

Lifescience practice adda

DBT BET 2020

Answer will be changed after releasing final answer key.

Section : Section A

Q.1 The Freund's complete adjuvant is a mixture of

- Ans
- 1. oil, water and dried *Mycobacterium* cells
 - 2. glucose, oil, and dried *E. coli* cells
 - 3. oil, water, dried bacterial spores
 - 4. amino acids, detergent and dried *S. aureus* cells

Q.2

- Ans
- 1. urea PAGE
 - 2.
 - 3.
 - 4. RP-HPLC

Single stranded DNA can be separated from double stranded DNA efficiently using

-
- hydrophobic interaction chromatography
- hydroxyapatite chromatography
-

Q.3 Chlorine is assigned an atomic weight of 35.5. This is due to

- Ans
- 1. presence of half a proton
 - 2. presence of isotopes
 - 3. presence of half a neutron
 - 4. none of the given options

Q.4 Mr. Thomas invested an amount of Rs. 13,900 divided in two different schemes A and B at the simple interest rate of 14% p.a. and 11% p.a., respectively. If the total amount of simple interest earned in 2 years was Rs. 3508, what was the amount invested in Scheme B ?

- Ans
- 1. Rs. 7500
 - 2. Rs. 6400
 - 3. Rs. 7200
 - 4. Rs. 6500

Q.5 Enzymes bind their substrates via

- Ans
- 1. shape complementarity
 - 2. hydrogen bonds
 - 3. hydrophobic interactions
 - 4. all of the given options are correct

Q.6 How many peptide fragments can be generated from the complete digestion of the polypeptide AGRCDKQANRSLMNF with trypsin?

- Ans
- 1. 3
 - 2. 2
 - 3. 6
 - 4. 4

Q.7 In enzyme kinetics, if the enzyme concentration is doubled

- Ans
- 1. K_m does not change
 - 2. K_m increases 4-fold
 - 3. K_m becomes double
 - 4. K_m becomes half

Q.8 How much sodium hydroxide will you weigh to prepare 0.25 L of 3 M solution?

- Ans
- 1. 30 g
 - 2. 80 g
 - 3. 40 Kg
 - 4. 40 μ g

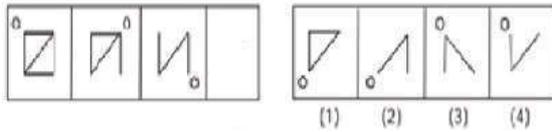
Q.9 Trypsin cleaves a protein at the

- Ans
- 1. C-terminus side of Arg/Lys residues
 - 2. C-terminus side of Val/Ile residues
 - 3. N-terminus side of Val/Ile residues
 - 4. N-terminus side of Arg/Lys residues

Q.10 Which of the following is/are critical for genome replication?

- Ans
- 1. ligase
 - 2. polymerase
 - 3. all of the given options are correct
 - 4. helicase

Q.11 Choose the correct alternative from the series on the right to complete the missing figure in the series on the left.

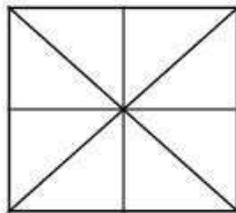


- Ans**
- 1. (4)
 - 2. (2)
 - 3. (3)
 - 4. (1)

Q.12 Which of the following is a non-reducing sugar?

- Ans**
- 1. sucrose
 - 2. ribose
 - 3. fructose
 - 4. galactose

Q.13 The number of squares and triangles in the following figure is



- Ans**
- 1. 16 triangles, 5 squares
 - 2. 16 triangles, 4 squares
 - 3. 12 triangles, 4 squares
 - 4. 12 triangles, 5 squares

Q.14 While working in the lab, you forgot to keep enzymes back in the fridge. Which of the following enzyme will be least affected on being left outside at room temperature?

Ans

- 1. DNA ligase
- 2. Topoisomerase
- 3. Taq DNA polymerase
- 4. *Bam*HI restriction enzyme

Q.15 The genetic codon is a triplet and there are 64 codons. How many codons would be possible if the codon is a doublet?

Ans

- 1. 8
- 2. 24
- 3. 64
- 4. 16

Q.16 What is the frequency with which a 4 bp cutter will cut the DNA, assuming random distribution of bases in the genome?

Ans

- 1. 1/4096
- 2. 1/64
- 3. 1/256
- 4. 1/254

Q.17 The fruit of a particular tree species formed the predominant diet of the dodo. After the dodo became extinct, that tree species also became extinct. Which of the following is the most likely cause for the tree's extinction?

Ans 1.

by living close to the tree, the dodo protected the tree from other birds

2.

the seeds of that tree required passage through the digestive system of the dodo for germination

3. the dodo habitat was destroyed

4.

other birds ate the fruit of that tree, as well as fruit of other trees, and dispersed more seeds than the dodo did

Q.18 Which of the following is NOT true?

Ans 1. prokaryotes are unicellular organisms

2. eukaryotes can be either multicellular or unicellular organisms

3.

eukaryotic cells are evolutionarily more ancient than prokaryotic cells

4.

prokaryotic cells lack nucleus whereas eukaryotic cells have a nucleus

Q.19 The most important step of an automated DNA sequencing reaction is

Ans 1. cleavage of template DNA

2. addition of calcium chloride

3. specific and systematic termination of the amplified DNA

4. ligation of DNA template

Q.20 Eight 3rd year students can finish an experiment in 15 days and eighteen 1st year students can complete the same experiment in 10 days. If all these students work together, in how many days will the experiment get completed?

- Ans**
- 1. 6.67
 - 2. 7.67
 - 3. 6.33
 - 4. 6.00

Q.21 Someone tells you that the pH of a solution is minus 2. Which one of the following is false?

- Ans**
- 1. such a value of pH is unlikely to occur in practice
 - 2. such a value of pH is possible in theory
 - 3. such a value of pH is impossible even in theory
 - 4. concentration of H_3O^+ is 100 M

Q.22 Histones

- Ans**
- 1. are negatively-charged globular proteins
 - 2. contain high amount of basic amino acids
 - 3. have molecular weights in excess of 100,000 Da
 - 4. contain both α -helix and β -pleated sheet

Q.23 Denaturation of DNA is a

- Ans**
- 1. cooperative phenomenon
 - 2. temperature-independent process
 - 3. neither linear nor a cooperative process
 - 4. linear process

Q.24 Ligands 'A' and 'B' bind to protein 'P' with dissociation constants of 1 nM and 100 nM, respectively. Which of the following is true?

