



Gujarat Biotechnology Research Centre

Marine BT

Application No: _____

This question booklet contains 28 pages

Time: 2 Hours

Total Marks: 200

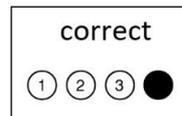
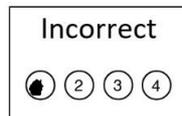
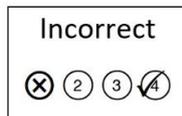
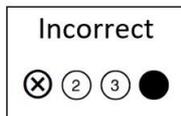
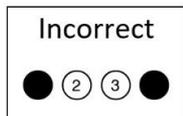
Total Questions: 200

Invigilator Signature :

Candidate Signature :

Instructions for Candidate

1. This question booklet contains 200 questions.
2. Each correct answer carries 1 mark.
3. Every attempted question with incorrect answer shall carry a negative mark of 0.25.
4. Use only Black Ball Point Pen to darken the appropriate circle in OMR.
5. Please darken the complete circle.
6. Darken ONLY ONE CIRCLE for each Question as shown below:



7. Answer once marked cannot be changed.
8. Please do not make any stray marks on the Question Booklet.
9. Rough works must be done on the blank page of Question Booklet.
10. Mark your answer in the appropriate space in the Answer Sheet against the Number corresponding to the question.
11. The Candidate has to submit Question booklet and OMR response sheet to the invigilator on conclusion of examination.

- 1 Length of coast line (Km) of Gujarat
 - (A) 1600
 - (B) 1637
 - (C) 1700
 - (D) 8118

- 2 Which of the following has greater probability of being lost in genetic drift.
 - (A) Common allele
 - (B) Recessive allele
 - (C) Rare allele
 - (D) Dominant allele

- 3 Respiratory pigment present in crustacean is
 - (A) Hemocyanin
 - (B) Hemoglobin
 - (C) Hemoerythrin
 - (D) Hemogreen

- 4 The region of cytochrome oxidase I used for barcoding is known as
 - (A) Barcoding gene
 - (B) Taxa gene
 - (C) Folmer region
 - (D) Walter region

- 5 Enzyme with template independent polymerase activity
 - (A) Terminal deoxynucleotidyl transferase
 - (B) Taq polymerase
 - (C) Recombinase
 - (D) PFU

- 6 Ziconotide used for treatment of pain is extracted from
 - (A) Sponge
 - (B) Cone snail
 - (C) Jellyfish
 - (D) Seaweed

- 7 Which type of exonuclease activity required for proof reading?
 - (A) 3'-5' exonuclease
 - (B) 5'-3' exonuclease
 - (C) Both type of exonuclease ability
 - (D) Random exonuclease activity

- 8 Lac operon system is switched on
 - (A) Presence of glucose and lactose both
 - (B) Absence of glucose
 - (C) Absence of glucose and presence of lactose
 - (D) Presence of lactose and galactose

- 9 Amplification plot in real time PCR analysis is a plot of
(A) ΔR_n vs CT
(B) ΔR_n vs PCR cycle no.
(C) ΔT vs PCR cycle no.
(D) ΔT vs CT.
- 10 If OD value of the SS RNA sample at A260 nm is one then what is the concentration of SS RNA?
(A) 33 $\mu\text{g/ml}$
(B) 50 $\mu\text{g/ml}$
(C) 40 $\mu\text{g/ml}$
(D) 45 $\mu\text{g/ml}$
- 11 What is the source of proteinase K?
(A) Tritirachium albuminum
(B) Tritirachium album
(C) Tritiracha albuuminum
(D) Tritirachium bacteria
- 12 Which one is the most efficient method of extracting lipid from microalgae for production of biodiesel?
(A) Supercritical fluid extraction method
(B) Chemical solvent extraction method
(C) Physical method
(D) Lyophilization method
- 13 Most popular method of plasmid transfer into fish embryo is
(A) Ballistic method
(B) Electroporation
(C) Virus mediated transfer
(D) Microinjection
- 14 Role of KCl in PCR
(A) Catalyze polymerase activity
(B) Cofactor for Polymerase
(C) Annealing of primer
(D) Efficient denaturation
- 15 What is the normally used molar ratio of insert: vector for cloning?
(A) 01:03
(B) 03:01
(C) 01:06
(D) 06:01
- 16 Method used for spawning of shrimp is _____
(A) Ovatide injection
(B) RNA interference
(C) Eyestalk ablation
(D) Eyestalk puncture

