Previous Year Paper

5th June 2023 (Shift 3)

Q1. The probability of having a haemophilia carrier daughter by a haemophilia carrier mother and a normal father is:
(a) 100%
(b) 50%
(c) 25%
(d) 75%

Q2. Arrange the stages of oogenesis in order of their occurrence.
(A) Formation of ovum & IInd polar body
(B) Meiosis II begins but held at Metaphase II
(C) Meiosis I started but held at Prophase I
(D) Formation of primary oocyte from oogonia
(E) Completion of Meiosis-I and formation of secondary oocyte and first polar body

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

Q3. A mature embryo sac of an angiosperm is:
(a) 7 nucleate, 7 celled
(b) 8 nucleate, 7 celled
(c) 6 nucleate; 7 celled
(d) 4 nucleate, 7 celled

Q4. Who proposed the concept 'saltation' in evolution?
(a) Thomas Malthus
(b) Charles Darwin
(c) Hugo deVries
(d) Ernst Haeckel

Q5. Arrange the following steps of sewage treatment in a sequential order.
(A) Primary effluent passed in aeration tank
(B) Activated sludge is formed
(C) Filtration and sedimentation of sewage
(D) Aerobic microbes grow into flocs

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

Q6. The finches found on Galapagos Islands were originally _____.
(a) Insectivores
(b) Fruit eaters
(c) Fish eaters
(d) Seed eaters

Q7. `Hisardale' a new breed of sheep developed in Punjab by:
(a) In-breeding
(b) Out-crossing
(c) Cross-breeding
(d) Out-breeding

Q8. Which of the following is an example of auto-immune disease?
(a) Rheumatoid arthritis
(b) Malaria
(c) Elephantiasis
(d) Amoebiasis

Q9. If the solar energy available to a particular ecosystem is 1,000,000 J. What will be the energy available at 2nd trophic level in the food chain?
(a) 100 kJ
(b) 10 kJ
(c) 1 kJ
(d) 0.1 kJ

Q10. The Verhulst - Pearl Logistic Growth of population is characterised by:
(a) Straight line curve
(b) Sigmoid curve
(c) J-shaped curve
(d) L-shaped curve

Q11. Match **List-I** with **List-II**:

List-I		**List-II**	
(A)	Somaclone	(I)	Pomato
(B)	Totipotency	(II)	Virus free regions in plant
(C)	Meristem	(III)	Genetically identical to original plant used in tissue culture
(D)	Somatic hybrid	(IV)	Stem cells

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

Q12. Match **List-I** with **List-II**:

List-I		List-II	
(A)	Cloning vector	(I)	Sea weeds
(B)	β-galactosidase	(II)	Selectable marker
(C)	Agarose	(III)	Ti-plasmid of *Agrobacterium tumifaciens*
(D)	amp^R in pBR322	(IV)	Chromogenic screening

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

Q13. Use of biofertilizers as a nutrient source is a practised in _____.
(a) Inorganic farming
(b) Animal husbandry
(c) Organic farming
(d) Crop rotation

Q14. Examples of Ex-situ conservation are:
(A) Botanical gardens
(B) Sacred grooves
(C) Hot spots
(D) Zoological parks

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

Q15. The gene controlling the ABO blood groups in humans is:
(a) A
(b) B
(c) I
(d) O

Q16. 'Barnacles' growing on the back of whale is a classical example of:
(a) Mutualism
(b) Predation
(c) Amensalism
(d) Commensalism

Q17. Identify the statements which hold true for transgenic animals.
(A) Transgenic animals can be used to study vaccine safety.
(B) Over 95% of transgenic animals are mice
(C) Transgenic animals cannot be used to study human diseases
(D) Transgenic animal possesses and express foreign gene

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

Q18. Select the properties of cancer cell
(A) Forms benign tumors
(B) Causes very little damage to the surrounding tissues
(C) Can show Metastasis
(D) Lacks contact inhibition