- Ans
- 1. Dissociation constant is not related to affinity
 - 2. Both 'A' and 'B' bind 'P' with equal affinity
 - 3. 'A' binds 'P' with more affinity
 - 4. 'B' binds 'P' with more affinity

Q.25 Bacteria protect themselves from phages by producing the following enzymes which fragment the phage genome

- Ans
- 1. methylases
 - 2. endonucleases
 - 3. topoisomerases
 - 4. exonucleases

Q.26 The enzyme used in glucometers to estimate blood glucose levels is

- Ans
- 1. glucose oxidase
 - 2. hexokinase
 - 3. insulin
 - 4. glucose isomerase

Q.27 During growth, the diameter of a *Staphylococcus* bacterial cell increases by 5%. The specific surface area (defined as surface area per unit volume)

- Ans
- 1. increases approximately by 4π %
 - 2. decreases approximately by 5%
 - 3. increases approximately by 5%
 - 4. decreases approximately by 4π %

Q.28 Find the next number in the series 23, 30, 38, 47, 57

- Ans
- 1. 67
 - 2. 69
 - 3. 65
 - 4. 68

Q.29 The aluminium bronze alloy consists of copper and aluminium in the ratio of 10:1 by weight. If an object made of this alloy weighs 77 Kilograms (Kg), how many Kg of aluminium does it contain?

- Ans
- 1. 0.7
 - 2. 7.7
 - 3. 70.7
 - 4. 7.0

Q.30 Primary cilia biogenesis typically starts at the

- Ans
- 1. S and G2 phase of the cell cycle
 - 2. S phase of the cell cycle
 - 3. G1/G0 phase of the cell cycle
 - 4. G2 phase of the cell cycle

Q.31 Which of the following is true for acetyl-CoA?

- Ans
- 1. it is another name for oxaloacetate
 - 2. it is a protein
 - 3. it is an acetyl group joined with a form of cobalt
 - 4. it is an acetyl group attached to a type of coenzyme

Q.32 A buffer contains 10% glucose, 20 mM Tris, and 50 mM HCl. For making 1 litre of buffer from the following stock solutions – 50% glucose, 1 M Tris, and 1 M HCl, the correct combination of volume of each of the stock solutions will be

Ans

1. 200 ml, 20 ml, 50 ml
2. 200 ml, 50 ml, 20 ml
3. 50 ml, 50 ml, 50 ml
4. 50 ml, 100 ml, 10 ml

Q.33 The molecular weight of Val and Ser are 117 Dalton and 105 Dalton, respectively. Val and Ser form a dipeptide Val-Ser. The molecular weight (in Daltons) of the dipeptide is

Ans

1. 204
2. 222
3. 240
4. 186

Q.34 Which of the following is NOT a rational grouping of amino acids based on their polarity properties?

Ans

1. Met and Leu
2. Val and Leu
3. Asn and Gln
4. Glu and Ile

Q.35 In the first semester course work at the Biotech Institute, 50 students signed up for both Genetics and Statistics, and 90 students signed up for either Genetics or Statistics. If 25 students are taking Genetics but are not taking Statistics, how many students are taking Statistics but not taking Genetics?

Ans

- 1. 25
- 2. 35
- 3. 65
- 4. 15

Q.36 The egg white protein, ovalbumin, is denatured in a hard-boiled egg. Which of the following is least affected?

Ans

- 1. quaternary structure of ovalbumin
- 2. secondary structure of ovalbumin
- 3. primary structure of ovalbumin
- 4. tertiary structure of ovalbumin

Q.37 Nucleic acid structures are stabilized by

Ans

- 1. hydrophilic interactions
- 2. hydrophobic interactions and hydrogen bonding
- 3. covalent interactions
- 4. covalent and hydrophilic interactions

Q.38 Keshav and Kunal are good in Maths and Chemistry. Sumit and Keshav are good in Maths and Biology. Vineet and Kunal are good in Cricket and Chemistry. Sumit, Vineet and Rohit are good in Football and Biology. Who is good in Biology, Cricket, Chemistry and Football?

- Ans**
1. Vineet
 2. Sumit
 3. Kunal
 4. Keshav

Q.39 What will be the generation time of a culture with a specific growth rate constant of 0.01 min^{-1} ?

- Ans**
1. 11.55 h
 2. 0.693 min
 3. 6.93 min
 4. 1.155 h

Q.40 A student made 0.15 M solution of copper sulphate. The absorbance of the solution was found to be 0.3 when using a cuvette with a path length of 1 cm. Copper sulphate solution made by a second student gave an absorbance of 0.45 using the same cuvette at the same wavelength. What is the concentration of the copper sulphate solution made by the second student?

- Ans**
1. 0.325 M
 2. 0.125 M
 3. 0.225 M
 4. 0.425 M

Q.41 Using only random VDJ recombination, from 40 V, 30 D and 6 J gene segments, the number of possible variable regions of the resulting antibody would be

- Ans**
1. 40
 2. 76
 3. 1.4×10^6
 4. 7,200

Q.42 The temperature of media post sterilization drops from 100°C to 60°C in 40 min by simply keeping it on the lab bench and allowing slow atmospheric cooling to take place at an ambient temperature of 20°C. In the next 40 min, the approximate temperature (°C) of the media would be around

- Ans**
- 1. 40°C
 - 2. 20°C
 - 3. 50°C
 - 4. 30°C

Q.43 The role of DNA ligase in DNA replication is

- Ans**
- 1. formation of a phosphodiester bond between the 3'-OH of one Okazaki fragment and the 5'-phosphate of the next on the lagging strand
 - 2. base pairing of the template and the newly formed DNA strand
 - 3. addition of new nucleotides to the lagging strand
 - 4. addition of new nucleotides to the leading strand

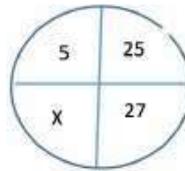
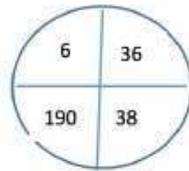
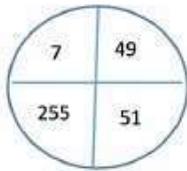
Q.44 What is the probability of getting 53 Sundays in a 'Leap' year?

- Ans**
- 1. 3/7
 - 2. 2/7
 - 3. 4/7
 - 4. 1/7

Q.45 Which of the following is a method of investigating the sequence specificity of DNA-binding proteins *in vitro*?

- Ans
1. gene targeting
 2. polymerase chain reaction
 3. Southern hybridization
 4. DNA fingerprinting

Q.46 What is the correct value of X ?



- Ans
1. 155
 2. 145
 3. 135
 4. 100

Q.47 Synthesis of majority of lipids in a cellular system occurs in the

- Ans
1. nucleus
 2. lysosomes
 3. mitochondria
 4. endoplasmic reticulum

Q.48 A, B, C and D are to be seated in a row. But C and D cannot be together. Also B cannot be at the third place. Which of the following must be false?

