20/08/2022
SLOT-01

Corporate Office : Aakash Tower, 8, Pusa Road, New Delhi-110005 | Ph.: 011-47623456

Answers & Solutions

Time : 3 hrs. *for* **M.M. : 200**

CUET UG-2022

(BIOLOGY)

IMPORTANT INSTRUCTIONS:

(1) The test is of 45 Minutes duration.

(2) The test contains 50 Questions out of which 40 questions need to be attempted.

(3) Marking Scheme of the test:

a. Correct answer or the most appropriate answer: Five marks (+5)

b. Any incorrect option marked will be given minus one mark (–1).

c. Unanswered/Marked for Review will be given no mark (0).

BIOLOGY

Choose the correct answer:

Question ID: 682591

Arrange the following options in a sequential manner to demonstrate degradation caused by improper resource utilisation and maintenance.

A. Barren patches of land that become large and lead to desertification

B. Fertile top soil can be removed easily by over cultivation

C. Deposition of thin crust of salt on land surface

D. Unrestricted grazing of animals

E. Irrigation without proper drainage of water leading to water logging in the soil

Choose the correct answer from the options given below

(A) A, B, C, D, E (B) C, D, A, B, E

(C) B, D, E, C, A (D) E, D, B, C, A

Answer (C)

Sol. The fertile top-soil can be removed very easily due to human activities like over-cultivation, unrestricted grazing, deforestation and poor irrigation practices, resulting in arid patches of land.

When large barren patches extend and meet over time, a desert is created.

Question ID: 682592

Match List I with List II

List I	List II
A. Ampulla	I. Present at the upper part of labia minora
B. Fimbriae	II. Along with vagina is birth canal
C. Clitoris	III. Site of fertilisation
D. Cervical Canal	IV. Helps in collection of ovum after ovulation

Choose the correct answer from the options given below:

(A) A-IV, B-I, C-II, D-III (B) A-III, B-IV, C-I, D-II

(C) A-I, B-II, C-IV, D-III (D) A-II, B-III, C-I, D-IV

Answer (B)

Sol. Correct answer is option (B) because

Ampulla – Site of fertilization.

Fimbriae – Helps in collection of ovum after ovulation.

Clitoris – Present at the upper part of labia minora.

Cervical canal – Along with vagina is birth canal

Question ID: 682593

Mucosa associated lymphoid tissue constitutes _____ % of lymphoid tissue in human body.

(A) 10% (B) 20%

(C) 40% (D) 50%

Answer (D)

Sol. Correct answer is option (D) because

MALT (Mucosa Associated Lymphoid Tissue) constitutes 50% of lymphoid tissue in human body. It is a secondary lymphoid tissue.

Question ID: 682594

Which of the following is INCORRECT statement?

A. In IUD's, released Cu ions increases sperm motility and fertilising capacity of sperms

B. Multiload 375 is medicated IUD

C. Lippes loop is non-medicated IUD

D. LNG-20 is hormones releasing IUD

E. Vault is an IUD.

Choose the correct answer from the options given below

(A) A & E only (B) A & B only

(C) B & D only (D) B & C only

Answer (A)

Sol. Correct answer is option (A) because

Copper releasing IUDs decrease sperm motility and fertilising capacity of sperm.

Vault is a barrier method of contraception.

Question ID: 682595

Which of the following is not a vegetation propaganda?

(A) Runner of grass

(B) Offset of water hyacinth

(C) Rhizome of Ginger

(D) Bud of Hydra

Answer (Dropped)

Sol. Considering the misprinted words vegetation propaganda as vegetative propagules the correct answer would be option D.

In plants, the units of vegetative propagation are runner, rhizome, sucker, tuber, offset, bulb etc. They are capable of giving rise to new offspring.

Buds in Hydra are asexual reproductive structures.

Question ID: 682596

Select the correct sequence of development of following stages in a primary succession

A. Scrub Stage

B. Marsh-meadow stage

C. Submerged free floating plant stage

D. Reed-swamp stage

E. Submerged plant stage

Choose the correct answer from the options given below

(A) C, E, B, D, A (B) E, C, D, B, A

(C) D, E, B, C, A (D) E, C, D, A, B

Answer (B)

Sol. In primary succession in water, the pioneers are replaced with time by rooted-submerged plants, rooted-floating angiosperms followed by free-floating plants, then reed-swamp, marsh-meadow, scrub and finally the trees.

