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ST. LAWRENCE HIGH SCHOOL

A JESUIT CHRISTIAN MINORITY INSTITUTION

SELECTION TEST– 2019

Sub: Life Science **Class: X** **F. M.-90**

Duration: 3hrs 15mins **Date: 06.11.2019**

Group A

(Multiple Choice Questions-15 marks)

(Answer to all questions is compulsory)

1. Write the answer in complete sentence by choosing the correct answer for each question with respective serial number. Mark for each question is 1. **(1x15=15)**

SECTION A

i) Protanopia is a type of

(1) Hemophilia (2) Thalassaemia (3)Myopia **(4)Colour blindness**

ii) Lung cancer is caused by

(1) **Tobacco** (2)Arsenic (3)Fluoride (4)DDT

iii) In the F2 generation of a dihybrid cross , the following is the phenotypic ratio

(1) **9:3:3:1** (2)9:3:1:3 (3)9:3:2:1 (4)9:8:3:1

iv) How many chromosomes are present in the cells of the testis in normal human being?

(1) **46** (2)47 (3)23 (4)24

v) Which of the following is not found in fishes?

(1) Fins 2)Myotomes (3)Operculum (4)Air sacs

vi) Which of the following is diploid in nature

(1) Egg **(2)Synergid** (3)Polar nucleus (4)Primary Endosperm Nucleus

vii) Which of the following reproduces through offset?

(1) Strawberry **(2)Water hyacinth** (3)Fern (4)Colocasia

viii) The height of modern horse is

(1) 50'' **(2)60''** (3)40'' (4)24''

ix) If a female gamete contains 11 chromosomes, what is the number chromosome present in the body cells?

(1) **22** (2)23 (3)11 (4)12

x) Which gas was not present in the earth initially?

(1) **Free Oxygen** (2)Nitrogen (3)Carbon dioxide (4)Sulphur Dioxide

xi) The part of the brain that does not belong to the brain stem is

(1) Midbrain **(2)Cerebellum** (3)Medulla (4)Pons

xii) Regeneration is observed in

(1) Snakes (2)Spirogyra (3)Centipede **(4)Planaria**

xiii) Phylloclade in cactus is _____ type of adaptation

(1) Behavioral (2)Anatomical **(3)Morphological** (4)Physiological

xiv) Salivation is controlled by

(1) Pons **(2) Medulla oblongata** (3) Cerebellum (4) Thalamus

xv) Which of the following absorbs the gas of swim bladder in bony fishes?

(1) Red gland (2) Anterior chamber (3) Gastric gland **(4) Retia mirabilia**

GROUP B

2. Answer any 21 questions out of 26 questions given below as instructed:(1x21=21)

Fill in the blanks with proper word in the following sentences: (any five) **(1x5=5)**

2.1 Paraquat is applied on eggs of birds.
2.2 In Amphibians the heart is three chambered.
2.3 A forager bee shows round dance when the food source is nearby.
2.4 Shoulder joint is not an example of Hinge joint.
2.5 Incomplete dominance is found in *Mirabilis jalapa*(Four o'clock plant).
2.6 The sexual reproduction that occurs among two genotypically different organisms of same species,is called Hybridisation .

Decide whether the following statements are True or False: (any five) **(1x5=5)**

2.7 RBC's of camel can swell upto 50% of the normal size for adaptation.False
2.8 ACTH is a steroid hormone. False
2.9 The paired homologous chromosomes are called Bivalents.TRUE
2.10 Two different types of gametes will be formed from BbSs.False
2.11 *Bacillus ramosus* is a nitrifying bacteria. False
2.12 Kidney disease is one of the effects of untreated diabetes mellitus. True

Match the words in column A with those which are most appropriate in column B and rewrite the correct pairing mentioning the serial number of both columns.(any five) **(1x5=5)**

Column A	Column B
2.13Nanmangalam	a. Kidneys cannot prevent excess excretion of water (2.16)
2.14Sundarban	b. Associated with temperature regulation(2.15)
2.15 Midbrain	c. Wing feather(2.17)
2.16 Diabetes insipidus	d. Biosphere reserve(2.14)
2.17 Remiges	e. yellow seed(2.18)
2.18 Dominant trait of pea plant	f. Reserve forest(2.13)
	g. green seed

Answer in a single word or in a single sentence: (any six) **(1x6=6)**

2.19 What is alpha-thalassemia?
It occurs when a gene or genes related to the alpha globin protein are missing or mutated.
2.20 Name two vestigial organs in human.
Nictitating membrane of human eye,Appendix.
2.21 Which gland secretes FSH?
Anterior pituitary gland.
2.22. Name the structure which forms myelin sheath in a neuron.
Schwann cell /Oligodendrocytes.
2.23 State one importance of Nitrogen cycle.
The Nitrogen cycle maintains balance between the gaseous nitrogen and soil nitrate converting atmospheric nitrogen to ammonia enriching the soil with the nitrogen rich compounds easily absorbable by the plants.