Ans

1. A is at the third place
2. A is at the fourth place
3. A is at the first place
4. A is at the second place

Q.49 A mixture of homotetramer 'X' and heterodimer 'Y' with identical molecular weight were resolved on SDS-PAGE. It gives three bands on a gel with molecular weights 40 kDa, 60 kDa, and 100 kDa. The native molecular weight (in kDa) of the homotetramer 'X' is

Ans

1. 240
2. 100
3. 320
4. 160

Q.50 Two particles are moving back and forth in a 10 m long tube. Particle 'P' is moving at a speed of 5 m/s and particle 'Q' at a speed of 2 m/s. Consider that both P and Q start at the same time in the same direction. How many times will 'P' cross 'Q' by the time 'Q' reaches the end of the tube?

Ans

1. 2
2. 0
3. 1
4. 5

Section : Section B

Q.1 How many linkage groups would be there in a plant with $2n = 20$?

- Ans
- 1. 40
 - 2. 5
 - 3. 20
 - 4. 10

Q.2 Ananda Chakrabarty received the first U.S. patent for a GM organism. This organism was

- Ans
- 1. Dolly the cloned sheep
 - 2. transgenic mouse expressing the growth hormone gene
 - 3. cloned *E. coli*
 - 4. *Pseudomonas* engineered to degrade petroleum

Q.3 Which class of phytochromes is highly abundant in etiolated seedlings and is also light labile?

- Ans
- 1. Phytochrome B
 - 2. Phytochrome D
 - 3. Phytochrome A
 - 4. Phytochrome C

Q.4 Identify the incorrect pair

- Ans
- 1. DNase I : Cleaves only double stranded DNA
 - 2. RNA polymerase: Transcription
 - 3. Alkaline Phosphatase : Removes 5' phosphate from the DNA
 - 4. DNA Polymerase I : Nick Translation

Q.5 What will be the molarity of a 4 mg/ml solution of NaOH?

- Ans
- 1. 4 M
 - 2. 1 M
 - 3. 0.1 M
 - 4. 0.0844 M

Q.6 5th June is observed as

- Ans
- 1. World Wildlife Day
 - 2. World Pollution Day
 - 3. World Environment Day
 - 4. World Forest Day

Q.7 A mixture of three proteins (X, Y and Z) was loaded on a size exclusion column. The molecular weight (MW) and pI of the proteins are as follows

Protein	MW (KD)	pI
X	140.75	5.5
Y	22.3	10.1
Z	88.6	2.8

The correct order of elution of the proteins from the column is

- Ans
- 1. X, Y, Z
 - 2. Y, Z, X
 - 3. X, Z, Y
 - 4. Y, X, Z

Q.8 Consider a bacterium that grows with doubling time of 20 min in the exponential phase of its growth cycle and acquire 10 random mutations in its genome in every generation. How many mutations will it acquire after 48 hr of growth in exponential phase?

- Ans**
- 1. 1404
 - 2. 1044
 - 3. 1000
 - 4. 1440

Q.9 A major organism used in commercial bioleaching for copper recovery is

- Ans**
- 1. *Pseudomonas aeruginosa*
 - 2. *Desulfovibrio desulfuricans*
 - 3. *Thiobacillus ferrooxidans*
 - 4. *Aspergillus niger*

Q.10 The comparison of the structures of haemoglobin and myoglobin shows that they have

- Ans**
- 1. different primary structure but similar tertiary structure
 - 2. similar primary structure but different tertiary structure
 - 3. different primary and tertiary structures
 - 4. similar primary and tertiary structures

Q.11 Immobilization of enzymes to water insoluble, anionic porous carriers often results in an apparent shift in the pH optima of the enzyme. The physico-chemical interaction likely to cause such a behaviour is

- Ans**
- 1. enzyme deactivation
 - 2. internal mass transfer limitation
 - 3. partitioning effect
 - 4. external mass transfer limitation

Q.12 A protein of 100 KDa would have approximately how many amino acids?

- Ans
- 1. 900
 - 2. 1000
 - 3. 100
 - 4. 800

Q.13 Which autoimmune disease is caused by production of autoantibodies and autoreactive T cells against DNA and chromatin proteins?

- Ans
- 1. Multiple Sclerosis
 - 2. Graves' Disease
 - 3. Sjögren syndrome
 - 4. Systemic lupus erythematosus

Q.14 In the DNA helix, the GC and AT base pairs

- Ans
- 1. stack on top of each other, perpendicular to the helix axis
 - 2. stack sideways, perpendicular to the helix axis
 - 3. stack on top of each other, parallel to the helix axis
 - 4. stack sideways, parallel to the helix axis

Q.15 Which post-translational modification is observed most commonly in signal transduction?

- Ans
- 1. phosphorylation
 - 2. acetylation
 - 3. nitrosylation
 - 4. carbonylation

Q.16 Which of the following is associated with SARS-CoV-2 infection?

- Ans
- 1. pneumonia
 - 2. all of the given options are correct
 - 3. cytokine storm
 - 4. lymphopenia

Q.17 Which of the following is not a suitable material for a depth filter used in air sterilization ?

- Ans
- 1. muslin cloth (pore size =40 - 50 μm)
 - 2. glass fiber (pore size =2 – 8 μm)
 - 3. glass wool (pore size < 10 μm)
 - 4. norite (pore size=0.1 - 4 μm)

Q.18 DNA glycosylases are DNA repair enzymes involved in

- Ans
- 1. SOS response
 - 2. base excision repair
 - 3. negative supercoiling of DNA
 - 4. DNA replication

Q.19 Which of the following processes is used to produce biodiesel?

- Ans
- 1. transamidation
 - 2. interesterification
 - 3. transglycosylation
 - 4. transesterification

Q.20 A shuttle vector is a vector that

- Ans
- 1. moves between two organisms automatically
 - 2. can replicate in the cells of more than one organism
 - 3. helps in conjugation of bacterial cells
 - 4. helps in transporting proteins from one cell to the adjacent cell

Q.21 Wetlands are very rich and diverse ecosystems and must be preserved. Which convention signed in Iran protects this specific ecosystem (wetlands) on a global basis?

- Ans
- 1. Vienna Convention
 - 2. Geneva Convention
 - 3. Ramsar Convention
 - 4. Basel Convention

Q.22 The following cellular process involves formation of double membrane vesicles that engulf and degrade the cellular organelles and macromolecules

- Ans
- 1. Necrosis
 - 2. Macro pinocytosis
 - 3. Autophagy
 - 4. Apoptosis

Q.23 What are the cellular sites for protein glycosylation?