- 17 Jayanti rohu is _____
(A) GMO
(B) Genetically improved variety
(C) Wild variety
(D) Hybrid
- 18 Which type of gene is used as internal control during real time PCR data analysis?
(A) Inducible gene
(B) Any gene
(C) Housekeeping gene
(D) HSP70 gene
- 19 Which type of NGS is based on single molecule real time sequencing?
(A) Illumina
(B) Ion torrent
(C) P450
(D) Pacbio
- 20 5' cap of mRNA constitute
(A) 7-methylguanosine
(B) 7-methylinosine
(C) 5-methylguanosine
(D) 5-methylinosine
- 21 Restriction modification system is naturally present in _____
(A) Fungal cell
(B) Bacterial cell
(C) Bacteriophage
(D) All virus
- 22 Which real time PCR chemistry is used for multiplexing?
(A) Sybergreen I
(B) Evagreen
(C) Taqman probe
(D) All chemistry
- 23 Reverse transcriptase enzyme showing strong RNaseH activity
(A) Mo-MLV
(B) Co-MLV
(C) All reverse transcriptase
(D) AMV
- 24 What is the condition of using random hexamer primer during cDNA synthesis?
(A) When size of RNA is extremely small
(B) When size of RNA is extremely long
(C) It is used for tRNA
(D) It is used for all type of RNA

- 25 What are Linkers?
(A) Short synthetic double stranded DNA sequence
(B) Short oligonucleotide sequence of host
(C) Short oligonucleotide sequence of vector
(D) Short synthetic single stranded DNA sequence
- 26 Shuttle vectors _____
(A) Can replicate in two different organism
(B) Can express RNA
(C) Can multiply in virus
(D) Can replicate in all types of host
- 27 Exonuclease III digests nucleotide progressively from a
(A) DNA strand in the 3' -to-5' direction
(B) DNA and RNA strand both in the 3' -to-5' direction
(C) DNA strand in the 5' -to-3' direction
(D) DNA and RNA strand both in the 5' -to-3' direction
- 28 Restriction enzyme that recognizes the same sequence but cuts it differently is
(A) Isoschizomers
(B) Neoschizomer
(C) Isocaudomers
(D) Neomer
- 29 The gene which produces change in more than one character is known as _____
(A) Pleiotropic genes
(B) Cumulative gene
(C) Multiple gene
(D) Lethal gene
- 30 Which one is bacterial promoter sequence?
(A) TTGGCA
(B) CCAAT
(C) TATAAT
(D) TATA
- 31 GAPDH promoter is _____
(A) Inducible
(B) Repressible
(C) Constitutive
(D) Inducible medium
- 32 Lactose consists of _____
(A) Beta-D-galactose and beta-D-glucose
(B) Alpha-D-galactose and beta-D-glucose
(C) Alpha-D-glucose and beta- D-fructose.
(D) Alpha-D-glucose and alpha-D-fructose.

- 33 The mg (number) of KOH required to hydrolyze one gram of fat is known as _____
(A) Iodine number
(B) Acid number
(C) Saponification number
(D) R-M number
- 34 Disulfide group is present in _____
(A) Cysteine
(B) Methionin
(C) Cystine
(D) Histidine
- 35 Which one is false regarding isozyme?
(A) Multiple forms of an enzyme catalysing the same reaction
(B) Physical and chemical properties of isozymes are different
(C) Physical and chemical properties of isozymes are same
(D) Produced by different gene
- 36 Pyridoxine is common name of _____
(A) Vit. B2
(B) Vit. B5
(C) Vit. E
(D) Vit. B6
- 37 Source of carbon in heterotrophic mode of microalgae cultivation is _____
(A) CO₂
(B) Glucose
(C) Starch
(D) Pure carbon
- 38 The toxin produced by conesnail is _____
(A) Neurotoxin
(B) Haemotoxin
(C) Nephrotoxin
(D) Hepatotoxin
- 39 Signaling molecule contributes in quoram sensing in gram negative bacteria _____
(A) Oligopeptide
(B) AHL
(C) Lactine
(D) Dispersin
- 40 Toxin responsible for paralytic shellfish poisoning is _____
(A) Brevitoxin
(B) Okadaic acid
(C) Saxitoxin
(D) Sigatoxin