Question ID: 682597

Which of the following process involves the theory of antigen-antibody interaction?

(A) PCR (B) ELISA

(C) Gene Therapy (D) Gel electrophoresis

Answer (B)

Sol. Correct answer is option (B) because

ELISA is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens (proteins, glycoproteins, etc.) or by detecting the antibodies synthesised against the pathogen.

Option (A) is incorrect because *via* PCR, very low concentration of bacteria or virus (at a time when the symptoms of the disease are not yet visible) can be detected by amplification of their nucleic acid.

Option (C) is incorrect because gene therapy is a collection of methods that allows correction of a gene defect that has been diagnosed in a child/embryo.

Option (D) is incorrect because gel electrophoresis is used to separate DNA fragments according to their size.

Question ID: 682598

Following are the animals that recently became extinct, except _____

(A) Dodo (B) Quagga

(C) Thylacine (D) *Clarias garipinus*

Answer (D)

Sol. Examples of recent extinctions of species include the dodo from Mauritius, quagga from Africa, thylacine from Australia and Steller's Sea Cow from Russia.

Clarias garipinus is African catfish. Its recent illegal introduction for aquaculture purposes is posing a threat to the indigenous catfishes in our rivers.

Question ID: 682599

Given below are two statements

Statement 1: Baculoviruses belonging to genus *Nucleopolyhedrovirus* are used as biological control agent.

Statement 2: These viruses are used as they are species-specific and have narrow spectrum insecticidal applications, so can be a good insecticide.

In the light of above statements, choose the most appropriate answer from the options given below

(A) Both statement 1 and statement 2 are correct

(B) Both statement 1 and statement 2 are incorrect

(C) Statement 1 is correct and statement 2 is incorrect

(D) Statement 1 is incorrect and statement 2 is correct

Answer (A)

Sol. Baculoviruses are pathogens that attack insects and other arthropods.

The majority of baculoviruses used as biological control agents are in the genus *Nucleopolyhedrovirus*. These viruses are for species-specific, narrow spectrum insecticidal applications.

Question ID: 6825910

Complete the analogy

Migration : Siberian Cranes : : _____ : Bear

(A) Regulation (B) Hibernation

(C) Aestivation (D) Diapause

Answer (B)

Sol. Siberian cranes migrate from Siberia to Keoladeo National Park (Rajasthan) every year to avoid stressful conditions.

Bear escapes in time during winter by a process called hibernation.

Question ID: 6825911

Development of analogous structure or organs are a result of _____

(A) Divergent evolution (B) Convergent evolution

(C) Adaptive radiation (D) Saltation

Answer (B)

Sol. Correct answer is option (B) because analogous structures are a result of convergent evolution - different structures evolving for the same function and hence having similarity.

Option (A) is incorrect because in animals, the same structure developed along different directions due to adaptations to different needs. This is divergent evolution and these structures are homologous.

Option (C) is incorrect because the process of evolution of different species in a given geographical area starting from a point and literally radiating to other areas of geography (habitats) is called adaptive radiation.

Option (D) is incorrect because Hugo de Vries believed mutation caused speciation and called it saltation (single step large mutation).

Question ID: 6825912

The treatment of the bacterial cell with divalent cations leads to

(A) Increase in hydrophilic nature of DNA molecule

(B) Decreases efficiency with which DNA enters the bacterium

(C) Change in permeability of cell wall

(D) Increased efficiency with which DNA enters the bacterium

Answer (D)

Sol. Option (D) is the correct answer because DNA is a hydrophilic molecule, it cannot pass through cell membranes. In order to force bacteria to take up the plasmid, the bacterial cells are first made 'competent' to take up DNA. This is done by treating them with a specific concentration of a divalent cations such as calcium, which increases the efficiency with which DNA enters the bacterium through the pores in the cell wall.

Question ID: 6825913

A person complaining of stomach ache, weakness and sustained high fever was recommended Widal test by the doctor. Identify the pathogen responsible for the disease the person is suffering from:

(A) *Streptococcus pneumonia*

(B) Rhino Virus

(C) *Salmonella typhi*

(D) *Plasmodium vivax*

Answer (C)

Sol. Option (C) is the correct answer because typhoid fever is confirmed by Widal Test and typhoid fever is characterised by sustained high fever (39° to 40°C), weakness, stomach pain, constipation, headache and loss of appetite. *Salmonella typhi* is a pathogenic bacterium which causes typhoid fever.

