

CUET (UG) Exam Paper 2023

National Testing Agency

Held on 25th May 2023

BIOLOGY

Solved

(This includes Questions pertaining to Domain Specific Subject only)

Max. Marks: 200

Time allowed: 45 Minutes

General Instructions:

1. The test is of 45 Minutes duration.
2. The test contains 50 questions out of which 40 questions needs 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 100 mark (0).

1. Select the organism which does not undergoes parthenogenesis.

- (1) Honeybee (2) Rotifer
(3) Turkey (4) Fruit fly

Ans. Option (4) is correct.

Explanation: Parthenogenesis is development of an egg into a complete individual without fertilisation. It occurs commonly among lower plants and invertebrate animals (particularly rotifers, aphids, ants, wasps, and bees) and rarely among higher vertebrates.

2. The method of producing thousands of plants through tissue culture is called as:

- (1) Somaclones
(2) Micro-propagation
(3) Somatic hybridisation
(4) Vegetative propagation

Ans. Option (2) is correct

Explanation : Micro propagation, also known as plant tissue culture, is the technique used for rapid vegetative multiplication of plants by using explants (living tissue or cells of a plant). Through this process, a large number of plants can be produced in a short span of time.

3. Which of the following statements are correct regarding decomposition?

- A. Decomposition is largely oxygen-requiring process.
B. The rate of decomposition is controlled by chemical composition of detritus and climatic factors.

- C. Dry and cold environment favour the decomposition.

- D. If detritus is rich in lignin and chitin, the decomposition rate is faster.

Choose the correct answer from the options given below:

- (1) A and B only
(2) C and D only
(3) B and C only
(4) A and D only

Ans. Option (1) is correct

Explanation : Decomposition is the process in which complex organic matter breaks down into inorganic substances like carbon dioxide, water and nutrients. It is largely an oxygen requiring process. The rate of decomposition is controlled by the chemical composition of detritus and climatic factors. It is slower if detritus is rich in lignin and chitin and quicker if detritus is rich in nitrogen and water soluble substances like sugars.

4. Identify the organism which is a source of single cell protein and is grown on commercial scale.

- (1) *Azotobacter* (2) *Rhizobium*
(3) *Azospirillum* (4) *Spirulina*

Ans. Option (4) is correct

Explanation : Microbes like *Spirulina* can be grown easily on material like waste material. They are being grown on an industrial scale as a source of good protein. It is used as a single celled protein.

5. Match List I with List II

LIST I		LIST II	
A	Wheat	I	Perisperm
B	Black pepper	II	Polyembryony
C	Cashew	III	Albuminous seed
D	Citrus	IV	False fruits

Choose the correct answer from the options given below:

- (1) A-III, B-II, C-I, D-IV
- (2) A-II, B-I, C-III, D-IV
- (3) A-III, B-I, C-IV, D-II
- (4) A-I, B-II, C-IV, D-III

Ans. Option (3) is correct

Explanation : Wheat is an albuminous seed, which have endosperm with persistent stores of nutrients. Perispermic seeds are seen in black pepper and beetroot. False fruits are seen in apple, strawberry and cashew nut whereas polyembryony is seen in Citrus and Mango.

6. Arrange the following events in correct sequence.

- A. Formation of zygote
- B. Formation of blastocyst
- C. Implantation
- D. Formation of morula

Choose the correct answer from the options given below:

- (1) A, D, B, E
- (2) A, B, D, C
- (3) A, B, C, D
- (4) C, D, B, A

Ans. Option (1) is correct

Explanation : During fertilisation, the sperm and egg unite in one of the fallopian tubes to form a zygote. Then the zygote travels down the fallopian tube, where it becomes a morula. Once it reaches the uterus, the morula becomes a blastocyst. The blastocyst then burrows into the uterine lining by a process called implantation. Hence, the correct sequence of events is: Formation of zygote → Formation of Morula → Formation of blastocyst → Implantation.

7. Which of the following is used to make the bacterial cell as 'Competent cell' to take up DNA?

- (1) Carbonate ion
- (2) Calcium ion
- (3) Sodium ion
- (4) Sulphate ion

Ans. Option (2) is correct

Explanation : In order to make the bacterial cells competent, they are first treated with a specific concentration of a divalent cation, such as calcium. It increases the efficiency with which DNA enters the bacterium through pores in its cell wall.

8. Identify the equation representing logistic growth of a population.

$$(1) \frac{dN}{dt} = rN \left(\frac{K-N}{K} \right) \quad (2) \frac{dN}{dt} = rN$$

$$(3) \frac{dN}{dt} = N \left(\frac{N-K}{K} \right) \quad (4) \frac{dt}{dN} = rN$$

Ans. Option (1) is correct

Explanation : The logistic growth curve, which is J-shaped, shows population growth when resources are limited. Carrying capacity is the maximum size of the population of a species that a certain environment can support for an extended period of time. The logistic growth equation can be given as $\frac{dN}{dt} = rN \left(\frac{K-N}{K} \right)$. Here, r = the intrinsic rate of growth, N = the number of organisms in a population, and K = the carrying capacity.

9. Early Greek thinkers thought that units of life called spores were transferred to different planets including earth. Identify the term associated with the above.

- (1) Abiogenesis
- (2) Panspermia
- (3) Spontaneous generation
- (4) Biogenesis

Ans. Option (2) is correct

Explanation : According to early Greek thinkers, units of life were called panspermia. They assumed that these panspermias were transferred to different planets including earth, which resulted in life.

10. In gel electrophoresis the separated DNA fragments can be visualised :

- (1) In visible light
- (2) In visible light with staining
- (3) In UV radiation without staining
- (4) In UV radiation after staining with ethidium bromide

Ans. Option (4) is correct

Explanation : Agarose gel electrophoresis is used to segregate DNA fragments according to the mass and size. The separated DNA fragments can be visualised only after staining the DNA with a compound known as ethidium bromide followed by exposure to UV radiation. We cannot see pure DNA fragments in the visible light and without staining.

11. Match List I with List II

LIST I		LIST II	
A.	Tubectomy	I.	Barrier method
B.	Copper ions	II.	Surgical method of sterilisation in human male.