- 41 Which one is dominant molecular marker?
(A) Microsatellite
(B) SNP
(C) EST
(D) RAPD
- 42 Most abundant marker in genome is _____
(A) Microsatellite
(B) Minisatellite
(C) SNP
(D) EST
- 43 Embryonic stem cells are _____
(A) Totipotent
(B) Pluripotent
(C) Multipotent
(D) Oligopotent
- 44 Which of the parameter affect the total duration of PCR _____
(A) Annealing temperature
(B) DNA template
(C) Ramp rate
(D) All the above
- 45 5'-3' exonuclease activity is present in _____
(A) Pfu DNA polymerase
(B) Pwo DNA polymerase
(C) Tfi DNA polymerase
(D) Taq polymerase
- 46 Which one of the following is based on two base sequencing method?
(A) Nanopore
(B) SOLID
(C) Pacbio
(D) Illumina
- 47 Second polar body is released _____
(A) After fertilization of egg
(B) Before fertilization of egg
(C) Simultaneously with fertilization
(D) During oogenesis
- 48 Which one of the following amino acid of GnRH is modified to produce analogue for use in induce breeding
(A) 5th
(B) 6th
(C) 7th
(D) 8th

- 49 Which type of bacteria dominates in biofloc?
(A) Autotrophic bacteria
(B) Anaerobic bacteria
(C) Pathogenic bacteria
(D) Heterotrophic bacteria
- 50 Inducing hormone in aquaculture is used for _____
(A) Gametogenesis
(B) Spawning
(C) Fertilization
(D) Maturation
- 51 Type of filter used in biosafety cabinet is _____
(A) Membrane filter
(B) HEPA filter
(C) Nylon filter
(D) Paper filter
- 52 Reagent used to detach the cell from the substrate _____
(A) Serum
(B) PBS
(C) L15
(D) Trypsin
- 53 Which method is used for sterilization of serum?
(A) Filtration
(B) Autoclaving
(C) Chemical treatment
(D) Boiling
- 54 Shortest phase during cell cycle is _____
(A) M Phase
(B) Interphase
(C) G1 phase
(D) G0 phase
- 55 The smallest self replicating organism is _____
(A) Virus
(B) Prion
(C) Mycoplasma
(D) Yeast
- 56 In Prokaryotes, the ribosomal binding site on mRNA is called _____
(A) Hogness sequence
(B) Shine-Dalgarno sequence
(C) Pribnow box
(D) TATA box

- 57 Tetracycline blocks protein synthesis by _____
- (A) Inhibiting initiation of translation
 - (B) Inhibiting termination of translation
 - (C) Inhibiting binding of ribosome to mRNA
 - (D) Inhibiting binding of aminoacyl tRNA to ribosome
- 58 Apoptosis is mediated by _____
- (A) Trypsin
 - (B) Cytochrome oxidase
 - (C) Caspases
 - (D) NADH
- 59 Which one is true about nucleus?
- (A) Covered by double membrane layer
 - (B) Connected with mitochondria
 - (C) Smallest cell organelle
 - (D) Present only in dividing cell
- 60 Which one of the following do not change with time in any cell?
- (A) Transcriptome
 - (B) Proteome
 - (C) Genome
 - (D) Metabolome
- 61 Which one is true about ion torrent sequencing?
- (A) It is based on detection of fluorescence.
 - (B) It is based on sequencing by synthesis.
 - (C) The read length is more than 500 bp
 - (D) All the above
- 62 The annealing temperature in PCR is decided based on _____
- (A) Target length
 - (B) Type of DNA polymerase used
 - (C) Primer
 - (D) PCR machine
- 63 The size of mitochondrial DNA in fish is _____
- (A) 15-16 Kbp
 - (B) 17-18 Kbp
 - (C) 19-20 Kbp
 - (D) 16-17kbp
- 64 PCR technique used to find out missing sequence of a gene is _____
- (A) Inverse PCR
 - (B) Asymmetric PCR
 - (C) RT PCR
 - (D) RACE PCR

