Previous Year Paper

10th June 2023 (Shift 1)

Q1. Select the statements which hold true for immune system:

A. Innate immunity or nonspecific immunity is present at the time of birth
B. Acquired immunity is never pathogen specific
C. Cytokine barriers are a part of innate immunity
D. Rheumatoid arthritis is an auto-immune disease

Choose the ***correct*** answer from the options given below.
(a) A, C and D only
(b) A, B and D only
(c) A, B and C only
(d) B, C and D only

Q2. Match **List-I** with **List-II**:

List-I		List-II	
(A)	*Brassica*	(I)	Pusa Sadabahar
(B)	Okra	(II)	Pusa Komal
(C)	Cowpea	(III)	Pusa Sawani
(D)	Chilli	(IV)	Pusa Swarnim

Choose the **correct** answer from the options given below:
(a) (A)-(IV), (B)-(III), (C)-(II), (D)-(I)
(b) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
(c) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
(d) (A)-(I), (B)-(IV), (C)-(III), (D)-(II)

Q3. *Bacillus thuringiensis produces* Bt toxin crystals it does not kill the bacterium itself as the toxin is in the _____ in bacteria.
(a) Harmless form
(b) Inactive form
(c) Premature stage
(d) Insoluble stage

Q4. Asexual reproductive structure of sponge is:
(a) Conidia
(b) Offset
(c) Gemmule
(d) Zoospore

Q5. Net primary productivity is the:
(a) Difference between the productivity of two different ecosystems
(b) Difference between the productivity of an area before and after succession
(c) Rate of production of organic matter
(d) Rate of production of organic matter after considering respiration loss

Q6. Two nucleotides linked together to form a dinucleotide though:
(a) 3' – 5' phosphodiester linkage
(b) 2' – 5' phospodiester linkage
(c) 1' – 5' phosphodiester linkage
(d) N-glycosidic linkage

Q7. Match **List-I** with **List-II**:

List-I		List-II	
(A)	Down's Syndrome	(I)	Absence of a copy of X chromosome
(B)	Klinefelter's Syndrome	(II)	Presence of additional copy of X chromosome
(C)	Turner's Syndrome	(III)	Mutation of X chromosome
(D)	Colour blindness	(IV)	Trisomy of 21st chromosome

Choose the **correct** answer from the options given below:
(a) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(b) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)
(c) (A)-(IV), (B)-(I), (C)-(II), (D)-(III)
(d) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)

Q8. The processing of pro-insulin involves:
(a) Attachment of C-peptide
(b) Modification of C-peptide
(c) Maturation of C-peptide
(d) Removal of C-peptide

Q9. Which is the biofortified variety of wheat with high protein content?
(a) *Kalyan Sona*
(b) *Sonalika*
(c) Atlas - 66
(d) *Himgiri*

Q10. Which is not a type of sexually transmitted infections?
(a) Genital warts
(b) Cancer
(c) Gonorrhoea
(d) Syphilis

Q11. Arrange the following steps of sewage treatment in correct sequence:

A. Flocs consume organic matter and reduces the BOD.
B. Removal of floating debris and grit.
C. Bacterial flocs allowed to sediment.
D. Primary effluent passed into aeration tank and agitated mechanically.
E. Effluent after secondary treatment is released into water bodies.

Choose the correct answer from the options given below:
(a) B—D—A—C—E
(b) B—C—A—D—E
(c) A—D—E—B—C
(d) A—C—D—E—B

Q12. Select the high yielding and disease resistant variety(ies) of rice from the following:
A. *Sonalika*
B. *Jaya*
C. *Kalyan Sona*
D. *Ratna*

Choose the ***correct answer*** from the options given below:
(a) B only
(b) B and D only
(c) A and C only
(d) A and D only

Q13. ABO blood groups are controlled by _____.
(a) Gene A
(b) Gene B
(c) Gene *I*
(d) Gene O

Q14. Which of the following is not made by fermentation?
(a) Dosa batter
(b) Bread
(c) Toddy
(d) Aerated drinks

Q15. Which of the following hormone is secreted by the ovary in the later phase of pregnancy?
(a) Lactogen
(b) Relaxin
(c) Human chorionic gonadotropin (hCG)
(d) Estrogen

Q16. Choose the correct sequence of events for the process of oogenesis:
A. The tertiary follicle changes into Graafian follicle
B. Formation of oogonia in fetal ovary.
C. Completion of first meiotic division by primary oocyte within the tertiary follicle.
D. Release of secondary oocyte from the ovary

Choose the **correct** answer from the options given below:
(a) A, B, C, D
(b) D, C, A, B
(c) B, A, D, C
(d) B, C, A, D

