteria that can be used is make human proteins.

   (4,7,9 marks)
   (Total = 20 mark

---

8. Fermentation is a biotechnological process involving the culturing of micro-organism in an aqueous suspension in a culture vessel known as fermented.
(a) Describe the man steps that are involved in penicillin production through his process
(b) How can yeast to produce breathe?
(c) State four advantages of fed-batch culture in biotechnology

   (10,6,4 marks)
   (Total = 20 mark

JUNE GCE 2014

1. (a) What are the main characteristics of enzymes?
   (b) How do enzymes work?
   (c) Explain the main types enzyme inhibitions.

   (6,5,5 marks)
   (Total = 20 mark

---

2. (a) Draw a fully labeled diagram of a generalized animal cell as seen under the election microscope.
   (b) Give five differences between this cell and a chlorenchyma cell.
   (c) State five disadvantages of preparing and viewing cells under the electron microscope.
   (d) Why are electron microscopes not found in laboratories in Cameroonian school?

   (8,5,5,2 marks)
   (Total = 20 mark

---

3. (a) Explain why lower organisms such as unicellular animals and cnidarians lack a respiratory organ.
   (b) Name three respiratory pigments in the animal kingdom, their corresponding metals and a group of animals in which each is found (Tabulate your answer).

(c) (i) Describe the ventilation mechanism in a named bony fish
(ii)Give reasons why generous exchange is more effective is a body than a cartilaginous fish .

(2,8,7,3 marks)
(Total = 20 mark

---

4. (a) What are the features of the genetic code?
(b) With the aid of an annotated diagram Only show the stage involved in sperm formation in man.
(c) Describe the processes leading to double fertilization in flowering plants.

(5,8,7 marks)
(Total = 20 mark

---

5. (a) Explain what meant by the term ecosystem.
(b) With reference to from a named ecosystem, explain what you understand by each of the following.

(i) Detritus feeders
(ii) Decomposers
(iii) Edaphic factors
(iv) Pyramid of biomass

(4,16 marks)
(Total = 20 mark

---

6. (a) What is a impulse?
(b) Describe how it is transmitted along a neuron
(c) How can this impulse be transmitted across a synapse?
(d) Differentiate between nervous and hormonal transmission.

(2,5,7,6 marks)
(Total = 20 mark

---

7. (a) Using suitable letters give possible genotypes of hamsters which are:

(i) Long bodied with straight fur and black eyes.
(ii) Stumpy, curly and red eyed.

(b) On crossing a stumpy, straight fur, blacked eyed hamster with a stumpy, curly and red eyed hamster, the following progeny were obtained.

31 stumpy. Straight red eyed
26 stumpy. Straight red eyed
29 stumpy. Curly red eyed
32 stumpy. Curly red eyed
Give the genotypes of the parents and a reasoned explanation of the results obtained.

(6,14 marks)
(Total = 20 mark

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8. (a) What do you understand by biotechnology?
   (b) (i) The search for alternative sources of energy has become a priority following a rise in oil pieces and threat of environment problems caused by the during of fossil fuels how is biotechnology useful is this fields?
   (ii) State how biotechnology is useful in the pharmaceutical production of penicillin .

(4,10,6, marks)
(Total = 20 mark

JUNE GCE 2015

1. (a) (i) What is metamorphoses,
   (ii)What advantages do insects acquires when they undergo metamorphosis in their life cycle,
   (b) Using a specific example, explain the process of development in a named holometabolous insect?
   (c) What role is played by hormones in the development of insects?

(6,8,6 marks)
(Total = 20 mark

---

2. Define an enzyme
   (b) State FIVE properties of enzymes.
   (c) Describe two mechanism of enzyme action
   (d)Explain the factors that affect the rate of enzyme action

(2,5,8,5, marks)
(Total = 20 mark

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3. (a) Describe the kingdom classification systems.

(b) (i) State five general characteristics of phylum arthropod a
(ii)What is the economic and ecological importance of arthropods

(10,10, marks)
(Total = 20 mark

4. (a) State the natural defense mechanism of the body against the entry of pathogens
(b) What is the role of blood in defense?
(c) (i) Explain erythroblastosis fetalis.
(iii) What advice can you give to parents of an individual with erythroblastosis fetalis?