- 65 Agar is extracted from red sea weed using _____
- (A) Lipid extraction
 - (B) Hexane extraction
 - (C) Water extraction
 - (D) Evaporation
- 66 Bioluminescent bacteria used to test water for environmental toxins is _____
- (A) *Vibrio anguillarum*
 - (B) *Pseudomonas marinum*
 - (C) *Vibrio fischeri*
 - (D) *Photobacterium fischeri*
- 67 Chitin is a polymer of _____
- (A) N-Acetyl N-glucosamine
 - (B) N-Acetyl D-glucosamine
 - (C) D-Acetyl D-glucosamine
 - (D) Glucose
- 68 Fish oil is rich in _____
- (A) Omega 3 fatty acid
 - (B) Omega 6 fatty acid
 - (C) Alfa 3 fatty acid
 - (D) Saturated fatty acid
- 69 Fucoidon is mainly extracted from _____
- (A) Green seaweed
 - (B) Red seaweed
 - (C) Brown seaweed
 - (D) Microalgae
- 70 Which one is culture independent technique to identify microbes?
- (A) HPLC
 - (B) Metabarcoding
 - (C) GCMS
 - (D) Metagenomics
- 71 The concept of producing Tuna from Mackerel is based on _____
- (A) Embryonic stem cell technology
 - (B) Surgery
 - (C) Surrogate broodstock technology
 - (D) Induce breeding
- 72 The study of effect of nutrient on expression of gene is known as _____
- (A) Nutrigenomics
 - (B) Foodgenomics
 - (C) Transcriptomics
 - (D) Metabolomics

- 73 Which component of RNA polymerase identify promoter region in prokaryote _____
- (A) Rho factor
 - (B) σ Factor of RNA polymerase
 - (C) DNA gyrase
 - (D) SSB protein
- 74 What is the effect of strong acid on DNA at high temperature?
- (A) Remove sugar from DNA
 - (B) Completely hydrolyze the DNA to base, sugar and phosphate
 - (C) Changes tautomeric stage of bases
 - (D) No effect on DNA
- 75 Buoyant density of DNA (gm/cc) is _____
- (A) 1.55
 - (B) 1.8
 - (C) 1.4
 - (D) 1.7
- 76 Pyrimidine dimer formed in DNA due to UV light is repaired by _____
- (A) DNA photolyase
 - (B) Base excision repair
 - (C) Strand break repair
 - (D) NER
- 77 What is the role of CRISPR/Cas9 system in bacteria?
- (A) Mutation
 - (B) Adaptive immune system
 - (C) Transformation
 - (D) RMS
- 78 Chemical used to arrest spindle fiber formation is _____
- (A) Ethidium bromide
 - (B) Colchicine
 - (C) NaOH
 - (D) Tetracyclin
- 79 Natural gynogenesis occur in _____
- (A) Griuper
 - (B) Seabass
 - (C) *Poecilia formosa*
 - (D) *Labeo rohita*
- 80 Which of the following DNA polymerase is used in PCR for producing PCR product for TA cloning?
- (A) Taq polymerase
 - (B) Pfu
 - (C) Vent
 - (D) Tih

