Section : **Biology**

Q.1 **What does 'r' denotes in the given equation?**
dN/dT = rN

1. Population density
2. Time
3. Base of natural logarithms
4. Intrinsic rate of natural increase

Options 1. 1
2. 2
3. 3
4. 4

Q.2 **Aravalli Hills of Rajasthan and Khasi and Jaintia Hills in Meghalaya are the examples of:**
1. Hotspots
2. Biosphere reserves
3. Sacred groves
4. Wildlife safari parks

Options 1. 1
2. 2
3. 3
4. 4

Q.3 **Exine of pollen grains has prominent apertures where sporopollenin is absent are known as:**
1. Intine
2. Germ pores
3. Vegetative cell
4. Generative cell

Options 1. 1
2. 2
3. 3
4. 4

Q.4 **In amensalism:**
1. One species is benefitted and the other is neither benefitted nor harmed
2. One species is benefited whereas the other is unaffected
3. One species is harmed whereas the other is unaffected
4. One species is harmed and other is benefitted

Options 1. 1
2. 2
3. 3
4. 4

Q.5 **Transmission of HIV infection occurs by:**
(A) By transfusion of contaminated blood
(B) By sharing infected needles
(C) Sexual contact with HIV infected person
(D) From an infected mother to her child through the placenta

Choose the correct answer from the options given below:
1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.6 In Sickle-cell anemia, the substitution of amino acid in the globin protein results due to the single base substitution at the sixth codon of the beta globin gene from:
1. AUG to GAG
2. AUG to GUG
3. GAG to AUG
4. GAG to GUG

Options 1. 1
2. 2
3. 3
4. 4

Q.7 In case of malaria, the rupture of RBCs is associated with release of a toxic substance called,_____, which is responsible for the chill and high fever recurring after every three to four days.
1. Haeme
2. Haemozoin
3. Haematozoin
4. Haemoglobin

Options 1. 1
2. 2
3. 3
4. 4

Q.8 In which region of the fallopian tube, fertilization of sperm and ovum takes place?
1. Isthmus
2. Ampulla
3. Infundibulum
4. Fimbriae

Options 1. 1
2. 2
3. 3
4. 4

Q.9 Choose the correct combination of STOP codons:
(A) UUU
(B) UAA
(C) UAG
(D) UGA

Choose the *correct* answer from the options given below:
1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.10 Thalassemia is an:
1. Autosome-linked dominant disorder
2. Autosome-linked recessive disorder
3. Sex-linked recessive disorder
4. Sex-linked dominant disorder

Options 1. 1
2. 2
3. 3
4. 4

Q.11 Match List-I with List-II

Immunity barriers	Examples

(A) Physical barriers (I) Interferons

(B) Cellular barriers (II) Acid in the stomach

(C) Cytokine barriers (III) Skin

(D) Physiological barriers (IV) WBCs

Choose the correct answer from the options given below:

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

Options 1. 1

2. 2

3. 3

4. 4

Q.12 The RNA polymerase II transcribes:

1. tRNA
2. hnRNA
3. snRNA
4. rRNA

Options 1. 1

2. 2

3. 3

4. 4

Q.13 The flowers which do not open at all are known as:

1. Chasmogamous flowers
2. Cleistogamous flowers
3. Submerged flowers
4. Cross-pollinated flowers

Options 1. 1

2. 2

3. 3

4. 4

Q.14 Statins produced by the yeast variety is_____ which have been commercialised as blood-cholesterol lowering agents.

1. *Aspergillus niger*
2. *Trichoderma polysporum*
3. *Monascus purpureus*
4. *Bacillus thuringiensis*

Options 1. 1

2. 2

3. 3

4. 4

Q.15 Contact inhibition is a property of:

1. Normal cells
2. Cancer cells
3. B-cells
4. T-cells

Options 1. 1

2. 2

3. 3

4. 4

Q.16 IUCN stands for:

1. International Union for Conservation of Natural Resources
2. International Union for Conservation of Nature
3. International Union for Conservation of Nature and Natural Resources
4. International Union Commission of Nature and Natural Resources