Q17. Human activities have accelerated rate of species extinction in the world. The major cause for it are:
A. Habitat loss and defragmentation
B. Habitat loss and fragmentation
C. Over-exploitation
D. Alien species invasions

Choose the correct answer from the options given below:
(a) A, C and D only
(b) A, B and C only
(c) B, C and D only
(d) A, B and D only

Q18. Match **List-I** with **List-II**:

List-I		**List-II**	
(A)	Surgical method	(I)	Saheli
(B)	Oral contraceptive	(II)	Condom
(C)	Barrier contraceptive	(III)	Sterilisation
(D)	Natural contraceptive	(IV)	Lactational amenorrhea

Choose the **correct** answer from the options given below:
(a) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(b) (A)-(III), (B)-(I), (C)-(II), (D)-(IV)
(c) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(d) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

Q19. Solid wastes generated from hospitals are generally disposed off by:
(a) Recycling
(b) Reusing
(c) Throwing it in landfills
(d) Using incinerators

Q20. Which of the following is not a cannabinoid?
(a) Marijuana
(b) Hashish
(c) Ganja
(d) Heroin

Q21. A double stranded DNA has 30% Of Thymine. The percentage Of Guanine in it would be:
(a) 70%
(b) 20%
(c) 40%
(d) 30%

Q22. Organs which differ in their origin and development but perform similar function are known as:
(a) Homologous organs
(b) Analogous organs
(c) Vestigial organs
(d) Atavistic organs

Q23. Match **List-I** with **List-II**:

List-I		**List-II**	
(A)	Agarose	(I)	Polymerase chain reaction
(B)	Thermostable DNA polymerase	(II)	Electrophoresis
(C)	Micro injection	(III)	Ampicillin resistance gene
(D)	Selectable marker	(IV)	Introduction of alien DNA in animal cell

Choose the **correct** answer from the options given below:
(a) (A)-(II), (B)-(I), (C)-(III), (D)-(IV)
(b) (A)-(II), (B)-(I), (C)-(IV), (D)-(III)
(c) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)
(d) (A)-(I), (B)-(III), (C)-(II), (D)-(IV)

Q24. Select the brain capacity of *Homo erectus* from the following:
(a) 900 cc
(b) 800 cc
(c) 1400 cc
(d) 500 cc

Q25. Sickle-cell anaemia is:
(a) Autosome linked dominant trait
(b) Sex linked dominant trait
(c) Sex linked recessive trait
(d) Autosome linked recessive trait

Q26. The enzyme that can recognise the following palindromic sequence
`5-GAATTC-3'
3`-CTTAAG-5' is _____:
(a) *Hind II*
(b) *EcoR I*
(c) *Hind III*
(d) *Bam HI*

Q27. Match **List-I** with **List-II**:

List-I		**List-II**	
(A)	*Haemophilus influenzae*	(I)	Elephantiasis
(B)	Rhino viruses	(II)	Ringworm
(C)	*Wuchereria bancrofti*	(III)	Common cold
(D)	*Trichophyton*	(IV)	Pneumonia

Choose the **correct** answer from the options given below:
(a) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(b) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
(c) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
(d) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)

Q28. Pollen grains are protected from high temperature and strong acids due to the presence of:
(a) Sporopollenin
(b) Collagen
(c) Pectin
(d) Cellulose

Q29. Match **List-I** with **List-II**:

List-I Name of the organism		**List-II Chromosome number in a meiocyte**	
(A)	Rat	(I)	38
(B)	Dog	(II)	42
(C)	Cat	(III)	1260
(D)	*Ophioglossum*	(IV)	78

Choose the **correct** answer from the options given below:
(a) (A)-(I), (B)-(II), (C)-(III), (D)-(IV)
(b) (A)-(II), (B)-(IV), (C)-(I), (D)-(III)
(c) (A)-(II), (B)-(III), (C)-(IV), (D)-(I)
(d) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)

Q30. Arrange the following stages of primary succession in water in correct sequence.
A. Rooted submerged plants
B. Marsh meadows
C. Phytoplanktons
D. Scrubs followed by trees
E. Free floating plants

Choose the correct answer from the options given below:
(a) A⟶C⟶B⟶E⟶D
(b) E⟶D⟶A⟶C⟶B
(c) D⟶B⟶A⟶C⟶E
(d) C⟶A⟶E⟶B⟶D

Q31. Match **List-I** with **List-II**:

List-I		**List-II**	
(A)	Dodo	(I)	Russia
(B)	Quagga	(II)	Australia
(C)	Thylacine	(III)	Mauritius
(D)	Stellar's Sea cow	(IV)	Africa

Choose the **correct** answer from the options given below:
(a) (A)-(IV), (B)-(II), (C)-(III), (D)-(I)
(b) (A)-(II), (B)-(III), (C)-(I), (D)-(IV)
(c) (A)-(III), (B)-(II), (C)-(I), (D)-(IV)
(d) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