2.24 Name one site of Red Panda conservation.

Singalila National Park,Sikkim

2.25 Which type of evolution is indicated by analogous organs?

Convergent Evolution

2.26 State the function of CSF in brain?

CSF Bathes the brain and spinal cord bringing nutrients from the blood to the brain and removes waste products from the brain.

GROUP C

3. Answer any 12 questions in 2-3 sentences out of 17 questions given below. (2x12=24)

3.1 What are allergens?Name one disease caused by allergens.

An allergen is any substance (antigen), most often eaten or inhaled, that is recognized by the immune system and causes an allergic reaction. Dust, pollen and pet dander are all common allergens, but it is possible to be allergic to anything.

Allergic Rhinitis,Asthma

3.2 Define homologous organ with example.

The organs in different organisms which have the same embryonic origin and have basic similarity but they are functionally may or may not be alike are called homologous organ

Example: The forelims of all vetrtebrate sexcept fishes have a common bony structure.

3.3 What is telomere and why is it important?

Telomere is the end of the chromatids which contains repetitive base sequences .

They protect the ends of the chromosomes from damage & stop them from becoming attached to each other.

3.4 What is Sundaland?State two important similarities among vertebrate embryos.

Sundaland is a biogeographicalregion of Southeastern asia which encompasses the Sunda shelf,a part of the asian continental shelf that are exposed during the last ice age .The biodiversity hotspot was dominated by the two islands –Barneo & Sumatra.

Similarities among vertebrate embryos:

- ***Presence of gill clefts,notochord ,tail***
- ***Development of limb buds***
- ***Notochord replaced by vertebral column***

3.5 Name two biodiversity hotspots of India.

Andaman & Nicobar islands,Eastern Himalayas.

3.6Name the gases used in Miller-Urey experiment. What was the source of energy in the experiment?

CH_4,NH_3,H_2O,H_2 .The electric discharge was the source of energy in the experiment.

3.7State two symptoms of Haemophilia.

- ***Excessive bleeding***
- ***Easy bruising***

3.8What is Natural selection?

The basic concept of natural selection is that a population can change over generations,if individuals that possess certain heritable traits leave for more offsprings than the other individuals. Natural selection is the differential success in the reproduction of different phenotypes resulting from the interaction of organisms with the environment.

3.9What do mean by Convergent evolution?
When similar parts of different animals or plants are modified for the same purpose ,it is called convergent evolution and also called parallel evolution. Example :wings of birds,insects and bats.

3.10Differentiate between Isomorphic & Heteromorphic Alternation of generation.
In an Isomorphic alternation of generation ,the sporophyte and the gametophyte are morphologically similar or identical while in the heteromorphic generation they are dissimilar

3.11State the name & one function of the hormone secreted from 'Islet of Langerhans'.
Insulin which absorbs excess glucose from the blood when the blood-glucose level rises above the normal threshold value.

3.12 Write the name of two genetic diseases which are expressed in human populations.
Haemophilia,Colourblindness

3.13 Explain two adaptive features in Sundri plant for salt tolerance.
They have special glands called Salt glands to get rid of the excess salts from the saline water. They discard the salts through leaves where they store salts and later excrete.

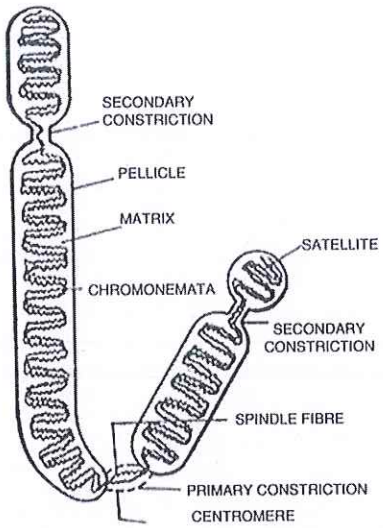
3.14 Write the harmful effects of Greenhouse gas & SPM.
The greenhouse gases like CO_2,CH_4 etc absorbs shorter UV rays of the Sun and also those which are reflected from the Earth's Atmosphere causing elevation of Global temperature resulting in melting of polar ice caps.
SPM-They reduce visibility,prevents the Sun rays to enter the atmosphere reducing the productivity .They also may cause lung diseases like COPD etc.