C.	Cervical cap	III.	Surgical method of sterilisation in human female.
D.	Vasectomy	IV.	Suppress motility of sperms

Choose the correct answer from the options given below:

- (1) A-III, B-IV, C-I, D-II
- (2) A-III, B-I, C-IV, D-II
- (3) A-II, B-I, C-IV, D-III
- (4) A-IV, B-II, C-III, D-I

Ans. Option (1) is correct

Explanation : Tubectomy is the sterilisation procedure in females. In this, a small part of the fallopian tube is removed or tied up through a small incision in the abdomen or through vagina. Copper releasing IUDs, namely Cu-T, Cu-7 release copper that suppress the sperm motility which in turn reduces its fertilising capacity. Cervical cap is a barrier method of contraception which prevents conception by blocking the entry of sperms through the cervix.

Vasectomy is the sterilisation procedure in males. In this, a small part of the vas deferens is removed or tied up through a small incision on the scrotum.

12. Mammals are able to survive in Antarctica or in the Sahara desert as they are

- (1) Conformers
- (2) Partial regulators
- (3) Regulators
- (4) Migrants

Ans. Option (3) is correct

Explanation : Mammals are able to survive in Antarctica or in Sahara desert as they are regulators. Evolutionary biologists believe that the success of mammals is largely due to their ability to maintain a constant body temperature and thrive whether they live in Antarctica or in the Sahara desert.

13. Match List I with List II

LIST I		LIST II	
A.	Down's syndrome	I.	44 + XXY
B.	Thalassemia	II.	Autosomal recessive trait
C.	Klinefelter's syndrome	III.	44 + XO
D.	Turner's Syndrome	IV.	45 + XY/ XX

Choose the correct answer from the options given below:

- (1) A-IV, B-II, C-III, D-I
- (2) A-IV, B-II, C-I, D-III
- (3) A-I, B-III, C-IV, D-II
- (4) A-II, B-IV, C-III, D-I

Ans. Option (2) is correct

Explanation : Down's syndrome is a genetic disorder which arises due to the presence of an extra chromosome number 21 in every cell of the body. So, 47 chromosomes are present instead of the normal number 46. Thalassemia is an inherited autosomal

recessive disease resulting from mutations in the α - and β -globin gene clusters on chromosome 16 and chromosome 11, respectively. Klinefelter's syndrome (sometimes called XXY) is where boys and men are born with an extra X chromosome. Turner's syndrome, a condition that affects only females, results when one of the X chromosomes (sex chromosomes) is missing or partially missing.

14. Match List I with List II

LIST I (Drugs)		LIST II (Obtained from)	
A.	Heroin	I.	Tobacco plant
B.	Cannabinoids	II.	<i>Erythroxivium coca</i>
C.	Cocaine	III.	<i>Cannabis sativa</i>
D.	Nicotine	IV.	<i>Papaver somniferum</i>

Choose the correct answer from the options given below:

- (1) A-I, B-II, C-III, D-IV
- (2) A-II, B-I, C-III, D-IV
- (3) A-I, B-II, C-IV, D-III
- (4) A-IV, B-III, C-II, D-I

Ans. Option (4) is correct

Explanation : Heroin is an opium derivative. Opium is obtained from dried latex of unripe capsules of Poppy plant (*Papavar somniferum*). Natural cannabinoids are obtained from *Cannabis sativa* (Hemp plant). Cocaine is obtained from *coca plant, Erythroxylum coca*.

15. Methanogens do not produce :

- (1) Carbon dioxide and methane
- (2) Methane and Hydrogen
- (3) Hydrogen and Carbon dioxide
- (4) Nitrogen and Oxygen

Ans. Option (4) is correct

Explanation : Methanogens are the microorganisms that produce methane, hydrogen sulphide and carbon dioxide in their metabolic reactions.

16. The correct sequence of steps involved in polymerase chain reaction (PCR) are:

- A. DNA polymerase is used to extend the primers using oligonucleotides.
- B. Desired DNA fragments are denatured.
- C. Amplified fragments are ligated with the vector for cloning.
- D. Oligonucleotides are added

Choose the correct answer from the options given below:

- (1) C, A, B, D
- (2) A, C, B, D
- (3) A, D, B, C
- (4) B, D, A, C

Ans. Option (4) is correct

Explanation : Each cycle has three steps: Denaturation, primer annealing and extension of primers.

Denaturation: The double stranded DNA molecules are heated to a high temperature (94°C) so that the two strands separate into a single stranded DNA molecule. This process is called denaturation. Each strand acts as template for DNA synthesis.

Annealing: In this step, the two oligonucleotide primers anneal (hybridize) to each of the single stranded DNA template, since, the sequence of the primers is complementary to the 3' ends of the template DNA. This step is carried out at a lower temperature depending on the length and sequence of the primers. This results in the duplication of the original DNA molecule.

Extension of primers: DNA polymerase (Taq polymerase) extends the primers using the nucleotides provided in the reaction. The optimum temperature for this polymerization step is 72°C . This process is repeated over several cycles to obtain multiple copies of rDNA fragment.

17. Select the correct statement/s from the following:
- Spermatogonia always undergo meiotic cell division.
 - Primary spermatocytes divide by mitotic cell division.
 - Secondary spermatocytes have 23 chromosomes and undergo second meiotic division.
 - Spermatozoa are transformed into spermatids.

Choose the correct answer from the options given below:

- (1) A and C only (2) C only
(3) D only (4) B and C only

Ans. Option (2) is correct

Explanation : Statement C is correct. Spermatogonia are diploid cells on the inside wall of seminiferous tubules that multiply by mitotic divisions. Some of the spermatogonia called primary spermatocyte undergo meiosis-I to give rise to secondary spermatocytes, which are haploid. Each secondary spermatocyte undergoes meiosis-II to give rise to two haploid spermatids which are transferred to spermatozoa by spermiogenesis.

18. Which of the following metal can not be recovered from manual recycling process of e-wastes ?
- (1) Gold (2) Mercury
(3) Copper (4) Nickel

Ans. Option (2) is correct

Explanation : E wastes are electronic wastes that generally include electronic goods such as computers etc. Such wastes are rich in metals such copper, iron, silicon, gold etc. These metals are highly toxic and pose serious health hazards. Recycling is the only solution for the treatment of e-waste, provided it is carried out in an environment friendly manner.

However toxicant such as asbestos, lead, mercury etc. cannot be recovered from manual recycling process of e-wastes.

19. Bt toxin produced by *Bacillus thuringiensis* is resistant to :
- (1) Drought (2) Insects
(3) Nematodes (4) Viruses

Ans. Option (2) is correct

Explanation : Some strains of *Bacillus thuringiensis* have proteins that kill insects like coleopterans (beetles), lepidopterans (tobacco budworm, armyworm) and dipterans (flies, mosquitoes etc). *Bacillus thuringiensis* forms protein crystals during a particular phase of their growth. These crystals contain a toxic insecticidal protein. These proteins are present in inactive protoxin form, but become active toxin in the alkaline pH of insect gut. The activated toxin binds to the surface of midgut epithelial cells and creates pores that cause cell swelling and lysis and eventually cause death of the insect.