- 81 Chromatography with solid stationary phase is called as _____
(A) Solid chromatography
(B) Adsorption chromatography
(C) Liquid chromatography
(D) Partition chromatography
- 82 Carrier gas used in gas chromatography is _____
(A) CO₂
(B) Nitrogen
(C) Oxygen
(D) Helium
- 83 Which one is used to find optimum annealing temperature of primer?
(A) Touchdown PCR
(B) Gradient PCR
(C) Inverse PCR
(D) BLAST
- 84 Post transcriptional modification in mRNA occurs in _____
(A) Cytoplasm
(B) Endoplasmic reticulum
(C) Nucleus
(D) Golgi body
- 85 Which one of the following cut both strand of DNA?
(A) Topoisomerase I
(B) DNA helicase
(C) Topoisomerase II
(D) DNA polymerase
- 86 Where is the miRNA binding site on mRNA ?
(A) CDS region
(B) 5'UTR
(C) 3'UTR
(D) Poly A tail
- 87 Who reported self incompatibility in plant for the first time?
(A) Nehemiah Grew
(B) Joseph Kolreuter
(C) Jagdishchandra Bose
(D) Gregor Mendel
- 88 Alternate forms of a gene are termed
(A) Chromosome
(B) Chromatin
(C) Exon
(D) Allele

- 89 Independent assortment means that
- (A) Alleles governing 2 different traits separate independent of each other during gametogenesis
 - (B) Alleles governing 2 different traits are not expressed in F2 generation
 - (C) Alleles governing 2 different traits are linked
 - (D) Alleles governing 2 different traits are inherited uniformly
- 90 In a monohybrid cross of Bb X Bb, the probability of obtaining the Progeny with Phenotype BB is
- (A) 0.50
 - (B) 0.25
 - (C) 0.16
 - (D) 0.125
- 91 The gene whose effect is masked by epistasis is termed _____
- (A) Antagonistic gene
 - (B) Hypostatic gene
 - (C) Epistatic gene
 - (D) Hyperstatic gene
- 92 One gene affecting multiple characteristics is termed _____
- (A) Phenocopy
 - (B) Imprinting
 - (C) Homozygous gene
 - (D) Pleiotropy
- 93 Successive nucleotides in DNA are linked by _____
- (A) H Bond
 - (B) Phosphate Bond
 - (C) Phosphodiester bond
 - (D) Double Bond
- 94 The relatively easy breaking and joining of the double stranded DNA is due to _____
- (A) P Bond
 - (B) S Bond
 - (C) H Bond
 - (D) Antiparallel nature
- 95 B DNA is _____
- (A) Inter molecular H Bonding
 - (B) Intra molecular H Bonding (Alpha Helix)
 - (C) Inter molecular S Bonding
 - (D) Intra molecular S Bonding
- 96 The group II introns are located at _____
- (A) rRNA genes
 - (B) Encoding genes in the nucleus
 - (C) tRNA genes
 - (D) rRNA, tRNA, and mRNA of organelles (chloroplasts and mitochondria)

- 97 The induced dissociation of the two DNA strands is called _____
- (A) Melting
 - (B) Annealing
 - (C) Restriction
 - (D) Digestion
- 98 Lambda Max nucleic acids is at the wavelength _____
- (A) 240 nm
 - (B) 260 nm
 - (C) 280 nm
 - (D) 320 nm
- 99 In vivo disruption of DNA, double strands is performed by _____
- (A) Oxygenases
 - (B) Hydrolases
 - (C) Transcriptases
 - (D) Helicases
- 100 The maximum absorption of light at 260 nm done by ssDNA as compared to dsDNA is known as _____
- (A) Hypochromic effect
 - (B) Hyperchromic effect
 - (C) Bathochromic effect
 - (D) Isochromic effect
- 101 A DNA triplex is generally comprised of _____
- (A) Two homopurine and one homopyrimidines
 - (B) Three homopurines
 - (C) Three homopyrimidines
 - (D) One homopurine and two homopyrimidines
- 102 DNA G-quadruplexes sequences predominantly contain _____
- (A) Guanine
 - (B) Cytosine
 - (C) Adenine
 - (D) Thymine
- 103 "Consensus sequences" generally show which residues are conserved and which residues are variable, considering the following example of DNA sequence "A[CT]N{A}YR" which notation explanation is best suitable
- (A) A means that an A is always found in that position; [CT] stands for either C or T; N stands for any base; and {A} means any base except A. Y represents any pyrimidine, and R indicates any purine
 - (B) A means that an A is never found in that position; [CT] stands for either C or T; N stands for any base; and {A} means any base except A. Y represents any pyrimidine, and R indicates any purine
 - (C) A means that an A is always found in that position; [CT] stands for C and T both; N stands for any base; and {A} means any base except A. Y represents any pyrimidine, and R indicates any purine
 - (D) A means that an A is always found in that position; [CT] stands for either C or T; N stands for any base; and {A} means only A. Y represents any pyrimidine, and R indicates any purine