Options 1. 1

2. 2

3. 3

4. 4

Q.17 **Match List-I with List-II**

Characteristics	Examples
(A) Symbiotic association with roots of leguminous plants	(I) Glomus
(B) Fixes atmospheric nitrogen while free living in the soil	(II) Rhizobium
(C) Symbiotic association of fungi and plants	(III) Anabaena
(D) Cyanobacteria which can fix atmospheric nitrogen	(IV) Azotobacter

Choose the correct answer from the options given below:
1. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options 1. 1

2. 2

3. 3

4. 4

Q.18 **The hormone releasing IUDs function by:**
1. Decreasing phagocytosis of sperms within the uterus
2. Activating sperm motility and the fertilising capacity of sperms
3. Making the uterus suitable for implantation and the cervix hostile to the sperms
4. Making the uterus unsuitable for implantation and the cervix hostile to the sperms

Options 1. 1

2. 2

3. 3

4. 4

Q.19 **The genetic disorder, Down's Syndrome is caused due to:**
1. Deletion of chromosome no. 21
2. Trisomy of chromosome no. 18
3. Trisomy of chromosome no. 21
4. Inversion of chromosome no. 21

Options 1. 1

2. 2

3. 3

4. 4

Q.20 **Arrange the given structures starting from chalazal end to micropylar end in a mature embryo sac?**
(A) Central cell
(B) Antipodals
(C) Synergids
(D) Egg

Choose the correct answer from the options given below:
1. (A), (B), (C), (D)
2. (D), (C), (B), (A)
3. (B), (A), (D), (C)
4. (C), (B), (D), (A)

Options 1. 1

2. 2

3. 3

4. 4

Q.21 You must have seen the weed *Calotropis* growing in abandoned fields. The plant produces highly poisonous_____ and that is why you never see any cattle or goats browsing on this plant.

1. Cardiac amino acids
2. Cardiac glucose
3. Cardiac glycerol
4. Cardiac glycosides

Options

1. 1
2. 2
3. 3
4. 4

Q.22 Arrange the given structures in correct sequence of spermatogenesis?

(A) Spermatozoa
(B) Secondary spermatocytes
(C) Spermatogonia
(D) Spermatids

Choose the correct answer from the options given below:

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

Options

1. 1
2. 2
3. 3
4. 4

Q.23 Identify the correct sequence of events during menstrual cycle?

(A) Next cycle begins
(B) Proliferative phase
(C) Menstruation
(D) Secretory phase

Choose the correct answer from the options given below:

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

Options

1. 1
2. 2
3. 3
4. 4

Q.24 The rate of biomass production is called productivity. It is expressed in terms of_____ to compare the productivity of different ecosystems.

1. (kcal m^{-1}) yr^{-1}
2. (kcal m^{-2}) yr^{-2}
3. (kcal m^{-2}) yr^{-1}
4. (kcal m^{-1}) yr^{-2}

Options

1. 1
2. 2
3. 3
4. 4

Q.25 The "Rivet Popper Hypothesis" was used by:

1. Alexander von Humboldt
2. Paul Ehrlich
3. Hardy-Weinberg
4. Edward Wilson

Options

1. 1
2. 2
3. 3
4. 4

Q.26 Nicotine stimulates the adrenal gland to release:
(A) Thyroid stimulating hormone (TSH)
(B) Adrenaline
(C) Estrogen
(D) Nor-adrenaline

Choose the *correct* answer from the options given below:
1. (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.27 Select the intra uterine devices from the following:
(A) Multiload 375
(B) Saheli
(C) Cervical caps
(D) Progestasert

Choose the *correct* answer from the options given below:
1. (A) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (B), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.28 Match List-I with List-II

List-I	List-II
Evolutionary stages of human species	Time of origin
(A) *Ramapithecus*	(I) About 1.5 million years ago
(B) Neanderthal man	(II) About 2 million years ago
(C) *Australopithecines*	(III) 1,00,000-40,000 years ago
(D) Homo erectus	(IV) About 15 million years ago