Option (A) is incorrect because *Streptococcus pneumoniae* is the causative agent of the disease, pneumonia.

Option (B) is incorrect because Rhinovirus causes common cold in human beings.

Option (D) is incorrect because *Plasmodium* is a tiny protozoan responsible for malaria.

Question ID: 6825914

If 100 deaths take place in a population of 10,00,000 per year, then the death rate will be

(A) 0.001 per person per year

(B) 0.0001 per person per year

(C) 0.1 per person per year

(D) 1 per person per year

Answer (B)

Sol. The death rate

= (Number of deaths per year / Total population)

$= \frac{100}{10,00,000}$

$= \frac{1}{10000}$

= 0.0001 per person per year

Question ID: 6825915

The genetic variation shown by medicinal plant *Rauwolfia vomitoria* growing in Himalayan ranges, is an example of _____.

(A) Ecosystem Diversity (B) Ecological Diversity

(C) Species Diversity (D) Genetic Diversity

Answer (D)

Sol. The diversity shown by the medicinal plant *Rauwolfia vomitoria* growing in different Himalayan ranges is an example of genetic diversity.

The diversity at the ecosystem level is called ecological diversity.

Species diversity is the diversity at species level within a reason, for example, the Western Ghats have a greater amphibian species diversity than the Eastern Ghats.

Question ID: 6825916

Prime contaminant of lake for eutrophication is

(A) Dissolved oxygen

(B) Algal bloom

(C) Nitrate and phosphate

(D) Fungi and Bacteria

Answer (C)

Sol. Eutrophication is natural ageing of a lake by nutrient enrichment of its water. However, pollutants from man's activities like effluents from industries and homes can radically accelerate the ageing process. This phenomenon is called cultural or accelerated eutrophication.

The prime contaminants that causes such eutrophication are nitrates and phosphates, which act as plant nutrients. They over stimulate the growth of algae farming algal blooms that decreases the dissolved oxygen of water.

Question ID: 6825917

In Verhulst Pearl logistic growth curve equation,

$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$, 'r' refers to:

(A) Population density at time t

(B) Population density at time Zero

(C) Intrinsic rate of natural increase

(D) Carrying capacity

Answer (C)

Sol. Verhulst-Pearl Logistic Growth curve equation is,

$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$,

where

N = Population density at time t

r = Intrinsic rate of natural increase

K = carrying capacity.

Question ID: 6825918

In the life cycle of *Plasmodium*, the gametocytes develop in

(A) WBC of human host

(B) RBC of human host

(C) Gut of mosquito

(D) Saliva of anopheles mosquito

Answer (B)

Sol. Option (B) is the correct answer because sexual stages (gametocytes) of *Plasmodium* develop in red blood cells of human host.

Option (A) is incorrect because malarial parasite affect cells of liver and RBCs, in humans.

Option (C) is incorrect because fertilization and development of gametocytes occur in the mosquito's gut.

Option (D) is incorrect because mature infective stages (sporozoites) occur in the saliva of *Anopheles* mosquito.

Question ID: 6825919

Match List I with List II

List I	List II
A. Chilli	I. Himgiri
B. Cauliflower	II. Pusa sadabahar
C. Brassica	III. Pusa snowball K-1
D. Wheat	IV. Pusa Swarnim

Choose the correct answer form the options given below

(A) A-I, B-III, C-IV, D-II (B) A-II, B-VI, C-I, D-III

(C) A-II, B-III, C-I, D-II (D) A-IV, B-III, C-I, D-II

Answer (C*)

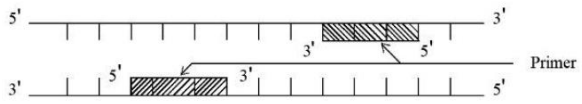
Sol. Disease resistance varieties of following crops are –

Crops	Varieties
Chilli	Pusa Sadabahar
Cauliflower	Pusa Snowball K-1
Brassica	Pusa swarnim
Wheat	Himgiri

None of the option correctly matches the crops with their respective variety. As per **NTA** option C is the answer considering first two crops are matched correctly.