Q32. 'r' in exponential growth equation implies:
(a) Difference between the total number of births and deaths
(b) Extrinsic rate of natural increase
(c) Population density
(d) Intrinsic rate of natural increase

Q33. Arrange the following steps of Polymerase Chain Reaction in correct sequence.
A. Annealing of Primer
B. Denaturation of dsDNA
C. Extension of Primer
D. Amplification

Choose the correct answer from the options given below:
(a) A-B-C-D
(b) B-A-C-D
(c) D-B-C-A
(d) C-A-B-D

Q34. Identify the gas which was not used by Miller's in his classic experiment:
(a) CH_4
(b) O_2
(c) H_2O
(d) NH_3

Q35. Identify the statements relevant to Genetically Modified (GM) crops:

A. They have better pest resistance.
B. They have increased nutritional value.
C. They are more reliant on chemical fertilisers.
D. They have less post harvest losses.

Choose the correct answer from the options given below:

(a) A, B, and C only
(b) A and B only
(c) A and C only
(d) A, B and D only

Q36. Zooplanktons species suspended their development during unfavourable conditions. This phenomenon is known as:

(a) Hibernation
(b) Dormancy
(c) Aestivation
(d) Diapause

Q37. Identify the statements which are true with respect to Euchromatin

A. Loosely packed
B. Densely packed
C. Stains light
D. Transcriptionally active

Choose the correct answer from the options given below:

(a) A, B and D only
(b) A, C and D only
(c) B and C only
(d) B, C, and D only

Q38. Identify the floral reward offered to insects for pollination

A. Pollen grains
B. Nectar
C. Fragrance
D. Safe place to lay eggs

Choose the ***correct answer*** from the options given below.

(a) A, B and D only
(b) B and C only
(c) C and D only
(d) A and C only

Q39. Select the statements(s) which is/are true for Baculoviruses:

A. They belong to genus Nucleopolytetra viruses.
B. They are species specific in their action.
C. They have narrow spectrum insecticidal application.
D. They don't have any negative impact on non-target insects.

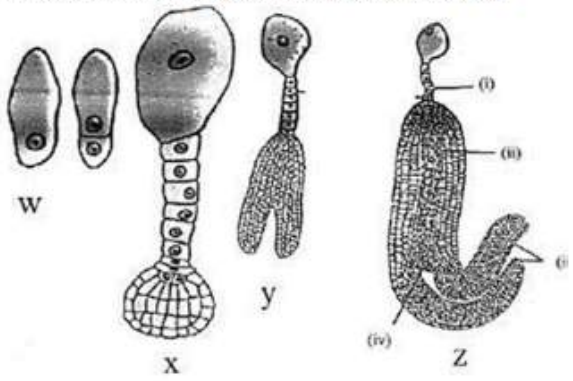
Choose the correct answer from the options given below:

(a) A, B and C only
(b) B and C only
(c) B, C and D only
(d) D only

Q40. Joint Forest Management (JFM) was introduced to promote:

(a) Chipko Movement
(b) Jhum Cultivation
(c) Slash and bum agriculture
(d) Local community in protecting forests

Q41. Observe the figures and answer the question

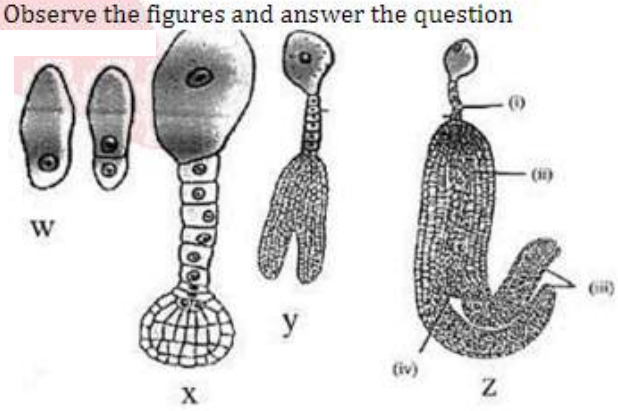


(Stages in embryo development in a dicot)

Why is it that most zygotes divide only after certain amount of endosperm is formed?

(a) It assures nutrition to the developing embryo.
(b) It assures nutrition to the developing cotyledons.
(c) It ensures that endosperm is completely consumed.
(d) It ensures that endosperm persists in the mature seed.

