

Name: _____

Date: _____



Direction for Questions: 1 to 5

The human cerebrum is divided into right and left cerebral hemispheres.

The outer 2-4mm of the cerebral hemispheres is known as the cerebral cortex. It consists of grey matter.

The left side of the cerebral cortex receives information from and controls movement of the right side of the body and vice-versa. A thick band of axons known as corpus callosum enables the right and left cerebral cortices to communicate. The left cerebral hemisphere is concerned with recognition of faces.

In a particular patient the corpus callosum was surgically removed as a treatment of last resort for the most extreme form of epilepsy in which fits occurred as often as 30 minutes. The patient appeared normal after recovery but exhibited a 'split-brain' effect.

Answer the following questions using options (Yes/No).

Question: 1 of 22

QID: 468

Marks: 1

The patient is blindfolded and given a comb in the left hand. Then the blindfolded person is asked to locate the comb in a mixture of objects (mirror, ball, pen, etc) with his left hand. Will he succeed?

A. Yes

B. No

Question: 2 of 22

QID: 469

Marks: 1

If the doctor asks the blindfolded patient to say what the object was, would he be able to answer?

A. Yes

B. No

Question: 3 of 22

QID: 470

Marks: 1

The doctor asks the blindfolded patient to find the comb in the mixture of objects with his right hand. Would he be successful?

A. Yes

B. No

Question: 4 of 22

QID: 471

Marks: 1

When the blindfolded patient is given the comb in right hand and asked to say what the object is, will he be able to answer?

A. Yes

B. No

Question: 5 of 22

QID: 472

Marks: 1

If the patient is shown a photograph of a familiar face first in the left field of vision and then in the right field, would he be able to put a name to the face, in either field?

A. Yes

B. No

Direction for Questions: 6 to 8

Origin of life in earth is traced back to about 3 billion years ago. Oparin (1924), and John Haldane (1929), independently suggested that if, the primitive atmosphere was reducing (as opposed to oxygen-rich), and if there was an appropriate supply of energy, such as lightning or ultraviolet light, then a wide range of organic compounds might be synthesized. Their hypothesis was proven by the famous Miller and Urey experiment.

Using high voltage electric sparks they could experimentally generate bio-molecules from elemental gases.

These experiments helped us to understand the sequence of events that might have helped in origin of life in earth.

Question: 6 of 22

QID: 465

Marks: 1

Considering the above information into account; predict which of the following combination makes the appropriate sequence of formation of bio-molecules and sub- cellular organelles.

- A. amino acid---protein ---chlorophyll
- B. chlorophyll --starch- --glycogen
- C. nucleic acid-- amino acid- -chlorophyll
- D. chlorophyll--nucleic acid ----amino acid

Question: 7 of 22

QID: 466

Marks: 1

Which of the following components might be logically most abundant in primitive earth?

- A. Ammonia and helium
- B. Juvenile water vapour
- C. Oxygen
- D. Hydrogen and Methane

Question: 8 of 22

QID: 467

Marks: 1

Which of the following energy source might have helped maximally for the formation of first life form in earth?

- A. Sunlight
- B. UV rays and lightening energy
- C. Hydrostatic pressure of sea water
- D. All of these

Direction for Questions: 9 to 13

During the study of factors affecting germination, Lata used 4 tubes P, Q, R and S. Seeds of green gram were subjected to different condition as described below

P- Seeds soaked in water were kept on moist cotton wool and placed in a tube with water. The tube was closed with loose cotton wool and kept at 25°C

Q- Same arrangement as above (P) but tube stored at 4°C

R- Seeds soaked in water was kept on moist cotton wool and placed in a tube with Pyrogallol instead of water. Pryogallol removes oxygen. The tube was closed tightly with a wooden block and kept at 25°C

S- Dry seeds kept on dry cotton wool, kept at 25°C without adding water

Every experiment should have controls. A control can be positive or negative. Negative control is a condition where the phenomenon (germination of seeds in this example) is not expected to happen while in positive control the phenomenon is expected to happen with respect to the parameter being tested.

Question: 9 of 22

QID: 460

Marks: 1

Which tube will have the highest frequency of germination?

- A. P
- B. Q
- C. R
- D. S

Question: 10 of 22

QID: 461

Marks: 1

Which tube serves as a positive control?

- A. P
- B. Q
- C. R
- D. S

Question: 11 of 22

QID: 462

Marks: 1

Which tube works as negative control for oxygen?

- A. P
- B. Q
- C. R
- D. S

Question: 12 of 22

QID: 463

Marks: 1

In the above experiment the influence of which of the following factor(s) on germination is/are being tested?