Question ID: 6825920

Identify the step involved in polymerase chain reaction from the given figure below



(A) Primer extension

(B) Denaturation

(C) Extension

(D) Annealing

Answer (D)

Sol. Option (D) is the correct answer because in the figure shown the primers bind to the complementary sequences of DNA and this step is known as annealing.

Options (A) and (C) are incorrect because in the step named primer extension, the DNA polymerase (*Taq polymerase*) extends the primers using the nucleotides provided in the reaction and the genomic DNA as template.

Option (B) is incorrect because in the step named denaturation, the two strands of the DNA double helix are physically separated at a high temperature.

Question ID: 6825921

'Rivet popper' hypothesis was proposed by

(A) Alexander Von Humboldt

(B) Paul Ehrlich

(C) Edward Wilson

(D) Robert May

Answer (B)

Sol. Stanford ecologist Paul Ehrlich proposed the 'Rivet Popper Hypothesis' which is an analogy to understand the importance of species diversity in an ecosystem.

Question ID: 6825922

Which of the following genes control corn borer disease?

(A) amp^R (B) *cry I Ac*

(C) *cry I Ab* (D) *cry II Ab*

Answer (C)

Sol. Option (C) is the correct answer because the proteins encoded by the genes *cry I Ab* control corn borer.

Option (B) and (D) are incorrect because the proteins encoded by the genes *cry I* Ac and *cry II* Ab control the cotton bollworms.

Option (A) is incorrect because amp^R is the ampicillin resistance gene, which is used as selectable marker.

Question ID: 6825923

The rate of decomposition in a particular climatic condition is quicker, if detritus is rich in _____ & _____

(A) Sugars, Phosphorus

(B) Lignin, Phosphorous

(C) Sugars, Nitrogen

(D) Lignin, Chitin

Answer (C)

Sol. The process of decomposition in an ecosystem depends upon various factors like –

a) Availability of oxygen.

b) Chemical composition of detritus, and

c) Climatic factors.

In a particular climatic condition, decomposition rate is slower if detritus is rich in lignin and chitin and quicker, if detritus is rich is Nitrogen and water-soluble substance like sugars.

Question ID: 6825924

Which of the following is a natural method of birth control?

(A) Condoms

(B) Lactational amenorrhea

(C) IUD

(D) Diaphragms

Answer (B)

Sol. Option (B) is the correct answer because lactational amenorrhoea is the method of natural contraception which is based on the fact that the ovulation and therefore the menstrual cycle do not occur during the period of intense lactation following parturition.

Option (A) and (D) are not the answers because condoms and diaphragms are the barrier methods of contraception.

Option (C) is not the answer because IUD stands for Intra Uterine Devices such as CU-T, multiload-375 etc.

Question ID: 6825925

The Graafian follicle ruptures to release the ovum from the ovary by the process called

(A) Ovulation (B) Menstruation

(C) Implantation (D) Copulation

Answer (A)

Sol. Option (A) is the correct answer as, ovulation is defined as the process of release of the secondary oocyte by the ovary due to rupture of Graafian follicles.

Option (B) is not the answer as, the reproductive cycle of the female primates (monkeys, apes and human beings) is called menstrual cycle.

Option (C) is not the answer as, implantation is the attachment of blastocyst into uterine endometrium.

Option (D) is not the answer as, copulation is the act of sexual intercourse.

Question ID: 6825926

Match List I with List II

	List I (Placental mammals)		**List II (Australian Marsupials)**
A	Anteater	I	Tasmanian tiger cat
B	Lemur	II	Tasmanian Wolf
C	Bobcat	III	Spotted cuscus
D	Wolf	IV	Numbat

Choose the correct answer from the options given below:

(A) A-III, B-I, C-II, D-IV (B) A-IV, B-III, C-I, D-II

(C) A-IV, B-I, C-III, D-II (D) A-IV, B-II, C-III, D-I

Answer (B)

Sol. Option (B) is the correct answer as,

Anteater shows convergent evolution with numbat.

Lemur shows convergent evolution with spotted cuscus.

Bobcat shows convergent evolution with Tasmanian tiger cat.

Wolf shows convergent evolution with Tasmanian wolf.

Question ID: 6825927

Select the statement that are correct for GM plants with genetic modifications.