20. In some organisms, male has ZZ chromosomes and female has ZW chromosomes. This type of sex-determination is found in :
- (1) *Drosophila* (2) Hen
(3) Cockroach (4) Snail

Ans. Option (2) is correct

Explanation : Sex determination in birds and some reptiles is of ZW-ZZ types in which females are heteromorphic (ZW) and males have homomorphic sex chromosomes (ZZ).

21. The organisation set up by the Indian Government to take decisions regarding the validity of GM research and the safety of introducing GM-organism is:
- (1) Genetic Engineering Approval Committee (GEAC)
(2) Genetic Modification Approval Committee (GMAC)
(3) Indian Council of Agricultural Research (ICAR)
(4) All India Institute of Medical Sciences (AIIMS)

Ans. Option (1) is correct

Explanation : Indian Government has set up organisations like GEAC (Genetic Engineering Approval Committee), which make decisions about the validity of GM research and the safety of GM-organisms for public services.

22. Which of the following is a hormone releasing IUD?
- (1) Multiload 375
(2) LNG-20
(3) Cervical Cap
(4) Vault

Ans. Option (2) is correct

Explanation : LNG 20 is a hormone releasing IUDs, which makes the uterus unsuitable for implantation and the cervix hostile to the sperms.

23. The puffed up appearance of dough is due to the production of:

- (1) Oxygen gas (2) CO₂ gas
(3) Ethyl alcohol (4) Pyruvic acid

Ans. Option (2) is correct

Explanation : The dough, which is used for making bread, is fermented by using baker's yeast (*Saccharomyces cerevisiae*). The puffed up appearance of dough is due to the production of CO₂ gas.

24. Select the statements which do not hold true for Cancer :

- A. Cancerous cells show a property of contact inhibition.
B. Metastasis is the most feared property of malignant tumors.
C. Malignant tumor cells invade and damage the surrounding tissue.
D. Malignant tumor cells grows slowly.

Choose the correct answer from the options given below:

- (1) A and B only (2) B and C only
(3) A and D only (4) B and D only

Ans. Option (3) is correct

Explanation : Cancer is an abnormal and uncontrolled multiplication of cells resulting in the formation of tumor. Cancerous cells appear to have lost the property of contact inhibition. They just continue to divide giving rise to masses of cell called tumors. Tumors are of two types: Benign tumors: They remain confined to the place of its origin. Hence, they cause little damage while malignant tumors are the mass of proliferating cells called neoplastic or tumor cells. These cells grow very rapidly and invade and damage surrounding tissues.

25. $(p+q)^2 = p^2 + 2pq+q^2 =1$ represents Hardy Weinberg equation. It is used in:

- (1) Population genetics
(2) Mendelian genetics
(3) Biometrics
(4) Molecular genetics

Ans. Option (1) is correct

Explanation : Hardy-Weinberg law is an algebraic equation that describes the genetic equilibrium within a population. It states that in a large, random-mating population, the gene pool (total genes and their alleles in a population) tends to remain constant from generation to generation unless outside forces act to change it. In such a way even the rarest forms of genes, which one would assume would disappear, are preserved.

26. Mature mRNA is a fully processed

- (1) hnRNA (2) snRNA
(3) 28S RNA (4) 5srRNA

Ans. Option (1) is correct

Explanation : Mature mRNA is the completely processed mRNA molecule in the cell of eukaryotes. The mRNA is a type of RNA involved in protein synthesis. It is synthesized based on a DNA template on the nucleus.

27. Which forest also known as the 'lungs of the planet earth' ?

- (1) Amazon rain forest
(2) Rain forest of north-east India
(3) Tiaga forest
(4) Tundra forest

Ans. Option (1) is correct

Explanation : The Tropical rainforest of Amazon is known as the lungs of the planet earth' because they are responsible for the production of about 20% of the earth's oxygen. They remove a large amount of carbon dioxide from the air and give out oxygen.

28. Inbreeding is carried out in animal husbandry because it:

- (1) Increase hybrid vigour
(2) Improves the breed
(3) Increase heterozygosity
(4) Increase homozygosity

Ans. Option (4) is correct

Explanation : Inbreeding is the mating of more closely related individuals within the same breed for 4-6 generations. It is carried out in animal husbandry because it increases homozygosity to evolve a pure line animal.

29. Which is known as 'Terror of Bengal'.?

- (1) Water Lilly (2) *Hydrilla*
(3) Water hyacinth (4) *Lantana*

Ans. Option (3) is correct

Explanation : Water hyacinth is known as the terror of Bengal. It is an exotic shrub which is growing at an alarming rate on the surface of water body. It inhibits the growth of fish and other aquatic organisms due to cut down of light and lack of oxygen. It is also an example of loss of biodiversity due to alien species invasion. It is also competing with the other native species and has also eliminated many.

30. Threatened animals and plants are taken out from their natural habitat and placed in special settings, protected and given special care is.

- (1) *In situ* conservation
(2) *Ex situ* conservation
(3) Conservation in national park
(4) Conservation in biospheres

Ans. Option (2) is correct

Explanation : *Ex situ* conservation (off site) is the method of conservation in which threatened species of plants and animals are taken out of their habitats and are kept in special settings such as genetic resource centres, zoological parks, botanical gardens, gene banks.

31. Match List I with List II

LIST I		LIST II	
A.	Dominant trait of pod colour in garden pea.	I.	Polygenic traits
B.	The physical association of two genes on a chromosome.	II.	Pleiotropy
C.	The traits generally controlled by three or more genes.	III.	Yellow
D.	When a single gene exhibit multiple phenotypic expression.	IV.	Linkage
		V.	Green

Choose the correct answer from the options given below

- (1) A-III, B-II, C-I, D-V
- (2) A-II, B-III, C-V, D-I
- (3) A-III, B-II, C-I, D-IV
- (4) A-V, B-IV, C-I, D-II

Ans. Option (4) is correct

Explanation : Green pod colour was dominant to yellow in garden pea. Linkage is defined as the co-existence of two or more genes in the same chromosome. If the genes are situated on the same chromosome and lie close to each other, then they are inherited together and are said to be linked genes.

Pleiotropy is the ability of a gene to have multiple phenotypic effects as it influences a number of characters simultaneously.