- Ans
- 1. endoplasmic reticulum and lysosomes
 - 2. endoplasmic reticulum and golgi body
 - 3. mitochondria and lysosomes
 - 4. endoplasmic reticulum and mitochondria

Q.24 The temperature ($^{\circ}\text{C}$) of liquid nitrogen used for cryopreservation of plant samples is

- Ans
- 1. -196°C
 - 2. -100°C
 - 3. -120°C
 - 4. -170°C

Q.25 A fermentation medium is being cooled from 70°C to 32°C in a double pipe heat exchanger. Fluid flowing counter currently with this stream is heated from 20°C to 46°C . The log mean temperature difference (in $^{\circ}\text{C}$) for the two streams is

- Ans
- 1. 12.6
 - 2. 17.3
 - 3. 4.8
 - 4. 8.5

Q.26 Which of the following floral whorls are absent in *agamous (ag)* mutant of *Arabidopsis*?

- Ans
- 1. stamens and carpels
 - 2. petals and stamens
 - 3. sepals and carpels
 - 4. sepals and petals

Q.27 The enzyme-linked immunospot (ELISPOT) assay is highly sensitive because it can measure

- Ans
- 1. size of the cytokine secreting cells
 - 2. frequency of cytokine secreting cells at the single cell level
 - 3. total concentration of secreted cytokine
 - 4. RNA copy number of the secreted cytokine

Q.28

Digestion of a 5 Kb linear DNA with BamHI leads to the generation of two fragments of size 2 Kb and 3 Kb, while digestion of the same DNA with HindIII generates 3 fragments of 0.7, 0.8 and 3.5 Kb. When the same DNA is cut with both BamHI and HindIII enzymes the fragments generated are of 0.7, 0.8, 1.3 and 2.2 Kb. The right order of the recognition sites for the two enzymes is

Ans

- 1. one BamHI site between two HindIII sites
- 2. one HindIII site between two BamHI sites
- 3. two BamHI sites followed by one HindIII site
- 4. two HindIII sites followed by one BamHI site

Q.29

Opsonization is the process of

Ans

- 1. coating of foreign substances by MHC
- 2. none of the given options is correct
- 3. coating of foreign substances by antibody
- 4. coating of foreign substances by TCR

Q.30

The malarial parasite that has caused recent outbreaks of Monkey malaria in humans is

Ans

- 1. *Plasmodium vivax*
- 2. *Plasmodium berghei*
- 3. *Plasmodium knowlesi*
- 4. *Plasmodium malariae*

Q.31

The technique used to locate specific genes in chromosomes is

Ans

- 1. in-situ hybridization
- 2. colony hybridization
- 3. western blotting
- 4. dot blot technique

Q.32 In plants, the cells adjacent to the egg cell in an ovule are known as

- Ans
- 1. antipodals
 - 2. synergids
 - 3. sperm cells
 - 4. polar nuclei

Q.33 Which of the following is NOT used as a biopesticide?

- Ans
- 1. *Trichoderma harzianum*
 - 2. *Bacillus thuringiensis*
 - 3. *Xanthomonas campestris*
 - 4. Nuclear Polyhedrosis Virus

Q.34 For a tetranucleotide sequence, the number of possible combinations using A, T and G are

- Ans
- 1. 256
 - 2. 81
 - 3. 512
 - 4. 27

Q.35 Accuracy of Protein Structure Prediction can be assessed using tools like

- Ans
- 1. BLAST
 - 2. COOT
 - 3. WHATIF
 - 4. PHENIX

Q.36 In an exponentially growing batch culture of *Saccharomyces cerevisiae*, the cell density is 30 gL^{-1} (DCW), the specific growth rate (μ) is 0.4 h^{-1} and substrate uptake rate (q) is $18 \text{ gL}^{-1}\text{h}^{-1}$. The cell yield coefficient $Y_{X/S}$ will be

- Ans
- 1. 0.50
 - 2. 0.45
 - 3. 0.32
 - 4. 0.67

Q.37 Which of the following is NOT used for producing vitamins industrially?

- Ans
- 1. *Ashbya gossypii*
 - 2. *Pseudomonas aeruginosa*
 - 3. *Corynebacterium sp.*
 - 4. *Propionibacterium freudenreichii*

Q.38 A covalently closed circular DNA was in a relaxed state in water at $30 \text{ }^\circ\text{C}$. What will happen if the water temperature increases to $60 \text{ }^\circ\text{C}$ or decreases to $10 \text{ }^\circ\text{C}$?

- Ans
- 1. DNA will undergo positive supercoiling at $60 \text{ }^\circ\text{C}$ and negative supercoiling at $10 \text{ }^\circ\text{C}$
 - 2. DNA will be negatively supercoiled at both $60 \text{ }^\circ\text{C}$ and $10 \text{ }^\circ\text{C}$
 - 3. DNA will undergo negative supercoiling at $60 \text{ }^\circ\text{C}$ and positive supercoiling at $10 \text{ }^\circ\text{C}$
 - 4. DNA will be relaxed at $60 \text{ }^\circ\text{C}$ and positively supercoiled at $10 \text{ }^\circ\text{C}$

Q.39 Which interactions are generally observed at the core of stable protein-protein complexes?

- Ans
- 1. salt bridges
 - 2. hydrogen bonds
 - 3. disulfide bonds
 - 4. hydrophobic

Q.40 A humanised antibody is one in which the

Ans 1. antibody heavy and light chains are from human

2.

complementarity-determining regions (CDRs) are from mouse and the rest is from human

3.

antibody light chain is from human and heavy chain is from mouse

4.

antibody heavy chain is from human and light chain is from mouse

Q.41 The β -sheet rich structure of prion protein represents the

Ans 1. abnormal disease-causing protein

2. normal functional protein

3. soluble form of the protein

4. intermediator state of the protein

Q.42 What is Single Nucleotide Polymorphism (SNP)?

Ans 1.

variation at a single nucleotide position observed in 100% population

2.

variation at a single nucleotide position observed in more than 10% population

3.

variation at a single nucleotide position observed in at least 10% population

4.

variation at a single nucleotide position observed in at least 1% population

Q.43 Which of the following is NOT a feature of bacterial DNA replication?

- Ans
- 1. chain growth in the 5' → 3' direction
 - 2. semi-conservative
 - 3. semi-discontinuous
 - 4. unidirectional

Q.44 A supramolecular complex that serves to degrade damaged or unneeded proteins in the cell is called as

- Ans
- 1. lysosome
 - 2. ribosome
 - 3. proteasome
 - 4. flagella

Q.45 'Cybrids' are produced by

- Ans
- 1. fusion of nuclear genomes
 - 2. *in vitro* fusion of cytoplasm
 - 3. *in vitro* fusion of gametes
 - 4. fusion of plastids

Q.46 Small/short interfering RNA (siRNA) is a commonly used RNA tool that causes

- Ans
- 1. duplication of protein encoding genes
 - 2. short-term silencing of protein coding genes
 - 3. deletion of protein encoding genes
 - 4. permanent silencing of protein coding genes

Q.47 The mature anther wall comprises an epidermis followed by a layer of radially elongated cells with fibrous bands of callose called endothecium whose function is

- Ans**
1. mechanical
 2. nutrition
 3. dehiscence
 4. protection

Q.48 Which of the following represents a quantitative measure of the structural similarity between two proteins ?