Choose the correct answer from the options given below:
1. (A) - (I), (B) - (II), (C) - (III), (D) - (IV)
2. (A) - (IV), (B) - (III), (C) - (II), (D) - (I)
3. (A) - (IV), (B) - (I), (C) - (II), (D) - (III)
4. (A) - (II), (B) - (I), (C) - (IV), (D) - (III)

Options 1. 1
2. 2
3. 3
4. 4

Q.29 Baculoviruses are pathogens that attack -
1. Birds and other mammals
2. Bacteria and other fungi
3. Plants and other algae
4. Insects and other arthropods

Options 1. 1
2. 2
3. 3
4. 4

Q.30 The second trophic level in an aquatic ecosystem is:
1. Phytoplanktons
2. Fishes

3. Large fishes
4. Zooplanktons

Options 1. 1
2. 2
3. 3
4. 4

Q.31 Match List-I with List-II

List-I	List-II
Geological periods	Plants evolved
(A) Devonian	(I) Gnetales
(B) Carboniferous	(II) Cycads
(C) Jurassic	(III) Seed ferns
(D) Cretaceous	(IV) Progymnopserms

Choose the correct answer from the options given below:
1. (A) (I), (B) (II), (C) (III), (D) - (IV)
2. (A) (I), (B) - (II), (C) - (IV), (D) - (III)
3. (A) (IV), (B) (III), (C) (II), (D) - (1)
4. (A) (III), (B) (IV), (C) (I), (D) - (II)

Options 1. 1
2. 2
3. 3
4. 4

Q.32 The inner cell mass of the embryo contains some cells which can give rise to all the tissues and organs. They are known as:
1. Ectoderm
2. Blastomeres
3. Trophoblast
4. Stem cells

Options 1. 1
2. 2
3. 3
4. 4

Q.33 Zygote or embryos upto 8 blastomeres can be transferred into the fallopian tube for further development. The procedure is known as:
1. Zygote intra fallopian transfer (ZIFT)
2. Gamete intra fallopian transfer (GIFT)
3. Intra cytoplasmic sperm injection (ICSI)
4. Intra-uterine insemination (IUI)

Options 1. 1
2. 2
3. 3
4. 4

Q.34 Cyclosporin A, which is used as an immunosuppressive agent, is produced by:
1. *Staphylococcus*
2. *Penicillium notatum*
3. *Trichoderma polysporum*
4. *Monascus purpureus*

Options 1. 1
2. 2
3. 3
4. 4

Q.35 The pyramid of biomass in the sea is -
1. Always upright
2. Upright
3. Inverted

4. Neither inverted nor upright

Options 1. 1
2. 2
3. 3
4. 4

Q.36 Arrange the given structures in correct sequence of transcription unit when we move from left to right?
(A) Terminator
(B) Promoter
(C) Structural gene
(D) Transcription start site

Choose the correct answer from the options given below:
1. (A), (B), (C), (D)
2. (B), (D), (C), (A)
3. (B), (A), (D), (C)
4. (C), (B), (D), (A)

Options 1. 1
2. 2
3. 3
4. 4

Q.37 Choose the scientists associated with the antibiotic "Penicillin":
(A) Alexander Fleming
(B) James Watson
(C) Ernest Chain
(D) Howard Florey

Choose the *correct* answer from the options given below:
1. (A), (B) and (D) only
2. (A), (B) and (C) only
3. (A), (B), (C) and (D)
4. (A), (C) and (D) only

Options 1. 1
2. 2
3. 3
4. 4

Q.38 Arrange the given taxa of invertebrates in terms of their increasing numbers.
(A) Other animal groups
(B) Molluscs
(C) Insects
(D) Crustaceans

Choose the correct answer from the options given below:
1. (A), (B), (C), (D)
2. (A), (C), (B), (D)
3. (D), (B), (A), (C)
4. (C), (B), (D), (A)

Options 1. 1
2. 2
3. 3
4. 4

Q.39 Match List-I with List-II

List-I	List-II
Structures	Characteristics
(A) Heterochromatin	(I) A set of positively charged basic proteins
(B) Nucleosomes	(II) Densely packed and inactive genetic material