Polygenic inheritance occurs when one characteristic is controlled by two or more genes. Inheritance of skin pigmentation is an example of polygenic inheritance.

32. Sequence the following steps in formation of female gametophyte of flowering plants

- A. Cell walls are laid down.
- B. Formation of seven cells with eight nuclei.
- C. Meiosis in megaspore mother cell and formation of megaspore tetrad.
- D. Functional megaspore undergoes three mitotic divisions, results in formation of eight nuclei.

Choose the correct answer from the options given below:

- (1) A, D, C, B
- (2) A, C, B, D
- (3) C, D, A, B
- (4) C, A, B, D

Ans. Option (3) is correct

Explanation : The megaspore mother cell (MMC) undergoes meiotic division to produce four megaspores. In a majority of flowering plants, only one megaspore is functional while the other three degenerate. The single functional megaspore develops into the female gametophyte.

33. In which process unusual nucleotide (methyl guanosine triphosphate) is added to the 5' end of hnRNA.

- (1) Splicing
- (2) Capping
- (3) Tailing
- (4) Transcription factor

Ans. Option (2) is correct

Explanation : Capping is the process in which an unusual nucleotide called methyl guanosinetriphosphate (cap) is added to the 5' end of hnRNA.

Tailing (Polyadenylation) is the process in which adenylate residues (200-300) are added at 3' end of hnRNA in a template independent manner.

Splicing is a biological process where a newly synthesized pre-mRNA is transformed into a mature mRNA. It involves the removal of non-coding sequences known as introns and then, joining the coding regions known as exons.

Transcription factors are proteins involved in the process of converting, or transcribing, DNA into RNA.

34. Select the incorrect statements given below.

- A. Methane and Carbon dioxide are green house gases.
- B. The Montreal Protocol is associated with the control of emission of ozone depleting substances.
- C. Use of incinerators is not crucial to dispose off hospital wastes.
- D. Dobson units is used to measure water quality.

Choose the correct answer from the options given below:

- (1) A and B
- (2) C and D
- (3) A and C
- (4) B and D

Ans. Option (2) is correct

Explanation : The thickness of the ozone (O₃) in a column of air from the ground to the top of the atmosphere is measured in terms of Dobson units (DU). Hospital wastes contain disinfectants and other harmful chemicals, and also pathogenic micro-organisms. The incinerators are used to dispose hospital wastes.

35. Biofertilisers are the organisms that enrich the nutrient quality of the soil. Which of the following is not a source of biofertiliser?

- (1) Bacteria
- (2) Fungi
- (3) Baculoviruses
- (4) Cyanobacteria

Ans. Option (3) is correct

Explanation : Biofertilisers are living organisms, which help increase the fertility of soil. It involves the selection of beneficial microorganisms like Bacteria, fungi, cyanobacteria etc. Baculoviruses are suitable for species-specific, narrow spectrum insecticidal applications. This is desirable in IPM (Integrated pest management) program to conserve beneficial insects.

36. Match List I with List II

LIST I		LIST II	
A.	The primates with brain capacity of around 900 cc.	I	Neanderthal man
B.	The primates with brain capacity of 1400 cc and lived in east and central Asia	II	<i>Homo erectus</i>
C.	The primates which arose in Africa and moved across continents and developed into distinct races	III	<i>Homo sapiens</i>
D.	The primates with the brain capacities between 650-800 cc and probably did not eat meat.	IV	Australopithecines
		V	<i>Homo habilis</i>

Choose the correct answer from the options given below:

- (1) A-III, B-I, C-V, D-II
 (2) A-II, B-I, C-III, D-V
 (3) A-I, B-IV, C-III, D-V
 (4) A-I, B-III, C-IV, D-II

Ans. Option (2) is correct

Explanation : *Homo erectus* is the primates with brain capacity of around 900 cc.

Neanderthal man is the primates with brain capacity of 400 cc, which lived in east and central Asia.

Homo sapiens are the primates which arose in Africa and moved across continents and developed into distinct races. *Homo habilis* are the primates with the brain capacities between 650- 800 cc, which probably did not eat meat.

37. Identify the gene which is effective against corn borer

- (1) *cryIAC* (2) *cryIAb*
 (3) *cryIIAb* (4) *z* gene

Ans. Option (2) is correct

Explanation : The protein coded by gene *cryIAB* controls corn borer whereas the protein coded by genes *cryIAC* and *cryIIAb* control the cotton bollworms.

38. Succession occurring after flood is:

- (1) Hydrarch succession

- (2) Primary succession
 (3) Secondary succession
 (4) Mesarch succession

Ans. Option (3) is correct

Explanation : Succession occurring after flood is called secondary succession. Successions where natural communities develop in an area that was earlier occupied by living organisms that was somehow lost are called secondary succession.

39. Identify the statement which do not hold true for Deoxyribose Nucleic Acid.

- A. Only purine bases are present in DNA.
 B. Deoxyribose sugar is present
 C. A nitrogenous base is linked to the 1'C pentose sugar through N-glycosidic linkage.
 D. Phosphate group is linked to OH of 4'C of a nucleotide.

Choose the correct answer from the options given below:

- (1) A and D only (2) A and B only
 (3) C and D only (4) B and C only

Ans. Option (1) is correct

Explanation : DNA has two purine bases: Adenine and guanine, which form hydrogen bonds with their complementary pyrimidines derivatives i.e. thymine, and cytosine, respectively. The phosphate is linked by a phosphodiester linkage to the 5' carbon of a nucleotide.

40. Match List I with List II

LIST I		LIST II	
A.	<i>Salmonella phi</i>	I.	Common Cold
B.	Rhmo viruse	II	Typhoid
C.	<i>Sreptecoccus pneumoniae</i>	III	Malaria
D.	<i>Plasmodium vivax</i>	IV	Pneumonia

Choose the correct answer from the options given below:

- (1) A-II, B-IV, C-I, D-III
 (2) A-II, B-IV, C-III, D-I
 (3) A-II, B-I, C-IV, D-III
 (4) A-I, B-II, C-III, D-IV

Ans. Option (3) is correct

Explanation : Typhoid fever is a life-threatening infection caused by the bacterium *Salmonella typhi*. Rhinoviruses are the most common cause of the common cold. The most common bacteria causing pneumonia is *Streptococcus pneumoniae*.

Read the passage and answer the question given below.