- A. O₂ and H₂O only
- B. CO₂ and Pyrogallol only
- C. O₂, H₂O and temperature
- D. Only H₂O

Question: 13 of 22

QID: 464

Marks: 1

What is most likely to happen to the frequency of germination in tube R if the wooden block is replaced with loose cotton wool?

- A. No change in germination frequency
- B. Increase in germination frequency
- C. Decrease in germination frequency

Direction for Questions: 14 to 15

'Triple parent' is a novel concept of creating embryos using DNA from three people. This technique can prevent passing of genetic diseases due to defects in mitochondria from a mother to her babies. This technique involves removing the nuclear DNA from a healthy female donor's eggs and replacing it with the nuclear DNA of the prospective mother. After fertilization, the resulting child would inherit the mother's nuclear DNA and the donor's healthy mitochondrial DNA. If approved for use, the technique would allow a woman to give birth to a baby who would inherit the normal nuclear DNA but not the defective mitochondrial DNA.

Question: 14 of 22

QID: 458

Marks: 1

The concept of a triple parent involves:

- A. Three females and no requirement of male
- B. One male and two females in which the other parent (female donor) is not genetically involved
- C. One male and two females all contributing genetically
- D. One female and two males all contributing genetically

Question: 15 of 22

QID: 459

Marks: 5

Given below are few statements regarding triple parent technique. Tell us if they are true (T) or false (F), by identifying them as either correct or incorrect statements.

- a) This technique can also be useful for father with defective mitochondrial genes.
- b) This technique will not work for mother or father with defective nuclear genes.
- c) The child produced by the technique will contain some foreign genes from a third parent.
- d) The chance of transmission of foreign gene to the next generation (by normal reproduction involving two parents) will be almost zero if the triple parent technique generates a male.
- e) The offspring produced by the triple parent technique will be affected if the third parent has a genetic defect in the nuclear genes

Direction for Questions: 16 to 18

The following is a hypothetical situation. A geneticist studies the inheritance of eye shape and color in a newly identified insect. Like *Drosophila* there are two eye shapes in this insect: round and bar. Round is dominant in this case. There are two eye colors: red and white, where red is dominant over white. Genes for eye-color and eye shape are present on the autosomes.

A cross is made between a red, round-eyed and bar, white-eyed insect. What will be the phenotype of the F1 progeny?

Question: 17 of 22

QID: 456

Marks: 1

When the F1 progeny were crossed, the following F2 progeny (phenotype: numbers) was obtained:

- Red, round eyed : 899
- Red, bar eyed : 301
- White, round eyed : 293
- White, bar eyed : 107

Based on the above data do the genes for eye color and shape show independent assortment?

A. Yes

B. No

Question: 18 of 22

QID: 457

Marks: 1

Calculate the ratio obtained from the given F2 progenies provided as above.

Direction for Questions: 19 to 22

Drosophila melanogaster (fruit fly) is a favorite among geneticists to study inheritance of characters. Like other insects the life cycle of *Drosophila* consists of larvae, pupae and adults.

It can be easily maintained in the laboratory, has a short lifecycle, produces large number of progeny and has only four pairs of chromosomes.

The inheritance of eye color and shape, have been studied by many geneticists. The eye shape could be round or slit-like (called Bar eyed). The allele that controls the Bar-eyed phenotype (B) is dominant over that which controls round shape (b). Although found in the laboratories, the occurrence of Bar-eyed fruit fly in nature is extremely rare.

Question: 19 of 22

QID: 451

Marks: 1

A geneticist wanted to study the inheritance of eye shape in *Drosophila*. Which one of the following is the necessary prerequisite to study inheritance of any character?

- A. Life cycle should be short.
- B. A homozygous line for the character should be available.
- C. Variation in character should be available in the population

Question: 20 of 22

QID: 452

Marks: 1

From the information given in the write-up which of the following statement(s) is/are correct?

- A. Bar eye is a mutant character because it is dominant over round.
- B. Bar eye is a mutant character because it is found rarely in the nature.
- C. Round eye is a mutant type character because it is recessive to Bar

Question: 21 of 22

QID: 453

Marks: 1

A bar-eyed *Drosophila* could be homozygous (BB) or heterozygous (Bb) for the gene controlling the bar-eye shape. In order to differentiate between the two genotypes a geneticist should cross it to a fly with which genotype.

BB?
Bb?
bb?

Question: 22 of 22

QID: 454

Marks: 1

Variations in phenotypes in *Drosophila* can be generated in the laboratory by mutagenesis. X-ray is a known mutagen. In order to generate mutants in *Drosophila* which one of the following stages in its life cycle should be treated with X-ray?

- A. Egg
- B. Larvae
- C. Pupae
- D. Adult

-- END OF QUESTION PAPER --