A. Made crops tolerant to abiotic stresses

B. Increased the reliance on chemical pesticides

C. Helped to reduce post-harvest losses

D. Decrease efficiency of mineral usage by plants

E. Enhanced nutritional value of food

Choose the correct answer from the options given below

(A) C and E only

(B) B and C only

(C) A, C and E only

(D) C, D and E only

Answer (C)

Sol. Option (C) is the correct answer as,

Genetic modification has

- Made crops more tolerant to abiotic stresses.
- Reduced reliance of chemical pesticides.
- Helped to reduce post-harvest losses.
- Increased efficiency of mineral usage by plants
- Enhanced nutritional value of food.

Question ID: 6825928

Father's blood group is A and mother's blood group is B. One of their offspring is with group AB. What is the percentage of probability of AB blood group offspring?

(A) NIL

(B) 25%

(C) 50%

(D) 75%

Answer (B,C)

Sol. Father's blood group is A and mother's blood group is B. There are 4 combinations of genotype possible–

$I^AI^A \times I^BI^B$ (♂ ♀), $I^Ai \times I^BI^B$ (♂ ♀), $I^AI^A \times I^Bi$ (♂ ♀) and $I^Ai \times I^Bi$ (♂ ♀)

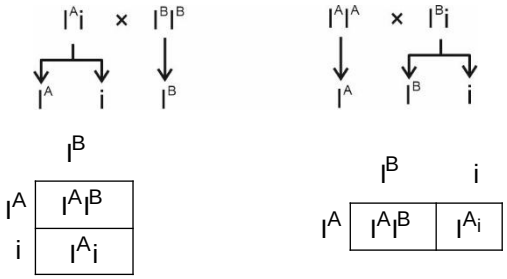
In first combination,

$$I^AI^A \times I^BI^B \downarrow I^AI^B$$

(AB)

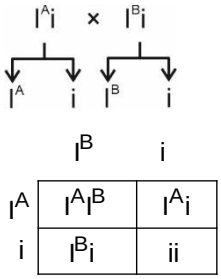
All offsprings will be of AB blood group, hence, it can be ruled out as question says one of the offsprings is of AB blood group.

In second and third combinations,



In both of them, 50% of the offsprings have AB blood group.

In fourth combination,



Here, only 25% of the progeny have AB blood group.

Hence, options (B) and (C) both are correct.

Question ID: 6825929

The embryo with 8 to 16 blastomeres is called _____

(A) Morula (B) Blastula

(C) Zygote (D) Foetus

Answer (A)

Sol. Option (A) is the correct answer as, the embryo with 8 to 16 blastomeres is called morula.

Option (B) is not the answer as blastula is the hollow sphere of blastomeres, produced due to repeated cleavage.

Option (C) is not the answer as zygote is single celled structure formed due to fusion of male and female gametes.

Option (D) is not the answer as foetus is the unborn offspring.

Question ID: 6825930

The species that invades a bare area is called _____

(A) Seral stage

(B) Allien species

(C) Endemic species

(D) Pioneer species

Answer (D)

Sol. During ecological succession, the species that invade a bare area is called pioneer species.

In case of xerarch succession, lichens are usually pioneer species.

In case of hydrach succession, phytoplanktons are pioneer species.

Question ID: 6825931

Mr. X wants to start Bee-keeping. Important points for successful bee-keeping are _____

A. Selection of suitable location for keeping beehives

B. Beehives can be kept in fruit orchards

C. Catching and hiving of swarms

D. Management of beehives during rainy season

E. Regular visit by veterinary doctor is mandatory

Choose the correct answer from the options given below:

(A) A, B, C and E (B) A, B and C

(C) A, B, D and E (D) A, C, D and E

Answer (B)

Sol. Option (B) is the correct answer because regular visits by veterinary doctor is not mandatory for bee-keeping.

Successful bee-keeping requirements are as follows:

(i) Knowledge of the nature and habits of bees,

(ii) Selection of suitable location for keeping the beehives

(iii) Catching and hiving of swarms

(iv) Management of beehives during different seasons, and

(v) Handling and collection of honey and of beeswax.

Question ID: 6825932

Given below are two statements; one is labelled as assertion A and other is labelled as Reason R

Assertion A: In gel-electrophoresis, DNA fragments are separated.

Reason R: DNA is negatively charged, so it moves towards the cathode under the influence of electric field.