Q42. Observe the figures and answer the question



(Stages in embryo development in a dicot)

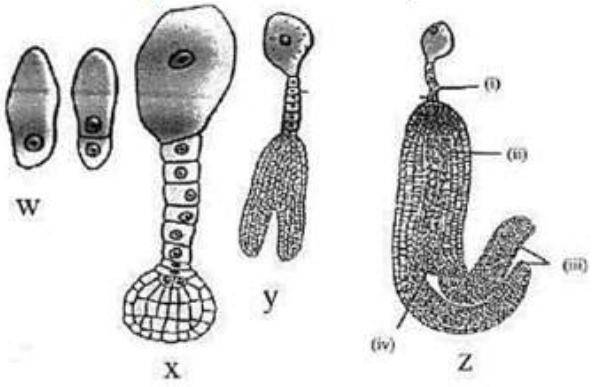
Identify the parts of the embryonal axis of a dicot embryo:

A. Epicotyle
B. Plumule
C. Radicle
D. Scutellum

Choose the correct answer from the options given below:

(a) A, B and D only
(b) A, B and C only
(c) B, C and D only
(d) A, C and D only

Q43. Observe the figures and answer the question

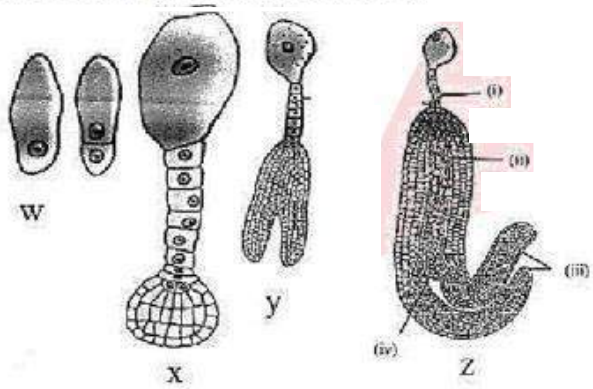


(Stages in embryo development in a dicot)

Coleoptile and Coleorrhiza in the embryo of grasses are:

(a) Part of the embryonal axis with hypocotyl
(b) part of the embryonal axis with epicotyl
(c) Hollow foliar structure enclosing shoot apex, leaf primordia AND sheath enclosing radicle and root cap, respectively
(d) Sheath enclosing root cap and hollow foliar structure enclosing leaf primordia respectively

Q44. Observe the figures and answer the question



(Stages in embryo development in a dicot)

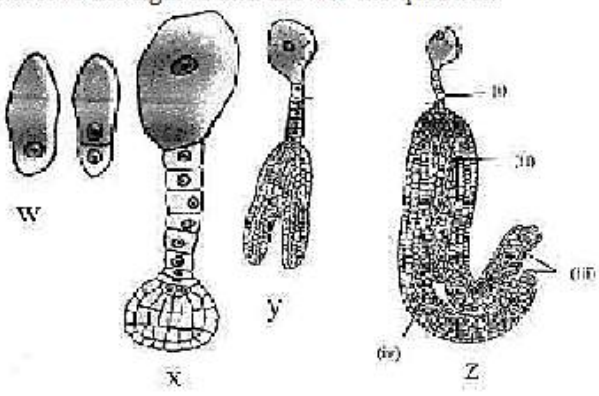
The correct sequence for parts labelled (i), (ii), (iii) and (iv) in the figure is:

A. Plumule
B. Suspensor
C. Cotyledons
D. Radicle

Choose the correct answer from the options given below:

(a) A, B, D, C
(b) B, C, A, D
(c) A, D, B, C
(d) B, D, C, A

Q45. Observe the figures and answer the question



(Stages in embryo development in a dicot)

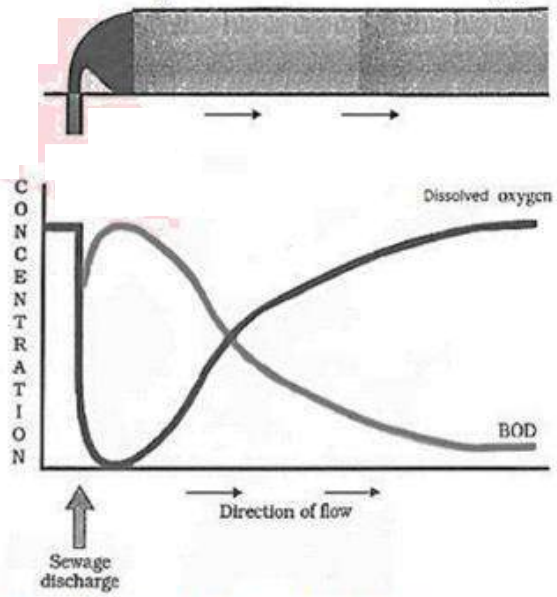
Match **List-I** with **List-II**:

List-I		List-II	
(A)	Globular embryo	(I)	W
(B)	Mature embryo	(II)	Y
(C)	Zygote	(III)	Z
(D)	Heart-shaped embryo	(IV)	X