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

Q19. In plants, continued self-pollination results in
(a) Outcrossing
(b) Inbreeding depression
(c) Self-incompatibility
(d) Male sterility

Q20. The first clinical gene therapy was given to treat:
(a) Thalassemia
(b) Haemophilia
(c) Adenosine deaminase deficiency
(d) Turner's Syndrome

Q21. In biolistic method, the cells are bombarded with high velocity microparticles of:
(a) DNA coated with gold or tungsten
(b) Gold or tungsten coated with DNA
(c) Platinum or copper coated with DNA
(d) Copper or iron coated with DNA

Q22. Which of the following does not show parthenogenesis?
(a) Honeybees
(b) Turkey
(c) Rotifers
(d) Snakes

Q23. Wings of an insect and wings of a bird are:
(a) Homologous organs
(b) Analogous organs
(c) Vestigial organs
(d) Over specialised organs

Q24. Snow-blindness happens when a person is exposed to _____.
(a) Extreme cold
(b) Snow blizzard
(c) High UV-B dose
(d) X-rays

Q25. Match **List-I** with **List-II**:

List-I		List-II	
(A)	Thalassaemia	(I)	Absence of one X chromosome
(B)	Phenylketonuria	(II)	Inborn error of metabolism
(C)	Down' s Syndrome	(III)	Autosomal recessive blood disease
(D)	Turner' s Syndrome	(IV)	Presence of an additional copy of the 21st chromosome

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

Q26. Match **List-I** with **List-II**:

List-I (Name of the plant)		List-II (Name of modifications)	
(A)	*Bryophyllum*	(I)	Offset
(B)	*Agave*	(II)	Bulbil
(C)	Ginger	(III)	Leaf buds
(D)	Water hyacinth	(IV)	Rhizome

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

Q27. Which enzyme is used as a `clot buster'?
(a) Staphlyokinase
(b) Glucokinase
(c) Streptokinase
(d) Protease

Q28. A double stranded DNA fragment has 500 Adenine bases. If total number of base pairs in this fragment is 2500, then what will be the number of guanine bases?
(a) 500
(b) 750
(c) 1000
(d) 2000

Q29. Arrange the following steps of rDNA technology in correct sequence.
(A) Amplification of gene by PCR
(B) Insertion of rDNA into host cell using vector
(C) Isolation of the genetic material from the cell
(D) Cutting the DNA at specific location

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

Q30. Some of the fresh water fishes commonly found in India are:
(A) *Hilsa*
(B) Pomfrets
(C) *Catla*
(D) *Rohu*
(E) Common carp

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

Q31. Which of the following hormone is generally not produced by the placenta?
(a) hCG
(b) hPL
(c) Thyroxin
(d) Estrogen

Q32. Read the following and select the set of correct statements.
(A) Euchromatin is transcriptionally inactive
(B) Heterochromatin is more densely packed
(C) Heterochromatin is loosely packed
(D) Euchromatin is transcriptionally active
(E) Euchromatin stains lighter

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

Q33. Match **List-I** with **List-II**:

List-I (Disease)		List-II (Pathogen)	
(A)	Amoebiasis	(I)	*Trichophyton*
(B)	Ascariasis	(II)	*Entamoeba histolytica*
(C)	Elephantiasis	(III)	Round worm
(D)	Ring Worms	(IV)	*Wuchereria*

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

Q34. The association of Glomus with roots of higher plants is known as _____.
(a) Mycorrhiza
(b) *Rhizobium*
(c) *Azotobacter*
(d) *Oscillatoria*

Q35. Match **List-I** with **List-II**:

List-I		List-II	
(A)	Barrier	(I)	Prevents physical contact between ovum and sperm
(B)	IUD	(II)	Sterilization
(C)	Surgical Methods	(III)	Saheli
(D)	Oral Contraceptives	(IV)	Increase phagocytosis of sperms and suppress sperm motility

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

Q36. Haemophilia is a
(a) Sex linked dominant disorder
(b) Sex linked recessive disorder
(c) Autosome linked dominant disorder
(d) Autosome recessive disorder