(10,5,5, marks)
(Total = 20 mark

5. (a) Explain the Oxygen dissociation curve
(i) What is the effect of high CO_2 concentration on the oxygen dissociation curve?
(ii) Explain why the oxygen dissociation curve of foetal hemoglobin lies in the left of the oxygen dissociation curve of adult hemoglobin
(b) Describe how humph and tissue fluid are ferment

(10,10, marks)
(Total = 20 mark

6. (a) What are recombinant DNA molecules?

(i) How can recombinant DNA molecules be contracted?
(b) Why is microorganism suitable for industrial processes,

(12,8 marks)
(Total = 20 mark

(a) Distinguish between photosynthesis and chemosynthesis.
(b) (i) What are C4 plants? Name two examples
(ii) State the significance of the C4 particularly of photosynthesis
(ii) What would be the effect? Of increasing oxygen concentration is C4 plants photosynthesis?
(c) Differentiate between C3 and C4 plants.

(4,11,5 marks)
(Total = 20 mark

7. (a) (i) Define the term concentration
(iii) State reasons for concentration

(b) State four methods of conserving each of the following

(i) Water
(ii) Wildfire and
(iii) Forest

(c) List THREE forest/game recessive in Cameroon

(15,13,3 marks)
(Total = 20 mark

JUNE GCE 2016

1. (a) Define excretion

(b) State the waste products of metabolism in vertebrates, their origin and the structures responsible for their elimination

(c) Describe

(i) The production and

(ii) The removal of urea in mammals

(2,13,5 marks)
(Total = 20 mark

2. (a) Explain how structures of

(i) Chloroplast and

(ii) Mitochondria are adapted to their functions.

(b) Using only structures, differentiate between a bacteria cell and a chorenchyma cell as revealed by an electron microscope.

(c) What are the advantages and disadvantages of using the light and electron microscope to study cell organelle?

(10,5,5 marks)
(Total = 20 mark

3. (a) (i) What are the effects oil pollution on marine and coastal environment?

(i) List five recent techniques for treating and preventing oil pollution.

(b) How can our land be conserved to ensure greater survival of species?

(c) State how you can ensure that the clean-up campaigns in our cities are more effective.

(10,6,4 marks)
(Total = 20 mark

4. (a) List the characteristics properties of hormones

(b) Explain briefly how hormones enter their target cells and exert their effects.

(c) Discuss the role of auxins in flowering plants

(4,8,8 marks)
(Total = 20 mark

.5. (a) (i) What is accommodation with respect to vision?

(ii) How can far and near objects be focused by the eye?

(b) List the differences between the photosynthesis cells found in the retina of the eye.

(c) How are synapses important in the transmission of nervous impulses in mammals?

(10,5,5 marks)
(Total = 20 mark

---

6 (a) Why do multicellular animals need a transport system?

(b) Differentiate between lymphatic and blood circulatory systems.

(c) State the role of the lymphatic system in the defense mechanism of the body.

(4,8,8 marks)
(Total = 20 mark

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6. (a) Define the following genetic terms:

(i) Gamete
(ii) Zygote
(iii) Chromosome
(iv) Homozygous
(v) Heterozygous

(b) Assume that brown hair colour is a genetic characteristic which is sex –linked and lethal in the homozygous recessive state.Carry out a cross and State the proportions of offspring prodced a woman who is heterozygous with brown hair is crossed with a homozygous dominant brown haired man.

(10,10 marks)
(Total = 20 mark

---

8. (a) Define the following terms as used in genetic engineering

(i) Recombinant DNA
(ii) Complementary DNA
(iii) Restriction enzymes
(iv) DNA ligase
(v) Vector
(vi) Host

(vii) Plasmid
(viii) Reverse transcriptase
(ix) Transgenic organism
(x) DNA polymerase
(b) Write short notes on the following
(i) Application of biotechnology in the field of medicine
(ii) Application of biotechnology in the field of agriculture.

(10,10 marks)
(Total = 20 mark

JUNE GCE 2017

1. (a) Define the term alternation of generations.
   (b) Draw an annotated life cycle of a moss to illustrate alternation of generations.
   (c) Why is water necessary for the cycle of the moss?

   (6,10,4 marks)
   (Total = 20 mark

---

2. (a) Sate the characteristics of a respiratory surface.
   (b) Describe the mechanism involved in the ventilation of.
   (i) An insect and
   (ii) Man
   (c) How is ventilation controlled in man?