In the light of the above sentences, choose the correct answer from the options given below

(A) Both A and R are true and R is the correct explanation of A

(B) Both A and R are true and R is not the correct explanation of A

(C) A is true but R is false

(D) A is false but R is true

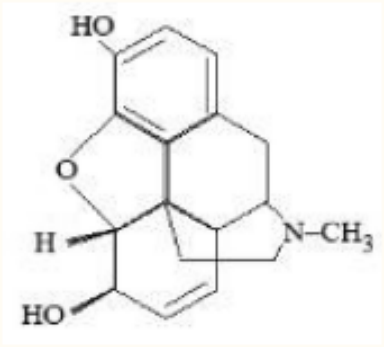
Answer (C)

Sol. Option (C) is the correct answer because DNA is a negatively charged molecule, hence it moves towards the positive electrode (anode).

The cutting of DNA by restriction endonucleases results in the fragments of DNA. These fragments can be separated by a technique known as gel electrophoresis.

Question ID: 6825933

Identify the drug shown below in the diagram



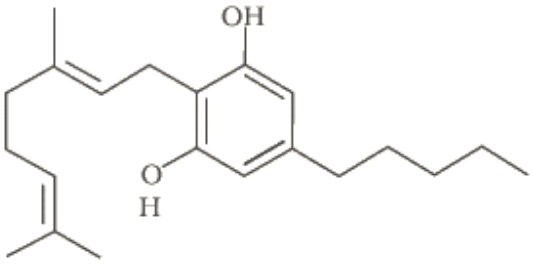
(A) Cocaine (B) Heroin

(C) Cannabinoid (D) Morphine

Answer (D)

Sol. Option (D) is the correct answer because the given structure is of morphine.

The skeletal structure of cannabinoid molecule is



Question ID: 6825934

Which of the following does not show ecological diversity?

(A) Coral reef (B) Alpine meadows

(C) Wetlands (D) *Rauwolfia vomitoria*

Answer (D)

Sol. *Rauwolfia vomitoria* shows genetic diversity having different concentration and potency of reserpine.

While coral reef, alpine meadows, deserts, wetlands, mangrove etc., are examples of ecological diversity.

Question ID: 6825935

Match List I with List II

	List I		List II
A	Phenylketonuria	I	Sex linked recessive disease
B	Down's syndrome	II	Autosomal Recessive disease
C	Turner's syndrome	III	Trisomy of chromosome number 21
D	Haemophilia	IV	Monosomy of X chromosome

Choose the correct answer from the options given below:

(A) A-I, B-III, C-IV, D-II (B) A-II, B-III, C-IV, D-I

(C) A-II, B-IV, C-III, D-I (D) A-III, B-II, C-IV, D-I

Answer (B)

Sol. Phenylketonuria is an autosomal recessive disorder.

Down's syndrome is trisomy of chromosome number 21.

Turner's syndrome is monosomy of X-chromosome.

Haemophilia is sex-linked recessive disorder.

Question ID: 6825936

The first restriction endonuclease isolated was

(A) *Eco* RI

(B) pBR 322

(C) *Hind* II

(D) Bam HI

Answer (C)

Sol. Option (C) is the correct answer because the first restriction endonuclease which was isolated was *Hind* II and it was characterised five years later.

Bam HI and *Eco* RI were isolated later.

Option (B) is incorrect because it is a plasmid and not a restriction endonuclease.

Question ID: 6825937

Which of the following are true, caused due to Inbreeding depression?

A. Reduces fertility and productivity

B. Helps in accumulation of inferior genes

C. Helps to evolve a hybrid in any animal

D. Increases productivity inbreed population

E. Retention of less desirable genes

Choose the correct answer from the options given below

(A) B and C only (B) A and D only

(C) C and E only (D) B and E only

Answer (B)

Sol. Option (B) is the correct answer because inbreeding depression usually reduces fertility and productivity.

Inbreeding helps in accumulation of superior genes and elimination of less desirable genes, and this approach, where there is selection at each step, increases the productivity of inbred population.

Question ID: 6825938

Which of the following microbe is used in production of antibiotics?

A. *Penicillium notatum*

B. *Streptomyces griseus*

C. *Aspergillus niger*

D. *Clostridium butylicium*

E. *Saccharomyces cerevisiae*

Choose the correct answer from the options given below

(A) A and B only (B) C and D only

(C) B and E only (D) C and E only

Answer (A)

Sol. Antibiotics are chemical substances which are produced by some microbes and kill or retard the growth of other (disease-causing) microbes.