Malaria is caused by the *Plasmodium* parasite. The parasite is spread to humans through the bites of infected mosquitoes. When a host is exposed to

antigens, which may be in the form of living or dead microbes or other proteins, antibodies are produced in the host body. This type of immunity is called active immunity. Active immunity is slow and takes time to give its full effective response. Injecting the microbes deliberately during immunisation or infectious organisms gaining access into body during natural infection induce active immunity. When antibodies are directly given to protect the body against foreign agents, it is called passive immunity.

- 41.** Colostrum secreted by mother during initial stage of lactation provides passive immunity as it is rich in.

(1) Placental lactogen (2) Prolactin
(3) Antigen (4) IgA antibodies

Ans. Option (4) is correct

Explanation : The yellowish milk produced by the new mother during the initial few days of lactation is called colostrum. It which contains immunoglobulin A which is essential to the new born baby to develop resistance to various antigens.

- 42.** Which of the following is passive immunisation?

(1) injecting inactivated pathogens
(2) injecting antigenic preparation
(3) injecting preformed antibodies
(4) injected weakened pathogens

Ans. Option (3) is correct

Explanation : Passive immunity is a type of acquired immunity in which ready made antibodies are transferred from one individual to another. It is fast and provides immediate relief.

- 43.** Immunity provided to the foetus from the mother through placenta during pregnancy is :

(1) Active immunity
(2) Passive immunity
(3) Non-specific immunity
(4) Innate immunity

Ans. Option (2) is correct

Explanation : Immunity provided to the foetus from the mother through placenta during pregnancy is called passive immunity.

- 44.** Production of antibodies against antigens in the body is :

(1) Innate immunity
(2) Passive immunity
(3) Active immunity
(4) Non-Specific immunity

Ans. Option (3) is correct

Explanation : Production of antibodies against antigens in the body is called active immunity. It is a slow process but has long lasting effect.

- 45.** Match List I with List II

LIST I		LIST II	
A.	Physical Barrier	I.	Saliva
B.	Cellular Barrier	II.	Interferons
C.	Physiological Barrier	III.	Skin
D.	Cytokine Barrier	IV.	Polymorpho-nuclear leukocytes

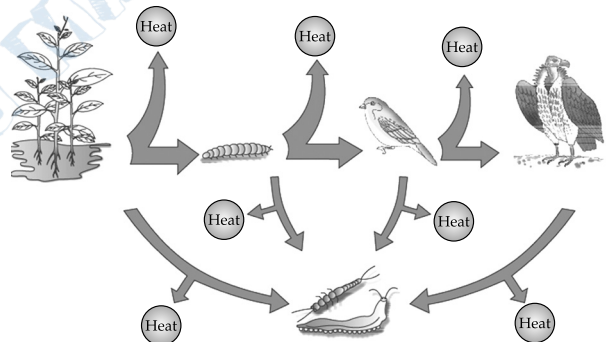
Choose the correct answer from the options given below:

- (1) A-III, B-I, C-II, D-IV
(2) A-III, B-IV, C-1, D-II
(3) A-I, B-IV, C-III, D-II
(4) A-IV, B-I, C-III, D-II

Ans. Option (2) is correct

Explanation : Skin is an example of physical barrier. Polymorpho-nuclear leukocytes (PMNL-neutrophils) kill pathogen by phagocytosis. They act as cellular barrier. Saliva in mouth is an example of physiological barrier while virus infected cells secrete proteins called interferon which protect non-infected cells from spread of viral infection is an example of cytokinin barrier.

Observe the diagram and answer the question given below.



- 46.** Which of the following constitutes the first trophic level?

(1) Plants (2) Herbivores
(3) Carnivores (4) Omnivores

Ans. Option (1) is correct

Explanation : Producers always occupy the first trophic level of every food chain because only they have the ability to trap solar energy with the help of chlorophyll and synthesize their own food.

- 47.** Sparrow comes under which of the following categories :

(1) Producers
(2) Primary consumers
(3) Secondary consumers
(4) Tertiary consumers

Ans. Option (3) is correct

Explanation : Sparrow is a primary consumer when it eats seeds, fruits, peas and a secondary consumer when it eats insects and worms.

48. Each trophic level has a certain mass of living material at a particular time called as :

- (1) Standing crop (2) Living crop
(3) Standing life (4) Time crop

Ans. Option (1) is correct

Explanation : Each trophic level has a certain mass of living material at a particular time called as the standing crop. The standing crop is measured as the mass of living organism (biomass) or the number in a unit area. The biomass of a species is expressed in terms of fresh or dry weight.

49. Which among the following is not a primary consumer?

- (1) Snake (2) Grasshopper CI
(3) Zooplankton (4) Caterpillar

Ans. Option (1) is correct

Explanation : Snakes are not primary consumers as they are not herbivores.

50. Which of the following is a part of detritus food chain?

- (1) Earthworm (2) Birds
(3) Man (4) Snake

Ans. Option (1) is correct

Explanation : The detritus food chain is a type of food chain that starts with dead organic matter. The earthworm acts as the primary consumer in a detritus food chain.

□□□

CUET Question Paper 2022

NATIONAL TESTING AGENCY

18th August 2022—Slot-1

Biology

[This includes Questions pertaining to Domain Specific Subject only]

SOLVED

Time Allowed: 3 hrs.

Maximum Marks: 200

General Instructions:

1. The test is of 45 Minutes duration.
2. The test contains is 50 Questions out of which 40 questions needs 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).

1. The protein formed by the encoded gene expression in a heterologous host is called:
- (A) Structural protein (B) Recombinant protein
(C) Transposons (D) Prohormone

Ans. Option (B) is correct

Explanation: Structural proteins are the most abundant class of proteins in nature and form structural elements. Transposons are repetitive DNA sequences that have the capacity to move from one location to another in genome and prohormones are the precursors of hormones. Therefore, Option (B) is the correct answer as any protein encoding gene is expressed in a heterologous host is called recombinant protein.

2. A kind of population interaction in which one species benefits and the other is neither harmed nor benefited?
- (A) Commensalism (B) Ammensalism
(C) Mutualism (D) Parasitism

Ans. Option (A) is correct

Explanation: A kind of population interaction in which one species benefits and the other is neither harmed nor benefited is commensalism. It can also be denoted by (+, 0).

3. Fruit which develop only from the ovary are called—
- (A) False fruits (B) Parthenocarpic fruits
(C) True fruits (D) Apomictic fruits

Ans. Option (C) is correct

Explanation: Fruit which develops only from the ovary are called true fruits, while in false fruits, parts other than ovary also contributes in its formation.

4. Algal blooms do not cause—
- (A) Imbalance in ecosystem dynamics.

- (B) Deterioration of the water quality and fish mortality.
(C) Reduction in BOD.
(D) Increase in organic matters in water body.