(C) Histones (III) Transcriptionally active genetic material

(D) Euchromatin (IV) DNA is wrapped around the histone octamer to form this structure

Choose the correct answer from the options given below:
1. (A) - (II), (B) - (IV), (C) - (I), (D) - (III)
2. (A) - (I), (B) - (III), (C) - (II), (D) - (IV)
3. (A) - (I), (B) - (II), (C) - (IV), (D) - (III)
4. (A) - (III), (B) - (IV), (C) - (I), (D) - (II)

Options 1. 1

2. 2

3. 3

4. 4

Q.40 Identify one of the given factors which does not affect Hardy-Weinberg equilibrium.
1. Mutation
2. Genetic drift
3. Reproduction
4. Gene flow

Options 1. 1

2. 2

3. 3

4. 4

Q.41 Read the following passage carefully and answer the given questions.
Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes). *B. thuringiensis* forms protein crystals during a particular phase of their growth. Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (a-1-antitrypsin) used to treat emphysema. In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk. A nematode *Meloidegyne incognitia* infects the roots of tobacco plants and causes a great reduction in yield. A novel strategy was adopted to prevent this infestation which was based on the process of RNA interference (RNAi). This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing). Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment. ELISA is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens (proteins, glycoproteins, etc.) or by detecting the antibodies synthesised against the pathogen.

Biopiracy is the term used to refer:
1. The use of bio-resources by multinational companies and other organisations with proper authorisation from the countries and people concerned with compensatory payment.
2. The use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned with compensatory payment.
3. The use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment.
4. The use of bio-resources by multinational companies and other organisations with proper authorisation from the countries and people concerned without compensatory payment.

Options 1. 1

2. 2

3. 3

4. 4

Q.42 Read the following passage carefully and answer the given questions.

Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes). *B. thuringiensis* forms protein crystals during a particular phase of their growth. Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (a-1-antitrypsin) used to treat emphysema. In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk. A nematode *Meloidegyne incognitia* infects the roots of tobacco plants and causes a great reduction in yield. A novel strategy was adopted to prevent this infestation which was based on the process of RNA interference (RNAi). This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing). Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment. ELISA is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens (proteins, glycoproteins, etc.) or by detecting the antibodies synthesised against the pathogen.

In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained a protein called_____ which was nutritionally a more balanced product for human babies than natural cow-milk.

1. Human alpha-lactoglobulin
2. Human beta-lactalbumin
3. Bovine alpha-lactalbumin
4. Human alpha-lactalbumin

Options 1. 1

2. 2

3. 3

4. 4

Q.43 Read the following passage carefully and answer the given questions.

Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes). *B. thuringiensis* forms protein crystals during a particular phase of their growth. Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (a-1-antitrypsin) used to treat emphysema. In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk. A nematode *Meloidegyne incognitia* infects the roots of tobacco plants and causes a great reduction in yield. A novel strategy was adopted to prevent this infestation which was based on the process of RNA interference (RNAi). This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing). Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment. ELISA is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens (proteins, glycoproteins, etc.) or by detecting the antibodies synthesised against the pathogen.

mRNA silencing through RNA interference (RNAi) refers to the:

1. Prevention of translation of mRNA
2. Prevention of transcription of mRNA
3. Prevention of replication of mRNA
4. Prevention of reverse transcription of mRNA

Options 1. 1

2. 2

3. 3

4. 4

Q.44 Read the following passage carefully and answer the given questions.

Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes). *B. thuringiensis* forms protein crystals during a particular phase of their growth. Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (a-1-antitrypsin) used to treat emphysema. In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk. A nematode *Meloidegyne incognitia* infects the roots of tobacco plants and causes a great reduction in yield. A novel strategy was adopted to prevent this infestation which was based on the process of RNA interference (RNAi). This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing). Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment. ELISA is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens (proteins, glycoproteins, etc.) or by detecting the antibodies synthesised against the pathogen.