- Ans**
1. root mean square distance
 2. standard deviation
 3. revised mode square deviation
 4. root mean square deviation

Q.49 Two amino acids with negatively charged side chains are

- Ans**
1. aspartic acid and glycine
 2. aspartic acid and lysine
 3. lysine and glutamic acid
 4. aspartic acid and glutamic acid

Q.50 The location of a proteins in cells can be studied using

- Ans**
1. NMR spectroscopy
 2. western blotting
 3. fluorescent microscopy
 4. X-ray crystallography

Q.51 In large scale fermentation processes, corn steep liquor is mainly used as a

- Ans
- 1. carbon source
 - 2. carbon and vitamin source
 - 3. vitamin and micronutrient source
 - 4. nitrogen source

Q.52 The fluid property, due to which, mercury does not wet the glass is

- Ans
- 1. surface tension
 - 2. viscosity
 - 3. polarity
 - 4. specific gravity

Q.53 Embryonic stem cells are

- Ans
- 1. pluripotent
 - 2. totipotent
 - 3. unipotent
 - 4. differentiated

Q.54 Two proteins of molecular weights 1.0×10^5 and 1.0×10^4 Daltons were eluted from a gel filtration column at 220 ml and 300 ml respectively. The molecular weight of an unknown protein that elutes at 140 ml under the same conditions, will be

- Ans
- 1. 5.00×10^6
 - 2. 5.00×10^5
 - 3. 1.00×10^6
 - 4. 1.00×10^5

Q.55 A bacterial population, growing in batch culture, increases from 1000 cells to 10,00,000 cells in 5 hours. What is the generation time of the bacteria?

- Ans**
- 1. 45 min
 - 2. 30 min
 - 3. 9 min
 - 4. 22 min

Q.56 Which one of the following involves RNA Editing?

- Ans**
- 1. joining of exons from two different pre-mRNA molecules to form mRNA
 - 2. deletion, insertion or chemical modification of nucleotides that are present in the mRNA
 - 3. joining of exons from one pre-mRNA molecule to form mRNA
 - 4. deletion, insertion or chemical modification of nucleotides in the gene encoding the mRNA

Q.57 Which of the following does not have a quaternary structure?

- Ans**
- 1. myoglobin
 - 2. haemoglobin
 - 3. RNA polymerase
 - 4. collagen

Q.58 A set of closely linked genetic markers present on a single chromosome, which are not easily separable by recombination and tend to be inherited together are termed as

- Ans**
- 1. haplotypes
 - 2. alleles
 - 3. allotypes
 - 4. isotypes

Q.59 The mucopolysaccharide hyaluronic acid is composed of

- Ans**
- 1. neither N-acetyl D-glucosamine nor D-glucuronic acid
 - 2. N-acetyl D-glucosamine only
 - 3. D-glucuronic acid only
 - 4. both N-acetyl D-glucosamine and D-glucuronic acid

Q.60 The broad-spectrum herbicide glyphosate, the active ingredient of Roundup, inhibits this enzyme

- Ans**
- 1. Chorismate synthase
 - 2. 3-deoxy-7-phosphoheptulonate synthase
 - 3. 5-enolpyruvylshikimate-3-phosphate synthase
 - 4. Shikimate dehydrogenase

Q.61 A cDNA encoding a human protein of interest was cloned in a bacterial expression vector and introduced into bacterial cells for expression. However, no expression of the human protein of interest was obtained. This could be because of

Ans 1. Presence of introns in the gene encoding the human protein

2.

E. coli RNA polymerase cannot transcribe the sequence encoding the human protein of interest

3.

Bacterial ribosomes were unable to bind to the mRNA corresponding to the human protein of interest

4. Codon bias

Q.62 In a DNA molecule, two antiparallel strands that are complementary in their nucleotide sequence are paired to form a

Ans 1.

right handed double helix with 8 nucleotide pairs per helical turn

2.

left handed double helix with 10 nucleotide pairs per helical turn

3.

right handed double helix with 10 nucleotide pairs per helical turn

4. none of the given options

Q.63 For a microbial culture, if the doubling time is 0.231 h, the specific growth rate (in h^{-1}) will be (assume that the endogenous metabolism is negligible)

Ans 1. 3.0

2. 2.5

3. 1.0

4. 0.3

Q.64 Which is the correct arrangement of the polarity of solvents?

- Ans
- 1. Water < DMSO > DMF < CH₃CN
 - 2. Water < DMSO > DMF > CH₃CN
 - 3. Water > DMSO < DMF > CH₃CN
 - 4. Water > DMSO > DMF > THF

Q.65 If a nonsense mutation is present in the LacZ gene of the lac operon, the mRNA of β -galactosidase would

- Ans
- 1. be expressed in response to binding of the lac repressor to the CAP protein
 - 2. be expressed in response to the presence of lactose
 - 3. always be expressed
 - 4. not be expressed at all

Q.66 BLOSUM matrix is used for

- Ans
- 1. DNA homology
 - 2. homology modelling
 - 3. alignment of protein sequences
 - 4. surface electrostatics

Q.67 All the vaccines mentioned below are attenuated or inactivated whole pathogen except

- Ans
- 1. oral polio vaccine
 - 2. Tetanus vaccine
 - 3. Hepatitis A vaccine
 - 4. Rotavirus vaccine

Q.68

Which histone is NOT a part of the nucleosomes?

Ans

- 1. H3
- 2. H2B
- 3. H1
- 4. H2A

Q.69

Synthesis of which of the following lipids is completed in the Golgi bodies

Ans

- 1. sphingolipids
- 2. cholesterol
- 3. phosphatidylserine
- 4. phosphatidylcholine

Q.70

Which type of post-translational modification does not occur in plastids?

Ans

- 1. acetylation
- 2. phosphorylation
- 3. glycosylation
- 4. s-nitrosylation

Q.71

Which of the following disorders does not show sex-linked inheritance?

Ans

- 1. Haemophilia B
- 2. Haemophilia A
- 3. Tay-Sachs disease
- 4. Duchenne muscular dystrophy

Q.72 A protein with 1000 amino acids was tagged with GFP. The molecular weight of GFP is 26 KDa
What will be the most likely molecular weight of the fused target protein?