Ans. Option (C) is correct

Explanation: Algal blooms are formed as a result of overproduction of algae in a water body that is nutrient-rich or eutrophicated water-bodies. They can cause harmful effects on aquatic species by increasing organic matter and thus BOD of water body increases too.

5.



Observe the given figure and name the step used in Recombinant DNA Technology.

- (A) Selecting (B) Scrolling
(C) Spiraling (D) Spooling

Ans. Option (D) is correct

Explanation: Spooling which is a method of extraction of substance like DNA in the form of a spool over a glass rod.

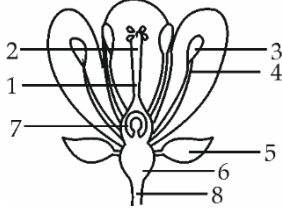
6. Perisperm differs from endosperm is that it is—
- (A) Haploid having reserve food.
(B) Polyploid having reserve food.
(C) Triploid having no reserve food.
(D) Diploid having no reserve food.

Ans. Option (D) is correct

Explanation: Perisperm is functionally similar to the endosperm. But perisperm is diploid as it is

developed from nucellus by mitosis, while endosperm is triploid.

7. Identify and name the two parts in a flower which are most important units of sexual reproduction?



- (A) 1 - Style, 3 - stamen
(B) 4 - filament, 6 - thalamus
(C) 3 - Anther, 7 - ovary
(D) 2 - Stigma, 5 - sepals

Ans. Option (C) is correct

Explanation: The important units of sexual reproduction are anther and ovary. So correct option is (C).

8. Density of population tells us about—
(A) total number of individuals of a species
(B) total area occupied by a species
(C) number of individuals present per unit space in a given time
(D) population growth in a particular time span

Ans. Option (C) is correct.

Explanation: Population density is a measurement of the number of people in an area. It is an average number. It is generally measured as number of individuals of species present in unit space in a given time.

9. Select the hormones produced in women only during pregnancy .
A. Estrogen
B. Human chronic gonadotroph
C. Progesterone
D. Human placental lactogen
E. Relaxin

Choose the correct answer from the options given below:

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

Ans. Option (D) is correct.

Explanation: hCG (human chorionic gonadotropin), hpL (human placental lactogen) and relaxin are produced in humans only during pregnancy while Estrogen and progesterone are secreted in a non-pregnant woman also.

10. Which of the following is not an example of terrestrial ecosystem?
(A) Wetland (B) Grassland
(C) Forest (D) Desert

Ans. Option (A) is correct.

Explanation: Wetland is not a terrestrial ecosystem, it is an aquatic ecosystem. Rest all are examples of terrestrial ecosystems.

11. Transfer of an ovum collected from a donor into fallopian tube is called _____ method.
(A) ZIFT (B) ICST
(C) GIFT (D) IVF

Ans. Option (C) is correct.

Explanation: GIFT is the method in which transfer of ovum collected from a donor into the fallopian tube of another female who cannot produce one, but can provide suitable environment for fertilisation takes place. Whereas, ZIFT stands for Zygote intra fallopian transfer which involves transfer of zygote (upto 8 blastomeres) into the fallopian tube.

ICSI stands for Intracytoplasmic sperm injection and is the method of injecting the sperms directly into the ovum in-vitro.

IVF stands for in- vitro fertilisation.

12. Given below are two statements: one is labelled as **Assertion A** and the other is labelled as **Reason R**.
Assertion (A): Leydig cells synthesise and secrete male testicular hormones called androgens.

Reason (R): Androgens, stimulate the process of spermatogenesis.

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

- (A) Both A and R is correct and R is the correct explanation of A.
(B) Both A and R are correct are R is NOT the correct explanation of A.
(C) A is correct but R is not correct.
(D) A is not correct but R is correct.

Ans. Option (A) is correct.

Explanation: LH acts on the Leydig cells and stimulates synthesis and secretion of androgens. This happens at the age of puberty due to significant increase in the secretion of gonadotropin releasing hormone there is an increase in the secretion of gonadotropins i.e., LH and FSH.

13. The inactive protoxin gets converted into an active form due to the
(A) Alkaline pH of insect's gut
(B) Temperature and acidic pH of gut
(C) Exposure to light
(D) Exposure to light and acidic pH of gut

Ans. Option (A) is correct.

Explanation: The Bt toxin is produced by the bacterium *Bacillus thuringiensis* through the process of sporulation. The Bt toxin protein exist as inactive protoxins but once an insect ingests the inactive toxin, it is converted into an active form of toxin due to alkaline pH of the gut which solubilize the crystals.

14. Which of the following gets embedded in the endometrium during implantation?
(A) Zygote (B) Morula
(C) Blastocyst (D) Embryo

Ans. Option (C) is correct

Explanation: The blastocyst gets embedded in the endometrium of the uterus. After attachment, the uterine cells divide rapidly and causes the blastocyst to become embedded in the endometrium of the uterus. This leads to pregnancy.

15. Introduction of which one of the following organism's species did cause decline or extinction of indigenous species?

- (A) *Eichhornia Crassipes*
- (B) Nile Perch
- (C) *Clarias gariepinus*
- (D) Steller's Sea cow

Ans. Option (B) is correct

Explanation: The Nile perch introduction into Lake Victoria led eventually to the extinction of ecologically unique assemblage of more than 200 species of cichlid fish in the lake.

16. Match List I with List II

List-I	List-II
A. Progestasert	I. once a week pill
B. Saheli	II. hormone releasing IUD
C. Lippe's Loop	III. Non-medicated IUD
D. Periodic abstinence	IV. Natural method of birth control

Choose the correct answer form the options given below:

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

Ans. Option (C) is correct

Explanation: Progestasert is a hormone-releasing IUD. Saheli is a 'once a week' pill. Lippe's loop is a non-medicated IUD. Periodic abstinence is a natural method of contraception in which couples abstain sexual intercourse from day 10 to 17 of a 28 days menstrual cycle.

17. The vital link that ensures continuity of species between organisms of one generation and the next generation is :

- (A) Male gamete
- (B) Female gamete
- (C) Zygote
- (D) Syngamy

Ans. Option (C) is correct

Explanation: Gametes are reproductive cells of a sexually reproducing organisms. The vital link that ensures continuity of species between organisms of one generation and the next generation is the zygote. Whereas, the process of fusion of gamete is called syngamy and it results in formation of diploid zygote.