Q37. Which of the following is **NOT** a sexually transmitted disease?
(a) Syphilis
(b) AIDS
(c) Filariasis
(d) Gonorrhoea

Q38. 'Polyblend' is a product made by Ahmed Khan. It is a:
(a) Herbal pesticide
(b) Biodegradable plastic
(c) Fine powder of recycled modified plastic
(d) A type of biofuel

Q39. Secondary productivity is:
(a) Measured by organic matter produced.
(b) Rate of formation of new organic matter by producers.
(c) Rate of formation of new organic matter by consumers.
(d) Always greater than primary productivity.

Q40. Match **List-I** with **List-II**:

List-I (Name of the Extinct Animal)		List-II (Name of the country)	
(A)	Stellar Sea Cow	(I)	Mauritius
(B)	Dodo	(II)	Africa
(C)	Thylacine	(III)	Russia
(D)	Quagga	(IV)	Australia

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

Q41.

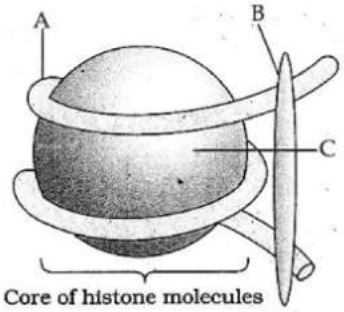


Figure showing packaging Of DNA Helix. Observe the figure and answer the following questions.
The number of base pairs (bp) in a typical nucleosome of DNA helix is:
(a) 100 bp
(b) 200 bp
(c) 500 bp
(d) 1000 bp

Q42.

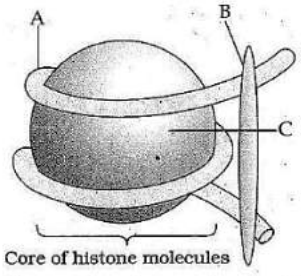


Figure showing packaging Of DNA Helix. Observe the figure and answer the following questions.
The basic amino acid residues present in abundance in histones are:
(a) Methionine and Alanine
(b) Tryptophan and Cysteine
(c) Lysine and Arginine
(d) Alanine and Cysteine

Q43.

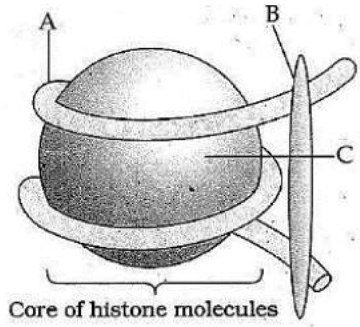


Figure showing packaging of DNA Helix. Observe the figure and answer the following questions.

Which part of the nucleosome is positively charged?

(a) Histone octamer
(b) Chromatin
(c) DNA
(d) Heterochromatin

Q44.

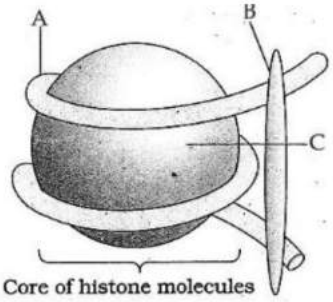


Figure showing packaging of DNA Helix. Observe the figure and answer the following questions.

Identify the lables A, B and C in the given figure

(a)	(A) HI histone	(B) DNA	(C) Histone octamer
(b)	(A) DNA	(B) HI histone	(C) Histone octamer
(c)	(A) Histone octamer	(B) DNA	(C) HI histone
(d)	(A) DNA	(B) Histone octamer	(C) HI histone

Q45.