- Ans
- 1. 100 KDa
 - 2. 136 KDa
 - 3. 126 KDa
 - 4. 150 KDa

Q.73 The probe used to analyse glycoproteins is

- Ans
- 1. interferons
 - 2. glutens
 - 3. lectins
 - 4. cytokine

Q.74 The artificial sweetener, aspartame, is enzymatically produced using

- Ans
- 1. rennin
 - 2. β -galactosidase
 - 3. lipase
 - 4. Thermolysin

Q.75 One centimorgan is defined as the genetic distance between two loci with a statistically corrected recombination frequency of

- Ans
- 1. 0.5%
 - 2. 0.1%
 - 3. 1%
 - 4. 10%

Q.76 The first drug approved by FDA of USA, that was produced through genetic engineering was

- Ans
- 1. somatotropin
 - 2. insulin
 - 3. interferon
 - 4. penicillin

Q.77 The sequence CGAATTGG is matched globally with four sequences in a database. The sequence that will give the highest similarity score taking match =1, mismatch = 0 and gap penalty = minus 1 is

- Ans
- 1. CGATTCG
 - 2. CGTTTGG
 - 3. CAATGAG
 - 4. CGTATCG

Q.78 The specific energy source for the reaction $\text{ADP} + \text{phosphate} \rightarrow \text{ATP}$ by the enzyme ATP synthetase (CF₁ Coupling Factor) in thylakoid membranes is

- Ans 1.

higher concentration of H^+ inside versus outside the thylakoid membranes

- 2. oxidation of NADPH
- 3.

movement of electrons between photosystem II and photosystem I

- 4. oxidation of water

Q.79 The first stable product of C₃ cycle is

- Ans
- 1. phospho enol phosphate
 - 2. ribulose bisphosphate
 - 3. 3-phosphoglycerate
 - 4. dihydroxy acetone phosphate

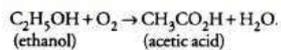
Q.80 Only 10 % of babies with Edward syndrome survive beyond 5 years. This is a genetic disease arising due to

- Ans**
1. absence of chromosome 18
 2. absence of chromosome Y
 3. Trisomy 13
 4. Trisomy 18

Q.81 What is Endoreduplication?

- Ans**
1. splitting up of endoplasmic reticulum (ER) to form rough and smooth ERs
 2. recurrent DNA replication without subsequent mitosis and cytokinesis
 3. replication of DNA in the nuclei and endocytosis of one copy to another organelle
 4. mobilization of DNA into ER and replication of DNA in the ER

Q.82 The equation for aerobic production of acetic acid from ethanol is:



Acetobacter aceti bacteria are added to vigorously-aerated medium containing 10 g.l⁻¹ ethanol. After some time, the ethanol concentration is 2 g.l⁻¹ and 7.5 g.l⁻¹ of acetic acid is produced. What is the observed yield (Y_O in g.g⁻¹) and theoretical yield (Y_T in g.g⁻¹) of acetic acid from ethanol?

- Ans**
1. $Y_O = 0.79$, $Y_T = 1.1$
 2. $Y_O = 0.94$, $Y_T = 1.3$
 3. $Y_O = 0.94$, $Y_T = 1.5$
 4. $Y_O = 0.69$, $Y_T = 1.0$

Q.83 Which of the following yeast is used for the production of riboflavin?

- Ans
- 1. *Candida utilis*
 - 2. *Saccharomyces cerevisiae*
 - 3. *Saccharomyces rouxii*
 - 4. *Eremothecium ashbyi*

Q.84 A combination of gametes that can be formed by the genotype AaBbCcDdEeFfGg are

- Ans
- 1. 128
 - 2. 64
 - 3. 32
 - 4. 16

Q.85 In the design of a fermenter, which one of the following is NOT the intended use of baffles?

- Ans
- 1. to reduce shear sensitivity of microorganism
 - 2. improve aeration efficiency
 - 3. increase the effect of agitation
 - 4. prevent eddy / vortex formation

Q.86 Match the polysaccharides (L.H.S.) with the microbial cultures (R.H.S.) associated with their industrial production

Polysaccharide

Microbial culture

(P) Cellulose

1. *Pseudomonas aeruginosa*

(Q) Alginate

2. *Alcaligenes faecalis*

(R) Curdalan

3. *Gluconacetobacter hansenii*

(S) Poly-hydroxy butyrate

4. *Ralstonia eutropha*

Ans 1. P-2, Q-1, R-4, S-3

2. P-3, Q-1, R-2, S-4

3. P-1, Q-2, R-3, S-4

4. P-1, Q-3, R-2, S-4

Q.87 Which of these procedures poses the least risk to an unborn child?

Ans 1. chorionic villi sampling

2. amniocentesis

3. alpha-feto protein sampling

4. embryoscopy & fetoscopy

Q.88 Aqueous two phase partitioning (ATPS) is used for the recovery of an enzyme from the cell free culture filtrate. On addition of PEG-2000 and dextran, the mixture separates into two phases with a partition coefficient for the enzyme as 4.2. The maximum possible enzyme recovery, when the volume ratio of the upper to lower phases is 5.0, will be

Ans 1. 68 %

2. 95 %

3. 85 %

4. 76 %

Q.89 Which of the following process does NOT contribute to conversion of a proto-oncogene to oncogene?

- Ans**
- 1. activating mutation in proto-oncogene
 - 2. de-activating mutation in proto-oncogene
 - 3. de-activating mutation in tumor suppressor
 - 4. increased expression of proto-oncogene

Q.90 Computational Prediction of protein folding assumes that

- Ans**
- 1. folding takes place at the monomeric level
 - 2. the folded state is a global free energy minima
 - 3. contributions of Potential Energy parameters to fold stability are reliable
 - 4. all the given options are correct

Q.91 Which of the following marine phototrophs can utilise carbon-dioxide as the carbon source?

- Ans**
- 1. Chloroacidobacteria
 - 2. Halobacteria
 - 3. Heliobacteria
 - 4. Green sulfur bacteria

Q.92 An energy generation process in which organic compounds act as both electron donors and terminal electron acceptor in a microbe is called

- Ans**
- 1. fermentation process
 - 2. photosynthesis
 - 3. biomass formation process
 - 4. aerobic process

Q.93 Which of the combination of gases is finally produced during anaerobic digestion?

- Ans
- 1. $\text{CH}_4 + \text{CO}_2$
 - 2. $\text{N}_2 + \text{NH}_3$
 - 3. $\text{CO}_2 + \text{CO}$
 - 4. $\text{CO} + \text{N}_2$

Q.94 Which one of the following approaches is generally not used for identifying an SNP?

- Ans
- 1. RNA Seq
 - 2. molecular beacons
 - 3. protein sequencing
 - 4. microarrays

Q.95 Deficiency of this macronutrient causes older leaves to turn dark green or reddish purple

- Ans
- 1. magnesium
 - 2. nitrogen
 - 3. calcium
 - 4. phosphorous

Q.96 Which of the following amino acids is most likely to disrupt an α -helix ?

- Ans
- 1. proline
 - 2. lysine
 - 3. valine
 - 4. arginine

Q.97 Which one of the following can be extended by Klenow enzyme upon addition of dNTPs and Mg^{2+} ?