Penicillium notatum produces penicillin.

Streptomyces griseus produces streptomycin.

Aspergillus niger produces citric acid (an organic acid).

Clostridium butylicum produces butyric acid (an organic acid).

Saccharomyces cerevisae is used in bakery and brewery industries.

Question ID: 6825939

Select the correct statements from the following

A. The presence of Thymine at the place of Uracil gives more stability to DNA

B. Both nucleic acids, i.e., DNA and RNA mutate

C. DNA is dependent on RNA for synthesis of proteins

D. RNA mutate at slower rate than DNA

E. DNA is better genetic material

Choose the correct answer from the options given below

(A) A and D only (B) A and B only

(C) A, B, C and D only (D) A, B, C and E only

Answer (D)

Sol. DNA being more stable is preferred as genetic material, as

(i) Presence of thymine (5-methyl uracil) at the place of uracil confers additional stability to DNA.

(ii) RNA being unstable, mutates at a faster rate than DNA.

RNA can directly code for the synthesis of proteins, hence can easily express the characters. DNA, however, is dependent on RNA for synthesis of proteins.

Question ID: 6825940

Mr. X had purchased a fruit juice bottle from the market and is puzzled to see that is completely clear. It is due to

(A) Lipase and Pectinase

(B) Amylase and Polymerase

(C) Pectinase and Protease

(D) Protease and Ligase

Answer (C)

Sol. The enzymes pectinases and proteases help in clarifying fruit juices making them clearer as compared to those made at home. Lipases are used in detergent formulations and are helpful in removing oily stains from laundry. Amylase degrades starch.

Polymerases catalyse the polymerisation of the monomers of a polymer.

Example: DNA Polymerase.

Ligase joins the broken fragments of a polymer such as DNA ligase.

Question ID: 6825941

Match List I with List II

List I	List II
A. Wind pollution	I. Bees
B. Water pollination	II. Grass
C. Major insect pollinator	III. *Zostera*
D. Tallest flower	IV. *Amarphophallus*

Choose the correct answer form the options given below:

(A) A-I, B-III, C-II, D-IV (B) A-I, B-III, C-IV, D-II

(C) A-II, B-I, C-III, D-IV (D) A-II, B-III, C-I, D-IV

Answer (D)

Sol. Wind pollination is quite common in grasses. Marine seagrass *Zostera* is a water-pollinated plant.

Among the animals, insects, particularly bees are dominant biotic pollinating agents.

The tallest flower *Amorphophallus* is about 6 feet in height.

Question ID: 6825942

Yucca plant shows _____

(A) Flower with non-sticky pollen grains

(B) Water pollination

(C) Large feather stigma

(D) Moth is partner to complete life cycle

Answer (D)

Sol. In some plants, floral rewards are given as providing safe places to lay eggs. Such a relationship exists between a species of moth and the plant *Yucca* where both species-moth and the plant cannot complete their life cycles without each other.

The flowers which are insect-pollinated have sticky pollen grains.

Wind-pollinated flowers often have large feathery stigma to easily trap air-borne pollen grains.

Question ID: 6825943

_____ is aquatic plant showing insect pollination

(A) *Hydrilla*

(B) *Vallisneria*

(C) *Zostera*

(D) Water hyacinth

Answer (D)

Sol. Some examples of water-pollinated plants are *Vallisneria* and *Hydrilla* which grow in fresh water and several marine sea-grasses like *Zostera*. Not all aquatic plants use water for pollination. In a majority of aquatic plants like water hyacinth and water lily, the flowers emerge above the water level and are pollinated by insects or wind as in most of the land plants.

Question ID: 6825944

Which of the following is NOT a feature of insect pollinated plant?

(A) Light and non sticky pollen grains

(B) Flowers are large and colourful

(C) Presence of nectar

(D) Flower with fragrance

Answer (A)

Sol. Wind pollination requires light weight and non-sticky pollen-grains so that they can be transported in wind currents.

Majority of insect pollinated flowers are large, colourful, fragrant and rich in nectar.