18. In case of COVID positive patients, presence of corona virus is suspected only when the pathogen has produced a disease symptom. But when the symptoms of the disease has not appeared, the corona virus in the body can be detected by-

- (A) Enzyme linked immuno-sorbent Assay (ELISA) only.
- (B) Recombinant DNA technology only.
- (C) Reverse transcriptase Polymerase Chain Reaction (RT-PCR).
- (D) Widal Test

Ans. Option (C) is correct

Explanation: As in RT-PCR, RNA of retrovirus is reverse transcribed with the help of enzyme reverse transcriptase. DNA formed is amplified with the help of PCR. So, a minute quantity of corona virus can also be detected with the help of RT-PCR.

19. *Bacillus thuringiensis* is a biocontrol agent against

- (A) Nematode
- (B) Fungal pathogen
- (C) Insect pests
- (D) Bacterial pathogen

Ans. Option (C) is correct

Explanation: *Bacillus thuringiensis* is a bio control agent against insect pests.

20. Arrange the following events in the female reproductive cycle in their natural sequence.

- A. Ovulation
- B. Growth of corpus luteum
- C. Sudden increase in level of LH
- D. Secretion of FSH
- E. Growth of ovarian follicle and oogenesis

Choose the correct answer from the options given below:

- (A) E - D - A - B - C
- (B) D - E - C - A - B
- (C) E - C - A - D - B
- (D) D - A - C - E - B

Ans. Option (B) is correct

Explanation: The correct sequence of the events in the female reproductive cycle is:
 D - Secretion of FSH
 E - FSH leads to the growth of ovarian follicles into a fully mature Graafian follicle.
 C - During the mid of menstrual cycle, there is sudden increase in the level of LH (LH surge).
 A - LH surge leads to ovulation.
 B - It is followed by luteal phase in which the remaining parts of the Graafian follicle transform as the corpus luteum.

21. Which of the following methods are commonly used in DNA fingerprinting?

- (A) Genetic transformation
- (B) PCR and RFLP
- (C) Bioprospecting
- (D) Molecular diagnosis

Ans. Option (B) is correct

Explanation: PCR and RFLP are commonly used in DNA fingerprinting to increase the sensitivity of the technique.

22. Which layer of microsporangium is nutritive in function?

- (A) Epidermis (B) Endothecium
(C) Middle Layers (D) Tapetum

Ans. Option (D) is correct

Explanation: Tapetum provides nourishment to developing pollen grains and it is the innermost wall layer of microsporangium. While layers like epidermis, endothecium and middle layers perform the function of protection and help in dehiscence of anther to release pollen.

23. Match List I with List II

List-I	List-II
A. Catalytic converter	I. Particulate matter
B. Incinerators	II. Organic waste
C. Electrostatic precipitator	III. Hospital Waste
D. Sewage treatment plant	IV. Carbon monoxide and nitrogen oxides

Choose the correct answer form the options given below:

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

Ans. Option (B) is correct

Explanation: When exhaust passes through catalytic converter then carbon monoxide and nitrogen oxide are converted to carbon dioxide and nitrogen gas.

The use of incinerator is crucial for disposal of hospital waste.

Incineration is the high temperature burning of a waste.

Electrostatic precipitator can remove over 99% of particulate matter. They worked on the principle of the attraction of a charged particle for an oppositely charged collector.

In sewage treatment plant biodegradation of organic matter occurs by microorganisms.

24. During gene therapy, which vector is used to introduce functional ADA cDNA into lymphocyte

- (A) Plasmid (B) Bacteriophage
(C) pBR322 (D) Retrovirus

Ans. Option (D) is correct

Explanation: The retrovirus is used as a vector to introduce functional ADA cDNA into the lymphocytes, which are subsequently returned to the patient.

25. The animals that feed on herbivores like insects, birds and mammals in terrestrial ecosystem, are called ____.

- (A) Saprotrophs
(B) Primary consumers
(C) Secondary carnivores
(D) Primary carnivores

Ans. Option (D) is correct

Explanation: The animals that feed on herbivores like insects, birds and mammals in terrestrial ecosystem, are called primary carnivores. These are also called secondary consumers. Herbivores are primary consumers.

26. Recombinant Proteins are expressed in:

- (A) Cloning vector
(B) Heterology Host
(C) Homologous chromosomes
(D) Promotor

Ans. Option (B) is correct

Explanation: Recombinant proteins are expressed in heterologous host. The hosts which have foreign genes are called heterologous host.

27. The chemical carcinogens present in tobacco smoke is the major cause of :

- (A) AIDS (B) Lung Cancer
(C) Allergy (D) Pneumonia

Ans. Option (B) is correct

Explanation: The chemical carcinogens present in tobacco smoke have been identified as a major cause of lung cancer.

28. Match the features that are required to facilitate cloning of alien DNA into a vector

List-I (Features to facilitate)	List-II (Cloning Vector)
A. Origin of replication (ori)	I. <i>Agrobacterium tumefaciens</i>
B. Selectable Marker	II. Recognition sites commonly used for restriction enzymes
C. Cloning sites	III. Helps in identifying and eliminating non-transformants
D. Vectors for cloning genes in plants	IV. Sequence from where replication starts

Choose the correct answer form the options given below:

Ans. Option (A) is correct

Explanation: Origin of the replication (ori) is the sequence of DNA at which replication starts on a chromosome, plasmid or virus.

Selectable markers in vector help in identifying and eliminating non-transformants and selectively permitting the growth of the transformants.

Cloning sites are the recognition sites commonly used for restriction enzymes.

Agrobacterium tumefaciens is a gram negative bacterium, it is used as a cloning vector for plants. It is called as natural genetic engineer of plants.

29. Which of the following is effect of steroid in males?

- (A) Premature baldness
- (B) Deepening of voice
- (C) Excessive hair growth on face and body
- (D) Enlargement of clitoris

Ans. Option (A) is correct

Explanation: The side effects of the use of anabolic steroids in males include premature baldness, increased aggressiveness, breast enlargement, etc.

30. Which of the following cells produce antibodies?

- (A) Monocytes
- (B) PMNL neutrophils
- (C) T-lymphocytes
- (D) B-lymphocytes

Ans. Option (D) is correct

Explanation: B-lymphocytes produce proteins that act as antibody in response to pathogens into our blood to fight with them. These proteins are called antibodies. The T-cells themselves do not secrete antibodies but help B cells to produce them. Neutrophils and monocytes are phagocytic cells.