Choose the **correct** answer from the options given below:

(a) (A)-(IV), (B)-(II), (C)-(I), (D)-(III)
(b) (A)-(IV), (B)-(III), (C)-(I), (D)-(II)
(c) (A)-(I), (B)-(IV), (C)-(II), (D)-(III)
(d) (A)-(III), (B)-(IV), (C)-(II), (D)-(I)

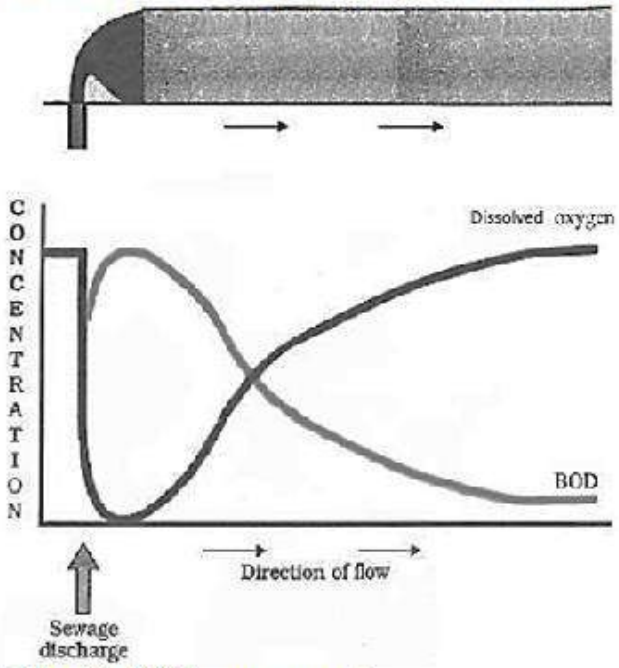
Q46. Observe the figures and answer the following question



Domestic sewage primarily contains:

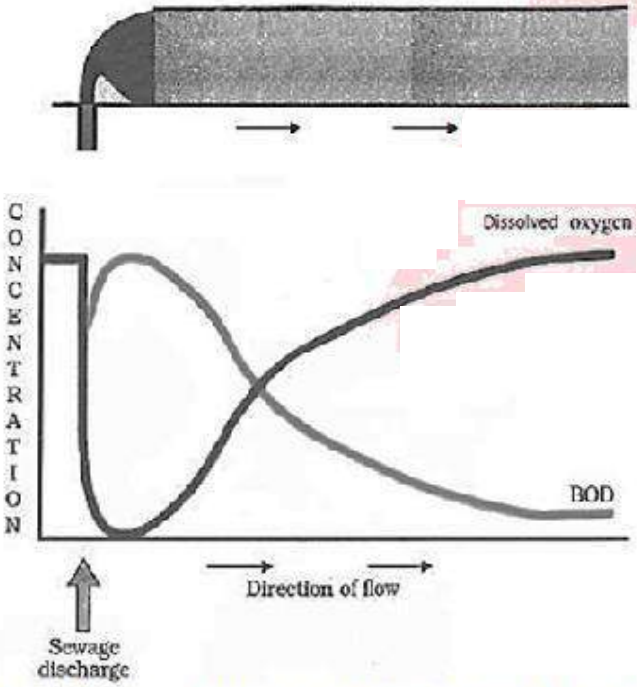
(a) Inorganic matter
(b) Organic matter
(c) Heavy- metals
(d) Electronic wastes

Q47. Observe the figures and answer the following question



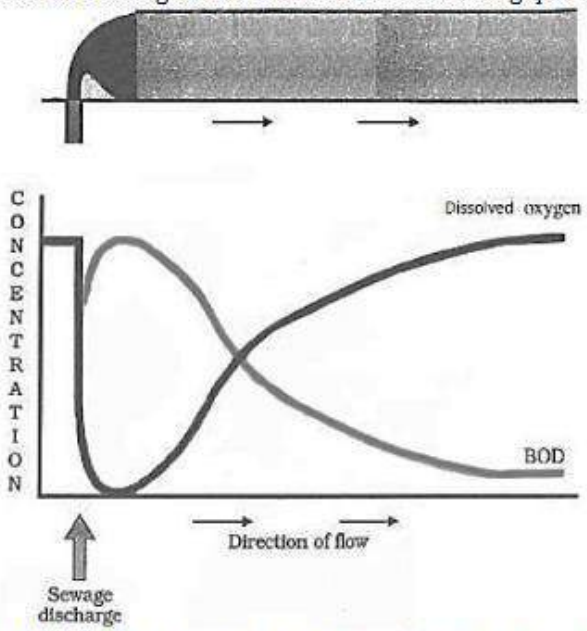
Indirectly, BOD is a measure of:
(a) Inorganic matter present in water
(b) Carbon dioxide in water
(c) Organic matter present in water
(d) Sand in water