- Ans**
- 1. single-stranded DNA
 - 2. restriction fragment with a 3' overhang
 - 3. restriction fragment with blunt ends
 - 4. restriction fragment with a 5' overhang

Q.98 What is the use of Aminopterin in hybridoma production?

- Ans**
- 1. to kill unfused myeloma cells
 - 2. to kill non-antibody secreting hybrids
 - 3. to kill non-specific antibody secreting hybrids
 - 4. to kill unfused splenic cells

Q.99 If neurons that produce the neurotransmitter dopamine could be generated from stem cells grown in culture, it might be possible to treat patient suffering with

- Ans**
- 1. Parkinson's Disease
 - 2. Cystic fibrosis
 - 3. Diabetes
 - 4. Amyotrophic lateral sclerosis

Q.100 Sam was investigating impact of lactate dehydrogenase knockout on glycolytic pathway. What will be the net NADH production that he would expect in conversion of Glucose to pyruvate in this case?

- Ans**
- 1. 4 NADH
 - 2. 0 NADH
 - 3. 3 NADH
 - 4. 2 NADH

Q.101 Sequence-specific recognition of DNA by proteins occurs primarily through the

- Ans
- 1. major groove
 - 2. minor groove
 - 3. histones
 - 4. polyphosphate backbone

Q.102 Met-Ile-Val-His-Tyr was the sequence of a hypothetical peptide. Assuming that there are two possible codons each for His, Val and Tyr, one possible codon for Met, and four possible codons for Ile, the number of possible nucleotide sequences coding for this peptide would be

- Ans
- 1. 32
 - 2. 66
 - 3. 11
 - 4. 13

Q.103 Which of the following organelle is NOT a site for Reactive Oxygen Species (ROS) generation?

- Ans
- 1. peroxisomes
 - 2. endoplasmic reticulum
 - 3. mitochondria
 - 4. nucleus

Q.104 Synthetic seeds are mostly derived from

- Ans
- 1. somatic embryos
 - 2. zygotic embryos
 - 3. fruit of coconut
 - 4. avocado seeds

Q.105 Which of the following is NOT an arboviral infection?

- Ans
- 1. Zika virus disease
 - 2. Dengue fever
 - 3. Chikungunya fever
 - 4. COVID-19

Q.106 Proteins are commonly purified by ion exchange chromatography (IEC) as a final step. Which of the following statements is NOT true?

- Ans
- 1. above the isoelectric point, the proteins bind to anion exchangers.
 - 2. even proteins of similar isoelectric point can be conveniently separated by IEC, because interaction with the support is determined by the surface charge distribution of the protein rather than the net charge.
 - 3. in general, proteins can be eluted by increasing ionic strength
 - 4. above the isoelectric point, the proteins bind to cation exchangers

Q.107 Phylogenetic tree provides information about

- Ans
- 1. ecological relationships between organisms
 - 2. environmental relationships between organisms
 - 3. evolutionary relationships between organisms
 - 4. none of the given options

Q.108 Two film theory of mass transfer considers

- Ans
- 1. maximum resistance at the interface
 - 2. negligible resistance at the interface
 - 3. 50 % resistance at the interface
 - 4. variable resistance at the interface

Q.109 Which one of the following statements is true regarding the magnesium porphyrin ring and the phytol chain of a chlorophyll molecule?

- Ans
- 1. both magnesium porphyrin ring and phytol chain are hydrophilic
 - 2. magnesium porphyrin ring is hydrophilic whereas phytol chain is lipophilic
 - 3. magnesium porphyrin ring is lipophilic whereas phytol chain is hydrophilic
 - 4. both magnesium porphyrin ring and phytol chain are lipophilic

Q.110 Which of following is a trisaccharide?

- Ans
- 1. trehalose
 - 2. cellobiose
 - 3. kestose
 - 4. mannose

Q.111 Which of the following is a chemotherapeutic drug obtained from marine source?

- Ans
- 1. avastin
 - 2. trabectedin
 - 3. abraxane
 - 4. adriamycin

Q.112 Which of the following methods first ionizes a protein before separation and detection?

- Ans
- 1. fluorescence spectroscopy
 - 2. nuclear magnetic resonance
 - 3. mass spectrometry
 - 4. reverse phase chromatography

Q.113 Which of the following plant hormones employs a phosphorelay system to regulate gene expression?

- Ans
- 1. cytokinin
 - 2. auxin
 - 3. brassinosteroid
 - 4. ethylene

Q.114 The genetic disease familial Hypercholesterolemia that leads to an increase in blood cholesterol is caused due to

- Ans
- 1. mutation in the low-density lipoprotein (LDL) receptor
 - 2. increased hydrolysis of stored intracellular cholesteryl esters
 - 3. consuming cholesterol rich foods
 - 4. increased *de novo* cholesterol synthesis

Q.115 Pruning helps in making the hedge dense because

- Ans
- 1. it induces the differentiation of new shoots from the rootstock
 - 2. it frees axillary buds from apical dominance
 - 3. more root growth supports more shoot branches
 - 4. the apical shoot grows slower after pruning

Q.116 Cellulose is a linear polymer of glucose with

- Ans
- 1. alpha-1,3-glycosidic linkage
 - 2. alpha1,4-glycosidic linkage
 - 3. beta-1,3-glycosidic linkage
 - 4. beta-1,4-glycosidic linkage

Q.117 A dilution of a microbial culture was prepared by adding 1 mL of the culture to 9 mL of sterile blank. Further, 200 μ L from the diluted culture was spread on an agar plate; and 150 colonies were observed after the incubation period. Calculate the CFU/mL of the original sample.

- Ans
- 1. 75
 - 2. 7500
 - 3. 750
 - 4. 75000

Q.118 At what condition does the specific growth rate of the microorganisms decline in a constant volume fed- batch culture

- Ans
- 1. cell biomass remains constant
 - 2. cell biomass increasing
 - 3. cell biomass decreasing
 - 4. cell biomass is equal to zero

Q.119 Hepatitis B is caused by a

- Ans
- 1. fungal infection
 - 2. bacterial infection
 - 3. protozoan infection
 - 4. viral infection

Q.120 Baroreceptors are responsible for sensing human

Ans

- 1. heart rate
- 2. oxygen saturation
- 3. temperature
- 4. blood pressure

Q.121 Choose the correct order in terms of pKa

Ans

- 1. Acetic acid > TFA < HCl < H₂SO₄
- 2. Acetic acid < TFA < H₂SO₄ < HCl
- 3. Acetic acid > TFA > HCl < H₂SO₄
- 4. Acetic acid > TFA > HCl > H₂SO₄

Q.122 To maintain soil fertility, the most sustainable agricultural practice is

Ans

- 1. burning the crop waste in the field
- 2. crop rotation
- 3. repeated use of fertilizers
- 4. growing same crop

Q.123 'Golden rice' is genetically engineered by altering the biosynthetic pathway for the production of

Ans

- 1. phycoyanins
- 2. chlorophylls
- 3. flavonoids
- 4. carotenoids

Q.124 The biological sample used for diagnosis of Giardiasis is

- Ans
- 1. urine
 - 2. blood
 - 3. stool
 - 4. sputum

Q.125 In the cloverleaf structure of tRNA, the cognate amino acid is attached at

- Ans
- 1. T loop
 - 2. anticodon arm
 - 3. D loop
 - 4. acceptor stem

Q.126 What is agent Orange?