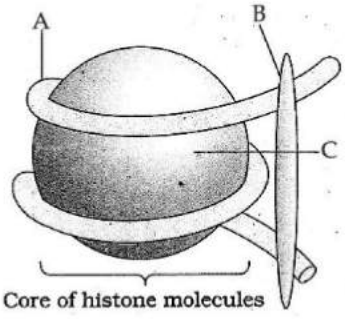
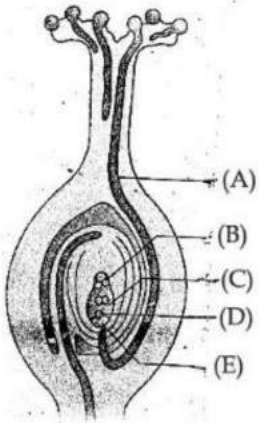


Figure showing packaging of DNA Helix. Observe the figure and answer the following questions.

The region in prokaryotic cell whose DNA is organised in large loops held by proteins is called:

(a) Nuclein
(b) Nucleic region
(c) Nucleus
(d) Nucleoid

Q46.

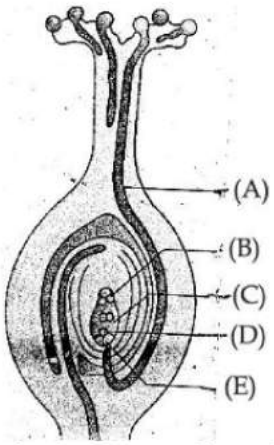


The figure given above shows the growth of pollen tube. Observe the figure and answer the following question.

The function of filiform apparatus is to:

(a) Help in germination of pollen grains
(b) Guide the entry of pollen tube into ovule
(c) Help in the development of embryo
(d) Formation of male gametes

Q47.

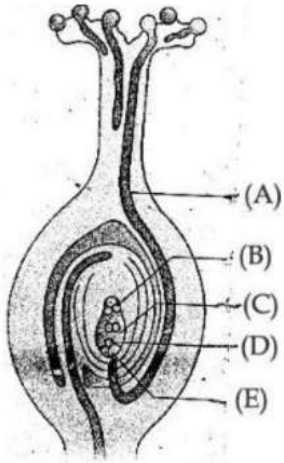


The figure given above shows the growth of pollen tube. Observe the figure and answer the following question.

The ploidy of parts (D) and (E) are:

(a) (D)-n	(E)-2n
(b) (D)-2n	(E)-n
(c) (D)-n	(E)-n
(d) (D)-n	(E)-3n

Q48.

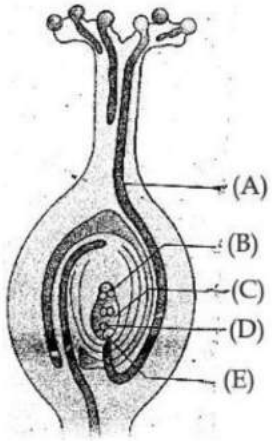


The figure given above shows the growth of pollen tube. Observe the figure and answer the following question.

Identify the part (A) and (B).

(a) Pollen tube and synergids respectively
(b) Synergids and female gamete respectively
(c) Pollen tube and antipodal cells respectively
(d) Pollen tube and female gamete respectively

Q49.

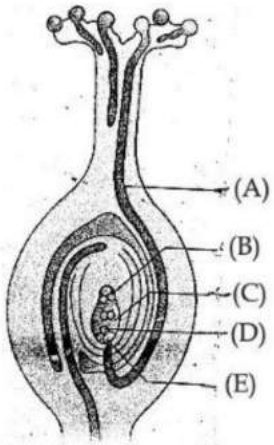


The figure given above shows the growth of pollen tube. Observe the figure and answer the following question.

The site of germination of pollen grains is:

(a) Stigma
(b) Ovary
(c) Style
(d) Embryo sac

Q50.



The figure given above shows the growth of pollen tube. Observe the figure and answer the following question.