Some strains of *Bacillus thuringiensis* produce proteins that do not kill certain arthropods, such as:
1. Lepidopterans
2. Coleopterans
3. Crustaceans
4. Dipterans

Options 1. 1
2. 2
3. 3
4. 4

Q.45 Read the following passage carefully and answer the given questions.
Some strains of *Bacillus thuringiensis* produce proteins that kill certain insects such as lepidopterans (tobacco budworm, armyworm), coleopterans (beetles) and dipterans (flies, mosquitoes). *B. thuringiensis* forms protein crystals during a particular phase of their growth. Transgenic animals that produce useful biological products can be created by the introduction of the portion of DNA (or genes) which codes for a particular product such as human protein (a-1-antitrypsin) used to treat emphysema. In 1997, the first transgenic cow, Rosie, produced human protein-enriched milk (2.4 grams per litre). The milk contained the human alpha-lactalbumin and was nutritionally a more balanced product for human babies than natural cow-milk. A nematode *Meloidegyne incognitia* infects the roots of tobacco plants and causes a great reduction in yield. A novel strategy was adopted to prevent this infestation which was based on the process of RNA interference (RNAi). This method involves silencing of a specific mRNA due to a complementary dsRNA molecule that binds to and prevents translation of the mRNA (silencing). Biopiracy is the term used to refer to the use of bio-resources by multinational companies and other organisations without proper authorisation from the countries and people concerned without compensatory payment. ELISA is based on the principle of antigen-antibody interaction. Infection by pathogen can be detected by the presence of antigens (proteins, glycoproteins, etc.) or by detecting the antibodies synthesised against the pathogen.

ELISA is based on the principle of:
1. Antigen-antibiotic interaction
2. Antibody-antibiotic interaction
3. Antigen-antigen interaction
4. Antigen-antibody interaction

Options 1. 1
2. 2
3. 3
4. 4

Q.46 Read the following passage carefully and answer the given questions.
Restriction endonuclease on finding its specific recognition sequence, bind to the DNA and cut each of the two strands of the double helix at

specific points in their sugar -phosphate backbones. Each restriction endonuclease recognises a specific palindromic nucleotide sequences in the DNA. Since the DNA is enclosed within the membranes, we have to break the cell open to release DNA along with other macromolecules such as RNA, proteins, polysaccharides and also lipids. This can be achieved by treating the bacterial cells/plant or animal tissue with enzymes such as lysozyme (bacteria), cellulase (plant cells), chitinase (fungus). Now a days the most commonly used matrix is agarose which is a natural polymer extracted from sea weeds. The DNA fragments separate (resolve) according to their size through sieving effect provided by the agarose gel. The first restriction endonuclease-*Hind II*, whose functioning depended on a specific DNA nucleotide sequence was isolated and characterised five years later. It was found that *Hind II* always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs. In addition to 'ori', the vector requires a selectable marker, which helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants. Transformation is a procedure through which a piece of DNA is introduced in a host bacterium. Normally, the genes encoding resistance to antibiotics such as ampicillin, chloramphenicol, tetracycline or kanamycin, etc., are considered useful selectable markers for *E. coli.*

Transformation is a procedure through which:
1. A piece of DNA is introduced in a host virus
2. A piece of RNA is introduced in a host bacterium
3. A piece of DNA is introduced in a host bacterium
4. A piece of protein is introduced in a host bacterium

Options 1. 1

2. 2

3. 3

4. 4

Q.47 Read the following passage carefully and answer the given questions.
Restriction endonuclease on finding its specific recognition sequence, bind to the DNA and cut each of the two strands of the double helix at specific points in their sugar -phosphate backbones. Each restriction endonuclease recognises a specific palindromic nucleotide sequences in the DNA. Since the DNA is enclosed within the membranes, we have to break the cell open to release DNA along with other macromolecules such as RNA, proteins, polysaccharides and also lipids. This can be achieved by treating the bacterial cells/plant or animal tissue with enzymes such as lysozyme (bacteria), cellulase (plant cells), chitinase (fungus). Now a days the most commonly used matrix is agarose which is a natural polymer extracted from sea weeds. The DNA fragments separate (resolve) according to their size through sieving effect provided by the agarose gel. The first restriction endonuclease-*Hind II*, whose functioning depended on a specific DNA nucleotide sequence was isolated and characterised five years later. It was found that *Hind II* always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs. In addition to 'ori', the vector requires a selectable marker, which helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants. Transformation is a procedure through which a piece of DNA is introduced in a host bacterium. Normally, the genes encoding resistance to antibiotics such as ampicillin, chloramphenicol, tetracycline or kanamycin, etc., are considered useful selectable markers for *E. coli*.