Q48. Observe the figures and answer the following question



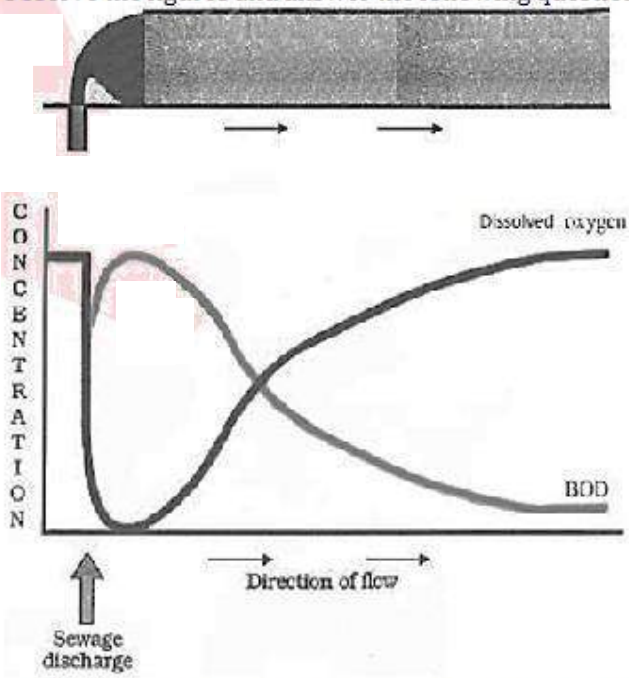
BOD of water decreases significantly and the clean water organisms appears, in the water because
(a) Microorganism have consumed all inorganic matter present in water
(b) Microorganisms have consumed most of the biodegradable organic matter present in Water
(c) Dissolved Oxygen is totally consumed
(d) Level of Carbon dioxide is significantly increased

Q49. Observe the figures and answer the following question



At the point of sewage discharge, the mortality of fish and Other aquatic creatures increases because:
(a) Dissolved oxygen becomes low
(b) Dissolved oxygen become high
(c) Dissolved Carbon dioxide becomes low
(d) Dissolved Nitrogen concentration becomes high

Q50. Observe the figures and answer the following question



The pollutants present in sewage which are relatively easy to remove are:
(a) Dissolved salts
(b) Metal ions
(c) Dissolved organic compounds
(d) Floating debris

SOLUTIONS

S1. Ans. (a)

Sol. Acquired immunity, on the other hand is pathogen specific.

S2. Ans. (a)

Sol.

Crop	Variety	Resistance to diseases
Wheat	*Himgiri*	*Leaf and stripe rust, hill bunt*
Brassica	*Pusa swarnim (Karan rai)*	*White rust*
Cauliflower	*Pusa Shubhra, Pusa Snowball K-1*	*Black rot and Curd blight black rot*
Cowpea	*Pusa Komal*	*Bacterial blight*
Chilli	*Pusa Sadabahar*	*Chilly mosaic virus, Tobacco mosaic virus and Leaf curl*

S3. Ans. (b)

Sol. Crystals of Bt toxin produced by some bacteria is inactive form which gets activated in alkaline conditions of the gut of the worms.

S4. Ans. (c)

Sol. Some common asexual reproductive structures are conidia (*Penicillium*), buds (*Hydra*) and gemmules (sponge).

S5. Ans. (d)

Sol. Gross primary productivity of an ecosystem is the rate of production of organic matter during photosynthesis. Gross primary productivity minus respiration losses (R), is the net primary productivity (NPP).

S6. Ans. (a)

Sol. A dinucleotide is obtained by the joining of two nucleotides by a 3'- 5' phosphodiester linkage.

S7. Ans. (b)

Sol. Colour-blindness is due to mutation in certain genes present in the X chromosome. Down's Syndrome is due to the presence of an additional copy of the chromosome number 21 (trisomy of 21). Klinefelter's Syndrome is caused due to the presence of an additional copy of X-chromosome and Turner's Syndrome is caused due to the absence of one of the X chromosomes.

S8. Ans. (d)

Sol. This C peptide is not present in the mature insulin and is removed during maturation into insulin.

S9. Ans. (c)

Sol. Atlas 66 , has a high protein content and has been used as a donor for improving cultivated wheat.

S10. Ans. (b)

Sol. Cancer is not a STD.