Triple fusion takes place when:

(a) One male gamete fuses with the one female gamete
(b) Two male gametes with the egg nucleus
(c) One female gamete fuses with the polar nuclei
(d) One male gamete fuses with the polar nuclei

SOLUTION

S1. Ans. (b)

Sol. The haemophilia is a sex-linked recessive disease which shows its transmission from an unaffected female carrier to some of the male progeny. In this disease, a single protein that is a part of the cascade of proteins involved in the coagulation of blood is affected. As a result of this, in an infected individual, a simple cut will result in non-stop bleeding. The heterozygous female carrier for haemophilia may transfer the disease to sons. The probability of the female becoming haemophilic is very rare because the mother of such a female has to be at least a carrier while the father should be haemophilic. It is an inherited genetic disorder which results in the deterioration of the formation of a blood clot. In a condition, where the father is normal and the mother is the carrier of haemophilia disease, then the female offspring that are produced may be normal or the carrier of the disease.

S2. Ans. (C)

Sol. Oogonia 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. A large number of these follicles degenerate during the phase from birth to puberty. Therefore, at puberty only 60,000-80,000 primary follicles are left in each ovary. The primary follicles get surrounded by more layers of granulosa cells and a new theca and are called secondary follicles. The secondary follicle soon transforms into a tertiary follicle which is characterised by a fluid filled cavity called antrum. The theca layer is organised into an inner theca interna and an outer theca externa. It is important to draw your attention that it is at this stage that the primary oocyte within the tertiary follicle grows in size and completes its first meiotic division. It is an unequal division resulting in the formation of a large haploid secondary oocyte and a tiny first polar body. During fertilization, the secretions of the acrosome help the sperm enter into the cytoplasm of the ovum through the zona pellucida and the plasma membrane. This induces the completion of the meiotic division of the secondary oocyte. The second meiotic division is also unequal and results in the formation of a second polar body and a haploid ovum (ootid).

S3. Ans. (b)

Sol. a typical angiosperm embryo sac, at maturity, though 8-nucleate is 7-celled.

S4. Ans. (c)

Sol. Evolution for Darwin was gradual while deVries believed mutation caused speciation and hence called it saltation (single step large mutation).

S5. Ans. (c)

Sol. Primary treatment of sewage involves h filtration and sedimentation. All solids that settle form the primary sludge, and the supernatant forms the effluent. The effluent from the primary settling tank is taken for secondary treatment. The primary effluent is passed into large aeration tanks 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. This sediment is called activated sludge.

S6. Ans. (d)

Sol. During his journey Darwin went to Galapagos Islands. There he observed an amazing diversity of creatures. Of particular interest, small black birds later called Darwin's Finches amazed him. He realised that there were many varieties of finches in the same island. All the varieties, he conjectured, evolved on the island itself. From the original seed-eating features, many other forms with altered beaks arose, enabling them to become insectivorous and vegetarian finches.

S7. Ans. (c)

Sol. Hisardale is a new breed of sheep developed in Punjab by crossing Bikaneri ewes and Marino rams.

S8. Ans. (a)

Sol. Rheumatoid arthritis which affects many people in our society is an auto-immune disease.

S9. Ans. (b)

Sol. In a food chain of an ecosystem, 10% of the energy is transferred to the next trophic level which is also called the 10% rule of energy transfer. So, if there is 1000000 J of sunlight then the first trophic level will be having 100000 J and the second trophic level will have 10000 J, that is 10kJ of energy.

S10. Ans. (b)

Sol. Logistic growth is the population growth curve represented by the equation $dN/dt = rN (1 - N /K)$, it is sigmoid.

S11. Ans. (c)

Sol. The method of producing thousands of plants through tissue culture is called micro-propagation. Each of these plants will be genetically identical to the original plant from which they were grown, i.e., they are somaclones. Even if the plant is infected with a virus, the meristem (apical and axillary) is free of virus. Pomato is a somatic hybrid. The capacity to generate a whole plant from any cell/explant is called totipotency.

S12. Ans. (d)

Sol. The ligation of alien DNA in pBR322 is carried out at a restriction site present in one of the two antibiotic resistance genes (amp^R and tet^R). The tumor inducing (Ti) plasmid of Agrobacterium tumifaciens has now been modified into a cloning vector which is no more pathogenic to the plants but is still able to use the mechanisms to deliver genes of our interest into a variety of plants. Nowadays the most commonly used matrix is agarose which is a natural polymer extracted from sea weeds.