31. Nutrient cycles are of two types—

- (A) Gaseous and solid
- (B) Liquid and sedimentary
- (C) Gaseous and sedimentary
- (D) Aquatic and Gaseous

Ans. Option (C) is correct

Explanation: Nutrient cycles are of two types:
Gaseous cycle - Exchange of nutrients occur in gaseous or vapour form. Reservoir pool is atmosphere or hydrosphere. e.g., Nitrogen; Carbon, Oxygen and Hydrogen cycle.
Sedimentary cycle - Sedimentary cycles are a type of biogeochemical cycle, in which the reservoir is Earth's crust. e.g., Sulphur and Phosphorus cycle.

32. Technology of biogas production in India was developed due to the efforts of—

- A. GEAC B. ICAR
- C. IARI D. IRRI
- E. KVIC

Choose the correct answer from the options given below:

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

Ans. Option (D) is correct

Explanation: The technology of biogas production was developed in India due to the efforts of Indian Agricultural Research Institute (IARI) and Khadi and Village Industries Commission (KVIC).

33. The bacterium responsible for breakdown of cellulose in a biogas plant is:

- (A) *Acetobacter aceti* (B) *Lactobacillus*
- (C) *Clostridium* (D) *Methanobacterium*

Ans. Option (D) is correct

Explanation: The bacteria that are collectively called methanogens and one such bacterium responsible for breakdown cellulose in a biogas plant is *Methanobacterium*. These bacteria grow anaerobically on cellulosic material produce large amount of methane along with CO₂ and H₂ after breakdown.

34. With reference to processing of hn RNA, which of the following statements is/are INCORRECT?

- A. Introns are removed and exons are joined directly splicing.
- B. Capping and Tailing occurs at 5' end and 3' end respectively.
- C. Addition of 200-300 adenylated residues means capping.
- D. Addition of guanosine triphosphate takes place at 5' end.
- E. Processing take place in the nucleus and converts hn RNA into functional RNA.

Choose the correct answer from the options given below:

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

Ans. Option (B) is correct

Explanation: Splicing involves cutting off introns and linking exons in a specific order takes place during the processing of human RNA. At the 5' end of hn RNA, methyl guanosine triphosphate is added. It is known as capping. Tailing occurs by the addition of adenylate residues of about 200-300 at 3' end of hn RNA. The mRNA, or completely processed in RNA, is transferred outside of the nucleus for translation.

35. Match List I with List II

List-I	List-II
A. Alec Jeffreys	I. Lac Operon
B. Francois Jacob and Jacques Monod	II. Deciphering of genetic code
C. Marshall Nirenberg	III. Semiconservative replication of DNA
D. Meselson Stahl	IV. DNA Fingerprinting

Choose the correct answer form the options given below:

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

Ans. Option (A) is correct

Explanation: Alec Jeffreys pioneered the DNA fingerprinting process.

The Operon model of gene control in bacteria was proposed by Jacob and Monod.

By converting a synthetic poly U RNA into polyphenylalanine, Nirenberg and Matthaei were able to interpret the genetic code.

Meselson and Stahl demonstrated that *E. coli* DNA replication follows a semi-conservative paradigm.

- 36.** The pyramid of biomass in sea is generally inverted because:
- (A) Sunlight is filtered through sea water leading to less photosynthesis.
 (B) Of the high salt content of sea water.
 (C) The biomass of phytoplankton far exceeds that of fishes.
 (D) The biomass of fishes far exceeds that of phytoplankton.

Ans. Option (D) is correct

Explanation: In sea ecosystem, since fishes have much larger bodies and longer lifespans than producers (phytoplankton) and primary consumers (zooplanktons), the biomass pyramid in the marine ecosystem is typically inverted.

- 37.** One of the following is NOT a characteristic/criteria of genetic materials, identify it:
- (A) Genetic material should be able to generate its replica.
 (B) Genetic material should be stable chemically and structurally.
 (C) It should not provide the scope for mutations.
 (D) It should be able to express itself in the form of Mendelian characters.

Ans. Option (C) is correct

Explanation: The following requirements must be met by a molecule before it may serve as genetic material;

It needs to be stable both chemically and structurally.

It should be able to create a copy of itself.

It ought to allow for the kind of slow mutation that evolution requires.

It ought to be able to manifest itself as Mendelian characteristics.

- 38.** Adenine pairs with Thymine through how many hydrogens bonds?
- (A) 2 (B) 3
 (C) 4 (D) 5

Ans. Option (A) is correct

Explanation: Thymine base pair is held together by 2 hydrogen bonds while the Guanine-Cytosine base pair is held together by 3 hydrogen bonds.

- 39.** A pure breeding garden pea plant was crossed with a pure dwarf plant. The plant produced 400 seeds. The seeds were sown to produce plants. The phenotype of the plants in next generation will be
- (A) All tall

- (B) All dwarf
 (C) 300 tall and 100 dwarf plants
 (D) All plants of intermediate height

Ans. Option (A) is correct

Explanation: Tallness and dwarfness in pea plants are dominant and recessive characters respectively. The cross can be represented as follows:

Parents	TT	x	tt
	T		t
F ₁ -generation	t	TT Tall	Tt Tall
	t	Tt Tall	Tt Tall

- 40.** If in a pond there were 150 carps found last year and through reproduction 450 new carps are added in the pond, what will be the birth rate here?

- (A) 4 offsprings per carp per year
 (B) 3 offsprings per carp per year
 (C) 2 offsprings per carp per year
 (D) 1 offspring per carp per year

Ans. Option (B) is correct

Explanation: Number of individuals last year (N) = 150

Number of individuals added in one year (ΔN) = 450

Time period (ΔT) = 1 Year

Birth rate = $\frac{450}{150} = 3$ offsprings per carp per year.

- 41.** When does the life appear on the earth after its formation?

- (A) After 200 million years
 (B) After 300 million years
 (C) After 500 million years
 (D) After 250 million years

Ans. Option (C) is correct

Explanation: Life appeared 500 million years after the formation of earth, i.e., almost four billion years ago.

- 42.** According to the early Greek thinkers, the unit of life which were transferred to different planets were—

- (A) Spores (B) Water
 (C) Oxygen (D) Methane

Ans. Option (A) is correct

Explanation: According to the early Greek thinkers, the unit of life called spores were transferred to different planets including earth. It is still a favorite idea of some astronomers.

- 43.** Louis Pasteur by careful experimentation demonstrated that life comes from—

- (A) Killed yeast (B) Rotting matter
 (C) Other plants (D) Pre-existing life

Ans. Option (D) is correct

Explanation: Louis Pasteur through careful experimentation proved that life originates from pre-existing life. According to the theory of