   (4,4,6,6 marks)
   (Total = 20 mark

---

3. A gardener working on pepper plants got the following results:
   A. When a pepper plant with long and yellow seeds was crossed with one with round and red seeds, all the offspring had long yellow seeds in the F1.
   B. A majority in the F1 pepper plants when crossed with a double recessive of both traits gave an equal number of pepper plants with long yellow and round red seeds in the F2
   C. A few pepper plants from among the F1 when crossed with a double recessive gave in the F2, the following phenotypic numbers.
   890 long yellow seeds
   900 round red seeds
   104 long red seeds
   110 round yellow seeds
   (a) State the dominant and recessive traits in these crosses
   (b) What can you suggest is responsible for the different phenotypic numbers of B an C?

(c) Using appropriate symbols, show the crosses of the findings in A, B and C. your crosses should show all the necessary steps.

(2,3,15 marks)
(Total = 20 mark

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4. Describe how
   (a) A stomach of a ruminant herbivore is adapted to carry out its functions.
   (b) The nervous and hormonal systems control digestive secretions in the human gut.
   (c) Auto digestion is prevented in the human gut.

(6,10,4 marks)
(Total = 20 mark

---

5. (a) (i) Define tropic and mastic responses stating one example in each case

   (iii) List the differences between tropic and mastic responses.
   (b) Explain why phytochromes are involved in detecting photoperiods in following plants?
   (c) List uses of auxins in agriculture.

(10,5,5 marks)
(Total = 20 mark

---

6. (a) Define a food web. Use organism in a named ecosystem to illustrate the principle of food web.
   (b) Briefly explain the following:

   (i) Ozone layer depletion
   (ii) Global warming and
   (iii) Eutrophication

(18,12 marks)
(Total = 20 mark

---

7. (a) What is:
   (i) Growth and
   (ii) Cell differentiation?
   (b) Discuss five factors: three external and two internal that affect growth in plants.

(5,15 marks)
(Total = 20 mark

---

8. (a) Define biotechnology
   (b) List the steps involved in a biotechnological process

   (c) Describe each of the following:

   (i) Cheese production;
   (ii) Yoghurt production and
   (iii) Production of the antibiotic penicillin

(5,5,12 marks)
(Total = 20 mark

JUNE GCE 2018

1. (a) What do you understand by biomolecules?

   (b) Comment on the importance of biomoleccules in living organisms.
   (c) How are nucleic acids different from other molecules?

(2,12,6 marks)
(Total = 20 mark

---

2. (a) Define anaerobic respiration.
   (b) Using suitable examples of organism, describe three possible anaerobic pathways.
   (c) Draw a large labeled diagram of a mitochondrion .
   (d) Analyses the role of co factors in respiration.

(3,12,5 marks)
(Total = 20 mark

---

3. (a) What do you understand by translocation?
   (b) Compare & contrast transport animals and plants.
   (c) Describe an experiment to proof that the phloem is the site of translocation

(3,12,5 marks)
(Total = 20 mark

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4. (a) What is meant the following ecological terms:
   (i) Conservation
   (ii) Biodiversity
   (iii) Endangered species
   (b) (i) List the main biomes in the universe.
   (ii) Describe four physical factors that affect the distribution of organisms in the enzyme.
   (c) (i) What factors contribute to the extinction of a particular species.
   (ii) How may the extinction of an organism be reduced.

(3, 12,5 marks)
(Total = 20 mark

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5. (a) Distinguish between the following terms as used in growth;

   (i) Isometric and Algometric growth
   (ii) Lilted and unlimited to growth
   (b) (i) How is the growth of an individual related to genes?
   (ii) What other factors affect growth?
   (c) Describe the role the following endocrine glands in the growth of humans
   Thyroid gland
   Pituitary gland

(8,4,8 marks)
(Total = 20 mark

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6. A Make a large labeled diagram of the mammalian ear.

   (b) Trace the events that occur in the enable you to hear the sound of morning vehicles outdoors.
   (c) How is the puts of the sound determined?

   (e) Describe the causes of two named ear defects.

(6,6,4,4 marks)
(Total = 20 mark

---

7. (a) Define the following terms:
   (i) Oxidative phosphorytation
   (ii) Compensation point
   (iii) Photo respiration

(b) Describe the light dependent stage in of plants.
(c) Outline the advantages of growing of plans instead of C3 plants

(8,10,2 marks)
(Total = 20 mark

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8. (a) What are lethal genes?

   (b) in a series of breeding experiments using mice, the following crosses were male
   A yellow fur coat female mouse was mated why a grey fur coat male
   A litter (offspring) had 3 grey fur coat and 6 yellow fur coat
   When two grey fur coat nice were mated the litter had all grey nice.
   - Given that the allele for fur coat is not sex inked, use suitable genetic symbols to explain the above crosses.
   - Explain why three ratios deviated from the expected Mendelian ratios.