S13. Ans. (c)

Sol. Natural manures, compost, and bio-fertilizers are used in organic farming by farmers.

S14. Ans. (b)

Sol. Botanical gardens, zoological parks, seed banks, cryopreservation, field gene banks are ex-situ methods of conserving biodiversity. Hot spots and sacred grooves are in-situ methods.

S15. Ans. (c)

Sol. ABO blood groups are controlled by the gene I gene in humans.

S16. Ans. (d)

Sol. Commensalism is the interaction in which one species benefits and the other is neither harmed nor benefited. An orchid growing as an epiphyte on a mango branch, and barnacles growing on the back of a whale benefit while neither the mango tree nor the whale derives any apparent benefit.

S17. Ans. (b)

Sol. Many transgenic animals are designed to increase our understanding of how genes contribute to the development of disease. These are specially made to serve as models for human diseases so that investigation of new treatments for diseases is made possible. Today transgenic models exist for many human diseases such as cancer, cystic fibrosis, rheumatoid arthritis and Alzheimer's.

S18. Ans. (d)

Sol. In our body, cell growth and differentiation is highly controlled and regulated. In cancer cells, there is breakdown of these regulatory mechanisms. Normal cells show a property called contact inhibition by virtue of which contact with other cells inhibits their uncontrolled growth. Cancer cells appears to have lost this property. Tumors are of two types, namely the Benign tumors that normally remain confined to their original location and do not spread to other parts of the body and cause little damage and malignant tumors that show metastasis.

S19. Ans. (b)

Sol. Continued self-pollination result in inbreeding depression. So flowering plants developed following devices to discourage self -pollination and to encourage cross-pollination.

S20. Ans. (c)

Sol. The first clinical gene therapy was given in 1990 to a 4-year old girl with adenosine deaminase (ADA) deficiency.

S21. Ans. (b)

Sol. In another method, suitable for plants, cells are bombarded with high velocity micro-particles of gold or tungsten coated with DNA in a method known as biolistics or gene gun

S22. Ans. (d)

Sol. some organisms like rotifers, honeybees and even some lizards and birds (turkey), the female gamete undergoes development to form new organisms without fertilisation. This phenomenon is called parthenogenesis.

S23. Ans. (b)

Sol. The wings of a bird and insects are analogous structures, they represent convergent evolution.

S24. Ans. (c)

Sol. In human eye, cornea absorbs UV-B radiation, and a high dose of UV-B causes inflammation of cornea, called snow-blindness, cataract, etc. Such exposure may permanently damage the cornea.

S25. Ans. (d)

Sol. Down's Syndrome is due to the presence of an additional copy of the chromosome number 21 (trisomy of 21). Turner's Syndrome is caused due to the absence of one of the X chromosomes, i.e., 45 with X0. Phenylketonuria is an in-born error of metabolism. Thalassemia is an autosome-linked recessive blood disease transmitted from parents to the offspring when both the partners are unaffected carrier for the gene.

S26. Ans. (b)

Sol. adventitious buds arise from the notches present at margins of leaves of Bryophyllum. This ability is fully exploited by gardeners and farmers for commercial propagation of plants, ginger propagates through rhizome, water hyacinth by offset and agave by bulbils.

S27. Ans. (c)

Sol. Streptokinase produced by the bacterium Streptococcus and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infarction leading to heart attack.

S28. Ans. (b)

Sol. According to Chargaff's law, Adenine = 500 bases,
$A + T = G + C$
$A + T = 500 + 500 = 1000$
Guanine bases = 2500 – 1000 = 1500, G = C = 750

S29. Ans. (a)

Sol. DNA containing the gene of interest is identified and isolated from the organism.

The gene of interest is inserted into the plasmid which is a vector which is used to deliver and maintain the DNA in the host organism. This is known as recombinant DNA or rDNA

The rDNA is now introduced into the host and the process is known as transformation.