- Ans
- 1. biodegradable insecticide
 - 2. herbicide containing dioxin
 - 3. color used in fluorescent lamps
 - 4. hazardous chemical used in luminous paints

Q.127 Fragile X syndrome is caused by a fragile site at the end of the long arm of X chromosome. Such a disorder is

- Ans
- 1. all the given options
 - 2. dominant
 - 3. X-linked
 - 4. caused by loss -of-function of FMR1 gene

Q.128 A class of temperature sensitive *E. coli* mutants defective in DNA replication were identified that ceased replication immediately upon increase in temperature. Which of the following processes are likely to be defective in these mutants?

- Ans**
- 1. termination of DNA replication
 - 2. elongation step of DNA replication
 - 3. initiation of DNA replication
 - 4. segregation step of DNA replication

Q.129 If four atoms A, B, C and D are connected linearly and there is rotation possible along bond BC, dihedral angle on this bond is described as

- Ans**
- 1. the angle between AC and BD
 - 2. the angle between AB and CD
 - 3. the angle formed between plane ABD and plane ACD
 - 4. the angle formed between plane ABC and plane BCD

Q.130 ATP with γ - ^{32}P can be used for which of the following type of reaction?

- Ans**
- 1. all of the given options are correct
 - 2. reverse transcription
 - 3. nick translation
 - 4. end-labeling

Q.131 A student added a 5' exonuclease enzyme instead of a restriction enzyme to digest his purified plasmid DNA sample. What is he likely to observe when he runs his plasmid digest on an agarose gel?

- Ans**
- 1. free nucleotides from the 5' end only
 - 2. free nucleotides from both ends
 - 3. plasmid DNA will be digested similar to the restriction enzyme
 - 4. no digestion of plasmid DNA

Q.132 During *Agrobacterium* infections, plant cell begins to synthesize Arginine derivatives called

- Ans
- 1. Acetosyringone
 - 2. Opines
 - 3. Acetobenzylpurine
 - 4. Hygromycin

Q.133 Which of the following microorganism is used for commercial production of dextran?

- Ans
- 1. *Leuconostoc mesenteroides*
 - 2. *Streptomyces olivaceus*
 - 3. *Bacillus polymyxa*
 - 4. *Bacillus thuringiensis*

Q.134 Epicatechin gallate (ECG) is a type of flavonoid found in which of the following?

- Ans
- 1. carrot
 - 2. orange
 - 3. berries
 - 4. green tea

Q.135 Nucleosides isolated from a Caribbean sponge, *Cryptotethya crypta*, were the basis for the synthesis of the antiviral

- Ans
- 1. Acyclovir
 - 2. Amantadine
 - 3. Abacavir
 - 4. Avarol

Q.136 The amino acid residue with the least preference for any quadrant in the Ramachandran map is

- Ans
1. valine
 2. glycine
 3. alanine
 4. serine

Q.137 The Budapest Treaty related to the international patent process concerns with

- Ans
1. higher plants
 2. microorganisms
 3. human subjects
 4. non-living materials

Q.138 During genome engineering process, the role of Flippase enzyme in the next round of modification in the target gene is to

- Ans
1. add frt sequence
 2. remove the antibiotic cassette
 3. remove frt sequence
 4. add the antibiotic cassette

Q.139 Cyclosporine, an immunosuppressive drug, given to avoid transplant rejection acts by

- Ans
1. T cell inhibition
 2. NK cell inhibition
 3. B cell inhibition
 4. complement inhibition

Q.140 Which of the following represents the correct sequence of steps in pathogenesis?

- Ans
- 1. invasion, infection, adhesion, exposure
 - 2. adhesion, infection, exposure, invasion
 - 3. exposure, adhesion, invasion, infection
 - 4. adhesion, exposure, infection, invasion

Q.141 Which of the following are NOT transcribed by RNA polymerase II ?

- Ans
- 1. miRNA and some snRNA
 - 2. miRNA and snoRNA
 - 3. mRNA and snoRNA
 - 4. tRNA and 5S rRNA

Q.142 The first organic acid to be produced industrially is

- Ans
- 1. lactic acid
 - 2. gibberellic acid
 - 3. acetic acid
 - 4. aspartic acid

Q.143 The primary structure of a protein is stabilized by

- Ans
- 1. covalent bond
 - 2. the angle formed between plane ABD and plane ACD
 - 3. hydrogen bonds
 - 4. ionic bond

Q.144 Genes related through vertical descent from a common ancestral gene are called

- Ans
- 1. xenologous
 - 2. heterologous
 - 3. paralogous
 - 4. orthologous

Q.145 The innate immune system recognizes Pathogen Associated Molecular Patterns (PAMPs) through activation of

- Ans
- 1. B cell receptor
 - 2. T cell receptor
 - 3. Fc receptor
 - 4. Toll-like receptor

Q.146 In which organelle of seeds are stored oils converted to fatty acids and glycerol during germination?

- Ans
- 1. amyloplast
 - 2. mitochondria
 - 3. endoplasmic reticulum
 - 4. glyoxysome

Q.147 The methods utilized to determine the three dimensional structure of proteins are

- Ans
- 1. all the given options
 - 2. Nuclear Magnetic Resonance
 - 3. Cryo-Electron Microscopy
 - 4. X-ray Crystallography

Q.148 A stirred tank bioreactor of 2.7 m^3 is agitated using a Rushton turbine with diameter 0.5 m and stirrer speed of 1 s^{-1} . If the fermentation broth has viscosity and density of $10^{-2} \text{ Pa}\cdot\text{s}$ and $1000 \text{ kg}\cdot\text{m}^{-3}$ respectively, the mixing time (in seconds) for the bioreactor will be

- Ans
- 1. 25.5
 - 2. 15.0
 - 3. 33.3
 - 4. 66.7

Q.149 Which part of a plant would be most suitable for raising virus-free plants for micropropagation?

- Ans
- 1. node
 - 2. vascular tissue
 - 3. bark
 - 4. apical meristem

Q.150 In Transmission Electron Microscope (TEM), a beam of electrons interact with the specimen to form image as

- Ans
- 1. shadow
 - 2. scattering
 - 3. diffraction
 - 4. reflection