(3,17 marks)
(Total = 20 mark

<u>JUNE GCE 2019</u>

1. (a) What do you understand by

   (i) Photoautotrophic nutrition
   (ii) Chemoautotrophic nutrition

   (b) How is the dicot leaf adapted to is function in a plant?

(c) Name the main photosynthetic pigments giving their colour and distribution in the plant kingdom.

(4,6,10 marks)
(Total = 20 mark

2.(a) What THREE characteristics are common to most circulatory systems?
(b) How are open circulatory systems different from close circulatory systems?
(c) Describe the series of of events that occur during blood clotting .
(d)Explain how oxygen is transported by blood

(3,7,6,4 marks)
(Total = 20 mark

---

3 (a) What is a protein?
(b) How is the structure of the protein adapted to its nary function?
(c) Outline SEVEN roles of carbohydrates in a plant.
(d)What are the structural differences between cellulose and starch?

(3,4,7,6 marks)
(Total = 20 mark

4.(a)Draw a large labelled diagram of the longitudinal section of the carpel of a following plant.
(b) Describe :
(i) Pollen grain development
(ii) Embryo sac of ovule development in a flowering plant.
(c) Describe the role of hormones in the control of the sexual cycle in a female mammal

(3,3,6 marks)
(Total = 20 mark

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5. (a) Using specific examples, define the following genetic terms.

(i) Genes
(ii) Alleles
(iii) Sex linkage
(iv) Hybrid

(b) in carts, black fur colour is determined by, a gene B and the allele responsible for yellow fur is .
These genes show co-dominance and the hybrid BL produces an albino. These genes are also sex-linked show the gametes and possible genotypes in the parents of the F1 and F2 generations of a cross between a black furred female with a yellow furred make cat.
(c) To what exert are the male and female offspring produced distinguished by their fur colour?

(8,10,2 marks)
(Total = 20 mark

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6. (a) What is a nerve impulse?

   (b) Describe how a nerve impulse is initiated along a neuron

   (c) How can this impulse be transmitted across a synapse?

   (d)Differentiate between nervous and hormonal coordination.

(2,5,7,6 marks)
(Total = 20 mark

---

7. (a) What is pollution?
   What are?
   (i) The main sources and
   (ii) The effects of oil pollution?

(c) Outline SEVEN reasons for using microorganism in bio-technology processes.

(6,7,7 marks)
(Total = 20 mark

JUNE 2021

1)

a. Make a fully labelled drawing of the stomach of a named ruminant.
b. Briefly describe how a named herbivore is adapted for mechanical and chemical digestion of cellulose.
c. How are products of cellulose digestion absorbed and used?

2)

a. explain the following terms as used in reproduction.
   i. Pathernogenesis.
   ii. Capacitation
   iii. Cortical reaction
   iv. Ovulation
b. Describe the process of spermatogenesis in Human.
c. How is spermatogenesis hormonally controlled in Humans?

3)

a. What are pollutants? give three examples
b. Describe briefly the hazards of water and air pollution
c. Differentiate between biodegrable and non-biodegrable pollutants giving at least one example of each.

4)

a. Outline:
   i. Mendel's first law of inheritance
   ii. Mendel's second Law of Inheritance
b. Explain, using appropriate genetic symbols, the possible blood group of children whose father is heterozygote blood group A and mother heterozygote Blood group B
c. If these parents have two children, what is the probability that both will have blood group A?

5)

Nucleic acids (DNA and RNA) are important components in the synthesis of proteins in living organisms.

i. Compare DNA and RNA
ii. Describe the events that occur in the translation of mRNA into polypeptides in cells.

6)

a. Make a fully labelled drawing of the cross section of the human eye.
b. Identify the proteins involved in the following eye defects and their methods of correction
   i. Long sightedness(hypermetropia)
   ii. Short sightedness (myopia)
c. Explain the mechanism of color vision in humans.

7)

a. Outline the mechanism of the uptake of the following in plants
   i. Water
   ii. Inorganic ions
b. How are organic substances transported and used in flowering plants?

ANSWERS

8)

a. What is genetic engineering?
b. Use flow a flow diagram to show some of the key stages which are typically involved in setting up a biotechnological process.
c. What advantages in using microorganisms as a food source?

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