The host cells that have taken up the rDNA are known as transformed cells. These cells need to be differentiated from the other cells that have not taken up the rDNA. Here, growing the mixture of cells in an antibiotic-containing medium helps in the selection and identification of the transformants from the non-transformants. The various selectable markers also play an important role in identifying the recombinants from the non-recombinants

The rDNA containing the gene of interest expresses itself by producing a protein and this is known as the expression of the introduced gene

S30. Ans. (d)

Sol. Some of the freshwater fishes which are very common include Catla, Rohu and common carp. Some of the marine fishes that are eaten include – Hilsa, Sardines, Mackerel and Pomfrets.

S31. Ans. (c)

Sol. Placenta also acts as an endocrine tissue and produces several hormones like human chorionic gonadotropin (hCG), human placental lactogen (hPL), estrogens, progestogens, etc.

S32. Ans. (d)

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.

S33. Ans. (c)

Sol. Ascaris, the common round worm and Wuchereria, the filarial worm, are some of the helminths which are known to be pathogenic to man. Ascaris, an intestinal parasite causes ascariasis. Wuchereria the filarial worms cause filariasis. 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. Entamoeba histolytica is a protozoan parasite in the large intestine of human which causes amoebiasis (amoebic dysentery).

S34. Ans. (a)

Sol. Fungi are also known to form symbiotic associations with plants (mycorrhiza). Many members of the genus Glomus form mycorrhiza.

S35. Ans. (d)

Sol. ovum and sperms are prevented from physically meeting with the help of barrier contraceptives, IUDs increase phagocytosis of sperms within the uterus and the Cu ions released suppress sperm motility and the fertilising capacity of sperms, Saheli is an oral contraceptive, surgical methods, also called sterilisation, are generally advised for the male/female partner as a terminal method to prevent any more pregnancies.

S36. Ans. (b)

Sol. Haemophilia is a sex-linked recessive disease, which shows its transmission from unaffected carrier female to some of the male progeny.

S37. Ans. (c)

Sol. Wuchereria (W. bancrofti and W. malayi), the filarial worms cause filariasis.

S38. Ans. (c)

Sol. Polyblend, a fine powder of recycled modified plastic, was developed then by his company.

S39. Ans. (c)

Sol. Secondary productivity is defined as the rate of formation of new organic matter by consumers.

S40. 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.

S41. Ans. (b)

Sol. A typical nucleosome contains 200 bp of DNA helix.

S42. Ans. (c)

Sol. Histones are rich in the basic amino acid residues lysine and arginine.

S43. Ans. (a)

Sol. There is a set of positively charged, basic proteins called histones. A protein acquires charge depending upon the abundance of amino acids residues with charged side chains. Histones are rich in the basic amino acid residues lysine and arginine. Both the amino acid residues carry positive charges in their side chains. Histones are organised to form a unit of eight molecules called histone octamer.

S44. Ans. (b)

Sol. A is DNA, B is H1 histone and C is histone octamer.

S45. Ans. (d)

Sol. In prokaryotes, such as, E. coli, though they do not have a defined nucleus, the DNA is not scattered throughout the cell. DNA (being negatively charged) is held with some proteins (that have positive charges) in a region termed as 'nucleoid'. The DNA in nucleoid is organised in large loops held by proteins

S46. Ans. (b)

Sol. The function of the filiform apparatus is to guide the pollen tube into the synergids.

S47. Ans. (c)

Sol. D is egg cell and is haploid and , E is synergids and is also haploid.

S48. Ans. (c)

Sol. A is pollen tube and B is antipodal cell.

S49. Ans. (a)

Sol. The site of germination of pollen grains is stigma.

S50. Ans. (d)

Sol. One of the male gametes moves towards the egg cell and fuses with its nucleus thus completing the syngamy. This results in the formation of a diploid cell, the zygote. The other male gamete moves towards the two polar nuclei located in the central cell and fuses with them to produce a triploid primary endosperm nucleus (PEN). As this involves the fusion of three haploid nuclei it is termed triple fusion.