S11. Ans. (a)

Sol. Primary treatment steps basically involve physical removal of particles – large and small – from the sewage through filtration and sedimentation. The primary effluent is passed into large aeration tanks (Figure 10.6) where it is constantly agitated mechanically and air is pumped into it. This allows vigorous growth of useful aerobic microbes into flocs. Once the BOD of sewage or waste water is reduced significantly, the effluent is then passed into a settling tank where the bacterial 'flocs' are allowed to sediment. d into a settling tank where the bacterial 'flocs' are allowed to sediment. This sediment is called activated sludge. A small part of the activated sludge is pumped back into the aeration tank to serve as the inoculum. The remaining major part of the sludge is pumped into large tanks called anaerobic sludge digesters. Here, other kinds of bacteria, which grow anaerobically, digest the bacteria and the fungi in the sludge. The effluent from the secondary treatment plant is generally released into natural water bodies like rivers and streams.

S12. Ans. (c)

Sol. Sonalika and Kalyan sona are high-yielding and disease resistant varieties.

S13. Ans. (c)

Sol. ABO blood group in humans is controlled by gene I.

S14. Ans. (d)

Sol. Aerated drinks is not made by fermentation.

S15. Ans. (b)

Sol. In the later phase of pregnancy, a hormone called relaxin is also secreted by the ovary.

S16. Ans. (d)

Sol. The process of formation of a mature female gamete is called oogenesis. Oogenesis is initiated during the embryonic development stage when a couple of million gamete mother cells. These cells start division and enter into prophase-I of the meiotic division and get temporarily arrested at that stage, called primary oocytes. Each primary oocyte then gets surrounded by a layer of granulosa cells and is called the primary follicle. the primary oocyte within the tertiary follicle grows in size and completes its first meiotic division. The tertiary follicle further changes into the mature follicle or Graafian follicle.

S17. Ans. (c)

Sol. The accelerated rates of species extinctions that the world is facing now are largely due to human activities. Habitat loss and fragmentation, alien species invasion, over-exploitation are responsible for species extinctions.

S18. Ans. (b)

Sol. Surgical methods, also called sterilisation, are generally advised for the male/female partner as a terminal method to prevent any more pregnancy. Saheli is an oral contraceptive developed by CDRI. Condom is a barrier contraceptive for males, lactational amenorrhea (absence of menstruation) method is based on the fact that ovulation and therefore the cycle do not occur during the period of intense lactation following parturition.

S19. Ans. (d)

Sol. Incineration is a process that involves burning of solid waste in a furnace until the waste are converted into ashes.

S20. Ans. (d)

Sol. Heroin, commonly called smack is chemically diacetylmorphine which is a white, odourless, bitter crystalline compound. It is an opioid.

S21. Ans. (b)

Sol. As per Chargaff's law: A + T = G + C
Thymine = 30%
Adenine = 30%
Cytosine = 20%
Guanine = 20%

S22. Ans. (b)

Sol. Analogous organs are those organs that have some superficial resemblance, perform similar functions and yet, have different evolutionary origins and hence, different anatomical structures.

S23. Ans. (b)

Sol. the most commonly used matrix is agarose which is a natural polymer extracted from sea weeds that is used in electrophoresis. In PCR, repeated amplification is achieved by the use of a thermostable DNA polymerase (isolated from a bacterium, Thermus aquaticus), which remain active during the high temperature induced denaturation of double stranded DNA. In micro-injection, recombinant DNA is directly injected into the nucleus of an animal cell. In rDNA technology, selectable marker helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants.

S24. Ans. (a)

Sol. Homo erectus had a large brain around 900cc.

S25. Ans. (d)

Sol. Sickle-cell anaemia is an autosome linked recessive trait that can be transmitted from parents to the offspring when both the partners are carrier for the gene.

S26. Ans. (b)

Sol. EcoRI cuts the DNA between the bases G and A only when the sequence GAATTC is present in DNA.

S27. Ans. (c)

Sol. Bacteria like *Streptococcus pneumoniae and Haemophilus influenzae* are responsible for the disease pneumonia. Rhino viruses represent one such group of viruses which cause one of the most infectious human ailments – the common cold. Many fungi belonging to the genera Microsporum, Trichophyton and Epidermophyton are responsible for ringworms which is one of the most common infectious diseases in man. Wuchereria causes elephantiasis or filariasis.

S28. Ans. (a)

Sol. Pollen grains are well-preserved as fossils because of the presence of sporopollenin.

S29. Ans. (b)

Sol. In diploid organisms, specialised cells called meiocytes (gamete mother cell) undergo meiosis. At the end of meiosis, only one set of chromosomes gets incorporated into each gamete.

S30. Ans. (d)

Sol. In primary succession in water, the pioneers are the small phytoplanktons, which 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. The climax again would be a forest

S31. Ans. (d)

Sol. Some examples of recent extinctions include the dodo (Mauritius), quagga (Africa), thylacine (Australia), Steller's Sea Cow (Russia) and three subspecies (Bali, Javan, Caspian) of tiger.