Question ID: 6825945

Grasses show pollination by

(A) Water

(B) Insect

(C) Wind

(D) Animals

Answer (C)

Sol. Wind pollination is quite common in grasses. Water pollination is seen in plants like *Vallisneria* and *Hydrilla* which grow in fresh water and several marine seagrasses like *Zostera*.

Yucca and *Amorphophallus* are insect-pollinated plants.

PASSAGE

Read the sentence and answer the questions.

The process of replication requires a set of catalyst (enzymes). The main enzyme is referred to as DNA dependent DNA Polymerase. *E.coli* that has only 4.6×10^6 bp (compare it with human whose diploid content is 6.6×10^6 bp), completes the process of replication within 18 minutes, that means the average rate of polymerisation has to be approximately 2000 bp per second these polymerase also have catalyse the reaction with high degree of accuracy. Deoxyribonucleoside triphosphates serve dual purposes. In addition to DNA dependent DNA polymerases, many additional enzymes are required to complete the process of replication with high degree of accuracy. For long DNA molecules, since the two strands of DNA cannot be separated in its entire length (due to very high energy requirement), the replication occur with in a small opening of the DNA helix, referred to as replication fork. The DNA-dependent DNA polymerase catalyse polymerisation only in one direction, that 5′-3′. This creates some additional complications at the replicating fork. Consequently, on one strand (the template with polarity 3′ $\rightarrow$ 5′) the replication is continuous, which on the others (the template with polarity 5′ $\rightarrow$ 3′), it is the discontinuous. The non-continuously synthesized fragments are later joined by the enzyme DNA ligase.

Question ID: 6825946

The DNA dependent-DNA polymerase catalyse polymerisation in one direction only that is _____

(A) 5′-3′ of DNA (B) 3′-5′ of DNA

(C) 5′-3′ of RNA (D) 3′-5′ of RNA

Answer (A)

Sol. The DNA dependent DNA polymerase catalyse polymerisation only in one direction that is 5′ $\rightarrow$ 3′ of DNA.

Question ID: 6825947

In human beings DNA polymerase complete the process of replication in _____

(A) 25 Minutes (B) 16 Minutes

(C) 12 Minutes (D) 18 Minutes

Answer (D*)

Sol. The main enzyme of DNA replication is referred to as DNA dependent DNA polymerase which completes the process of replication within 18 minutes.

Question ID: 6825948

The number of nucleotides in *E. coli* is _____

(A) 1.2×10^6 bp (B) 2.3×10^6 bp

(C) 4.6×10^6 bp (D) 6.6×10^6 bp

Answer (C)

Sol. The length of DNA is usually defined as number of nucleotides or base pairs present in it.

The number of nucleotide in *E.coli* is 4.6×10^6 bp.

Question ID: 6825949

In *E. coli* the main enzyme required to catalyze the polymerisation of deoxynucleotide is _____

(A) DNA-Dependent DNA Polymerase

(B) DNA-Dependent RNA Polymerase

(C) RNA-Dependent DNA Polymerase

(D) RNA-Dependent DNA Polymerase

Answer (A)

Sol. The main enzyme for polymerisation of DNA is referred to as DNA dependent DNA polymerases, since it uses a DNA template to catalyse the polymerisation of deoxyribonucleotides.

Question ID: 6825950

Which of the following statements are correct?

A. DNA dependent DNA polymerase is a slow catalyst

B. Deoxyribonucleoside triphosphate provide energy for polymerisation

C. Replication fork is a small opening of the DNA helix

D. The replication is discontinuous on DNA template with polarity 3′-5′

E. The replication is continuous on DNA template with polarity 3′-5′

Choose the correct answer form the options given below;

(A) A and B only

(B) B and C only

(C) A and D only

(D) C and E only

Answer (B*)

Sol.

- Average rate of polymerisation of The enzyme DNA dependent DNA polymerase is approximately 2000 bp per second with high degree of accuracy. Hence it is a fast catalyst.
- Deoxyribonucleoside triphosphates provide energy for polymerisation because its two terminal phosphates are high energy phosphate same as in case of ATP.
- Replication occurs with a small opening of the DNA helix, referred to as replication fork.
- The replication is continuous on the template strand with polarity 3′→5′ while on the other strand replication is discontinuous with polarity 5′→3′.
- As per NTA option (B) is correct however as per NCERT, statements (B), (C) and (E) are correct but none of the option includes all three statements that are (B), (C) and (E).

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