3.15 Explain how Eutrophication & BOD are related to each other?
excessive richness of nutrients in a lake or other body of water, frequently due to agricultural run-off from the land, which causes a dense growth of plant life and thus increases the BOD which reduces the amount of free oxygen present for the aquatic life leading to threat to the living organisms.

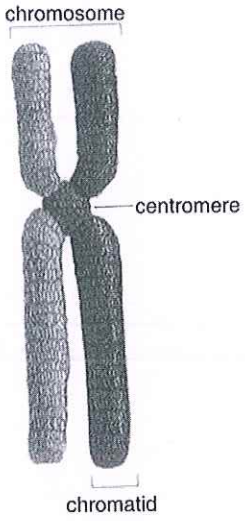
3.16 Give an example of a symbiotic relationship between a plant & its animal pollinator.
African lily,Massonia depressa
3.17 What is Kinetochore?
Kinetochore is a trilamellar protein disc shaped structure associated with the centromere of chromososmes to which the spindles fibres get attached during cell division.

SECTION D

4.1

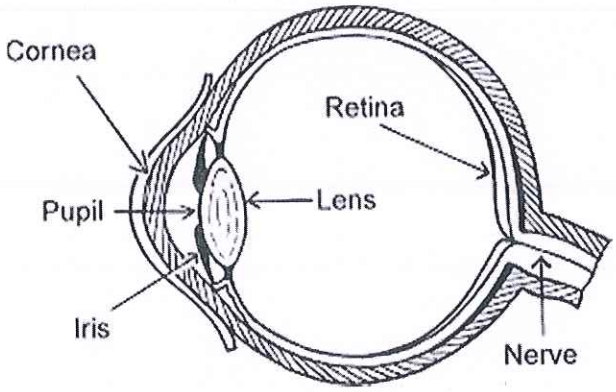


B



A

Or



Parent rrBB RRbb
Gametes rB Rb
F_1 generation RrBb (all rough and black)

Gametes	rB	rB
Rb	RrBb	RrBb
Rb	RrBb	RrBb

Selfing

Gametes	RB	Rb	rB	rb
RB	RRBB	RRBb	RrBB	RrBb
Rb	RRBb	RRbb	RrBb	Rrbb
rB	RrBB	RrBb	rrBB	rrBb
rb	RrBb	Rrbb	rrBb	rrbb

Phenotypes of F_2 generation:
Rough and black (RRBB, RRBb, RrBB, and RrBb)
Rough and white (RRbb and Rrbb)
Smooth and black (rrBB and rrBb)
Smooth and white (rrbb)

Incomplete dominance is a form of intermediate inheritance in which one allele for a specific trait is not completely expressed over its paired allele. This results in a third phenotype in which the expressed physical trait is a combination of the phenotypes of both alleles. E.g – Mirabilis jalapa

Or

Show the pattern of inheritance of thalassaemia in the offsprings when a thalassaemia minor female is crossed with a thalassaemia major man. These include:

- ***jaundice and pale skin***
- ***drowsiness and fatigue***
- ***chest pain***
- ***cold hands and feet***
- ***shortness of breath***
- ***leg cramps***
- ***rapid heart beat***
- ***poor feeding***
- ***delayed growth***
- ***headaches***
- ***dizziness and faintness***
- ***greater susceptibility to infections***

Skeletal deformities may result as the body tries to produce more bone marrow.

Describe the double – helical structure of DNA. 5

Or

Lamarkism –Darwinism to consulted from the text book

Neo-Darwinism, Theory of evolution that represents a synthesis of Charles Darwin's theory in terms of natural selection and modern population genetics. The term was first used after 1896 to describe the theories of August Weismann (1834–1914), who asserted that his germ-plasm theory made impossible the inheritance of acquired characteristics and supported natural selection as the only major process that would account for biological evolution.