S32. Ans. (d)

Sol. 'r' in exponential growth represents 'intrinsic rate of natural increase'.

S33. Ans. (b)

Sol. The steps of PCR include denaturation, annealing, extension and amplification.

S34. Ans. (b)

Sol. In 1953, S.L. Miller, an American scientist created similar conditions in a laboratory scale. He created electric discharge in a closed flask containing CH_4 , H_2 , NH_3 and water vapour at 8000C. He observed formation of amino acids.

S35. Ans. (d)

Sol. Genetic modification has: (i) made crops more tolerant to abiotic stresses (cold, drought, salt, heat). (ii) reduced reliance on chemical pesticides (pest-resistant crops). (iii) helped to reduce post harvest losses. (iv) increased efficiency of mineral usage by plants (this prevents early exhaustion of fertility of soil). (v) enhanced nutritional value of food, e.g., golden rice, i.e., Vitamin 'A' enriched rice.

S36. Ans. (d)

Sol. Under unfavourable conditions many zooplankton species in lakes and ponds are known to enter diapause, a stage of suspended development.

S37. Ans. (b)

Sol. In a typical nucleus, some region of chromatin are loosely packed (and stains light) and are referred to as euchromatin. The chromatin that is more densely packed and stains dark are called as Heterochromatin. Euchromatin is said to be transcriptionally active chromatin, whereas heterochromatin is inactive.

S38. Ans. (a)

Sol. To sustain animal visits, the flowers have to provide rewards to the animals. Nectar and pollen grains are the usual floral rewards. In some species floral rewards are in providing safe places to lay eggs.

S39. Ans. (c)

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 excellent candidates for species-specific, narrow spectrum insecticidal applications. They have been shown to have no negative impacts on plants, mammals, birds, fish or even on non-target insects.

S40. Ans. (d)

Sol. Realising the significance of participation by local communities, the Government of India in 1980s has introduced the concept of Joint Forest Management (JFM) so as to work closely with the local communities for protecting and managing forests.

S41. Ans. (a)

Sol. Embryo develops at the micropylar end of the embryo sac where the zygote is situated. Most zygotes divide only after certain amount of endosperm is formed. This is an adaptation to provide assured nutrition to the developing embryo.

S42. Ans. (b)

Sol. A typical dicotyledonous embryo, consists of an embryonal axis and two cotyledons. The portion of embryonal axis above the level of cotyledons is the epicotyl, which terminates with the plumule or stem tip. The cylindrical portion below the level of cotyledons is hypocotyl that terminates at its lower end in the radicle or root tip. The root tip is covered with a root cap.

S43. Ans. (c)

Sol. The embryonal axis has the radical and root cap enclosed in an undifferentiated sheath called coleorrhiza. The portion of the embryonal axis above the level of attachment of scutellum is the epicotyl. Epicotyl has a shoot apex and a few leaf primordia enclosed in a hollow foliar structure, the coleoptile.

S44. Ans. (d)

Sol. A typical dicotyledonous embryo, consists of an embryonal axis and two cotyledons. The portion of embryonal axis above the level of cotyledons is the epicotyl, which terminates with the plumule or stem tip. The cylindrical portion below the level of cotyledons is hypocotyl that terminates at its lower end in the radicle or root tip. The root tip is covered with a root cap.

S45. Ans. (b)

Sol. Embryogeny is similar in both monocotyledons and dicotyledons. The zygote gives rise to the proembryo and subsequently to the globular, heart-shaped and mature embryo.

S46. Ans. (b)

Sol. Domestic sewage primarily contains biodegradable organic matter, which readily decomposes – thanks to bacteria and other micro-organisms, which can multiply using these organic substances as substrates and hence utilise some of the components of sewage.

S47. Ans. (c)

Sol. indirectly, BOD is a measure of the organic matter present in the water.

S48. Ans. (b)

Sol. BOD refers to the amount of the oxygen that would be consumed if all the organic matter in one liter of water were oxidised by bacteria. The sewage water is treated till the BOD is reduced. The BOD test measures the rate of uptake of oxygen by micro-organisms in a sample of water and thus, indirectly, BOD is a measure of the organic matter present in the water. The greater the BOD of waste water, more is its polluting potential.

S49. Ans. (a)

Sol. Micro-organisms involved in biodegradation of organic matter in the receiving water body consume a lot of oxygen, and as a result there is a sharp decline in dissolved oxygen downstream from the point of sewage discharge. This causes mortality of fish and other aquatic creatures.

S50. Ans. (d)

Sol. Solids are relatively easy to remove, what is most difficult to remove are dissolved salts such as nitrates, phosphates, and other nutrients, and toxic metal ions and organic compounds.