A natural polymer extracted from sea weeds used in the field of biotechnology is:
1. Adipose
2. Agarose
3. Dextrose
4. Fucose

Options 1. 1

2. 2

3. 3

4. 4

Q.48 Read the following passage carefully and answer the given questions.
Restriction endonuclease on finding its specific recognition sequence, bind to the DNA and cut each of the two strands of the double helix at

specific points in their sugar -phosphate backbones. Each restriction endonuclease recognises a specific palindromic nucleotide sequences in the DNA. Since the DNA is enclosed within the membranes, we have to break the cell open to release DNA along with other macromolecules such as RNA, proteins, polysaccharides and also lipids. This can be achieved by treating the bacterial cells/plant or animal tissue with enzymes such as lysozyme (bacteria), cellulase (plant cells), chitinase (fungus). Now a days the most commonly used matrix is agarose which is a natural polymer extracted from sea weeds. The DNA fragments separate (resolve) according to their size through sieving effect provided by the agarose gel. The first restriction endonuclease-*Hind II*, whose functioning depended on a specific DNA nucleotide sequence was isolated and characterised five years later. It was found that *Hind II* always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs. In addition to 'ori', the vector requires a selectable marker, which helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants. Transformation is a procedure through which a piece of DNA is introduced in a host bacterium. Normally, the genes encoding resistance to antibiotics such as ampicillin, chloramphenicol, tetracycline or kanamycin, etc., are considered useful selectable markers for *E. coli.*

Chitinase is used to disrupt the membranes of:
1. Bacterial cells
2. Plant cells
3. Fungal cells
4. Virus

Options 1. 1

2. 2

3. 3

4. 4

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Hind II always cut DNA molecules at a particular point by identifying a specific sequence of six base pairs. This specific base sequence is called_____ for *Hind II.*
1. Restriction endonuclease
2. Antibiotic resistance gene
3. Recognition sequence
4. Origin of replication (ori)

Options 1. 1

2. 2

3. 3

4. 4

Q.50 Read the following passage carefully and answer the given questions.

Restriction endonuclease on finding its specific recognition sequence, bind to the DNA and cut each of the two strands of the double helix at specific points in their sugar -phosphate backbones. Each restriction endonuclease recognises a specific palindromic nucleotide sequences in the DNA. Since the DNA is enclosed within the membranes, we have to break the cell open to release DNA along with other macromolecules such as RNA, proteins, polysaccharides and also lipids. This can be achieved by treating the bacterial cells/plant or animal tissue with enzymes such as lysozyme (bacteria), cellulase (plant cells), chitinase (fungus). Now a days the most commonly used matrix is agarose which is a natural polymer extracted from sea weeds. The DNA fragments separate (resolve) according to their size through sieving effect provided by the agarose gel. The first restriction endonuclease-*Hind II,* whose functioning depended on a specific DNA nucleotide sequence was isolated and characterised five years later. It was found that *Hind II* always cut DNA molecules at a particular point by recognising a specific sequence of six base pairs. In addition to 'ori', the vector requires a selectable marker, which helps in identifying and eliminating non-transformants and selectively permitting the growth of the transformants. Transformation is a procedure through which a piece of DNA is introduced in a host bacterium. Normally, the genes encoding resistance to antibiotics such as ampicillin, chloramphenicol, tetracycline or kanamycin, etc., are considered useful selectable markers for *E. coli.*

Each restriction endonuclease recognises a specific_____ in the DNA.
1. Homologous nucleotide sequences
2. Non-palindromic nucleotide sequences
3. Inverted nucleotide sequences
4. Palindromic nucleotide sequences

Options 1. 1

2. 2

3. 3

4. 4