4.4 Double fertilization is a major characteristic of flowering plants. In this process, two male gametes fuse with one female gamete wherein one male gamete fertilizes the egg to form a zygote, whereas the other fuses with two polar nuclei to form an endosperm.
Double fertilization gives stimulus to the plant that results in the development of the ovary into fruit and ovules into seed. The fusion of haploid male and female gametes restores the diploid condition of the plant.
Double Fertilization Process
The process of double fertilization is explained below:
Angiosperms are flower-bearing plants and are the most diverse group of terrestrial plants. The flowers form the reproductive part of angiosperms with separate male and female reproductive organs. Each contains gametes – sperm and egg cells respectively.
Pollination helps the pollen grains to reach stigma via style. The two sperm cells enter the ovule-synergid cell. This proceeds to fertilization.
In angiosperms, fertilization results in two structures, namely, zygote and endosperm, hence named, double fertilization.
Double fertilization is a complex process where out of two sperm cells, one fuses with the egg cell and the other fuses with two polar nuclei which result in a diploid (2n) zygote and a triploid (3n) primary endosperm nucleus (PEN) respectively.
Since endosperm is a product of the fusion of three haploid nuclei, it is called triple fusion.
Eventually, the primary endosperm nucleus develops into the primary endosperm cell (PEC) and then into the endosperm.
The zygote becomes an embryo after numerous cell divisions.

. **'Mitosis is essential in meiosis'- Justify.**

Or

1. *Positive feedback – one hormone stimulates the production of another hormone instead of diminishing.*

Flowchart :

Hypothalamus
|
TRH
|
Anterior pituitary
|
TSH
|
Thyroid gland
|
Thyroxine

Production of lesser Thyroxine stimulates the hypothalamus to produce more TRH. Hence the process becomes a positive feedback.

. Functions of Auxin-

- *Phototropism*
- *Parthenocarpy*
- *Apical growth*
- *Initiates rootings in stem cuttings, weedicides, cell division*

4.5 What environmental factors may cause cancer in humans? If the water level in sea increases enormously due to global warming, what problems the humans and biodiversity of sunderbans may face?

Ultraviolet radiation ,asbestos,pesticides etc

If the water level rises it causes infiltration of saline waters in the low lying areas causing flood ,reduction of agricultural productivity.

Or

What are the characteristics of Biosphere Reserve? How are they different National Parks? Give an example of an endemic organism.

5

4.6 Explain the role of Bacteria in fixing nitrogen in the environment. Write any two significance of N_2 cycle.

Nitrogen-fixing bacteria are microorganisms present in the soil or in plant roots that change nitrogen gases from the atmosphere into solid nitrogen compounds that plants can use in the soil

The nitrogen cycle refers to the cycle of nitrogen atoms through the living and non-living systems of Earth. The nitrogen cycle is vital for life on Earth. Through the cycle, atmospheric nitrogen is converted to a form which plants can incorporate into new proteins.

Or

- *The burning of fossil fuels. Sulfur dioxide emitted from the combustion of fossil fuels like coal, petroleum and other factory combustibles are one the major cause of air pollution. ...*
- *Agricultural activities. ...*
- *Exhaust from factories and industries. ...*
- *Mining operations. ...*

Effects:

- *Respiratory diseases.*
- *Cardiovascular damage.*
- *Fatigue, headaches and anxiety.*
- *Irritation of the eyes, nose and throat.*
- *Damage to reproductive organs.*
- *Harm to the liver, spleen and blood.*

- *Nervous system damage.*

- *Biomagnification is the process by which toxic chemicals build up within predators. This typically occurs across an entire food chain and affects all of the organisms but animals higher up in the chain are more impacted.[2] When predatory animals consume their prey they also consume all of the toxic chemicals within said prey. When these toxins aren't easily excreted they build up in the animal's system through bioaccumulation. Therefore, when the food chain progresses, concentrations increase or magnify. Biomagnification can be considered the result of bioaccumulation.*
- *Example*
- *At the bottom of the food chain, plankton are infected with mercury (often through diffusion with the surrounding water) and eaten by some small fish (to greatly simplify things assume that each plankton has a concentration of 1 ppm of mercury in it). Each small fish consumes ten times their weight in plankton over a period of time. The fish would now have 10 ppm of mercury in their system. Now those small fish are eaten by a school of larger fish who consume ten times their weight each, the larger fish would now have 100 ppm of mercury in their system. This process continues all the way up the food chain to animals like humans and eagles (animals that are not usually eaten by other animals) where concentrations of the toxin reach their highest and the health dangers are the greatest.*