- 104 During DNA replication, the enzymes that alter super-coiling are
(A) Helicases
(B) Polymerases
(C) Ligase
(D) Topoisomerase
- 105 The degree of super coiling during DNA replication is determined by
(A) Amount of Helicases
(B) Amount of Topoisomerase
(C) The linking number of DNA
(D) Amount of Polymerase
- 106 A right-handed DNA super-coiling during replication is given
(A) Positive number
(B) Negative Number
(C) Twist number
(D) Nucleoside
- 107 The enzymes that play an important role in DNA replication, transcription and recombination are
(A) Topoisomerase I
(B) Topoisomerase II
(C) Both Topoisomerase I & II
(D) None of the above
- 108 During the DNA replication initiation, the trapping of single-stranded regions by single-stranded binding protein (SSB) results in the formation of
(A) OriC
(B) Prepriming complex
(C) Replication fork
(D) Duplex
- 109 The length of E. coli OriC is
(A) 542 bp
(B) 524 bp
(C) 452 bp
(D) 245 bp
- 110 The major product of RNA Polymerase I is
(A) mRNA
(B) tRNA
(C) rRNA
(D) snRNA
- 111 The consensus sequence of the transcription control element TATA box is
(A) TATATA
(B) GGGCGG
(C) TGAG
(D) TATAAA

- 112 The consensus sequence of the transcription control element Ig octamer is
(A) ATGCAAAT
(B) TATAAA
(C) TATATA
(D) GGGCGG
- 113 Transcription factor that binds to the transcription control element GC box is
(A) Sp1, Sp3 and Sp4
(B) TBP
(C) NF1*
(D) HSF
- 114 The eukaryotic rRNA genes are located at
(A) Cytoplasm
(B) Nucleolus
(C) Mitochondria
(D) Nucleus
- 115 Which eukaryotic RNA polymerase transcribes snRNAs?
(A) RNA polymerase I
(B) RNA polymerase II
(C) RNA polymerase III
(D) RNA polymerase IV
- 116 AUG is the most common START codon and it codes for which amino acid in prokaryotes?
(A) Methionine
(B) Methionine and formyl methionine
(C) Formyl methionine (fMet)
(D) Alanine
- 117 Which amino acid is coded only by a single triplet code?
(A) Alanine
(B) Arginine
(C) Formyl Methionine
(D) Tryptophan
- 118 tRNA isoacceptors means
(A) tRNAs with different anticodons but incorporating the same amino acid in protein synthesis
(B) tRNAs with different anticodons but incorporating the different amino acid in protein synthesis
(C) tRNAs with same anticodons and incorporating the different amino acid in protein synthesis
(D) tRNAs with same anticodons and incorporating the same amino acid in protein synthesis
- 119 The attachment of a tRNA to its appropriate amino acid is termed as _____
(A) tRNA Priming
(B) tRNA initiation
(C) tRNA pairing
(D) Aminoacylation

- 120 The complex formed by small ribosomal subunit, mRNA, initiator tRNA with its aminoacid, GTP and Initiation factors 3,2 and 1 during translation is called _____
- (A) Translation complex
 - (B) 30S initiation complex
 - (C) Initiation complex
 - (D) 70S initiation complex
- 121 The elongation of the polypeptide chain during translation is mediated by the factors
- (A) Only EF-Tu
 - (B) Only EF-Ts
 - (C) Both EF-Tu and EF-Ts
 - (D) Neither EF-Tu and EF-Ts
- 122 Enzyme that catalyzes the addition of an amino acid residue in order to grow the polypeptide chain in protein synthesis
- (A) Peptidyl transferase
 - (B) Peptidyl hydrolase
 - (C) Peptidyl oxygenase
 - (D) Peptidyl hydroxylase
- 123 Several ribosomes attached to mRNA is called
- (A) Rough endoplasmic reticulum
 - (B) Rough mRNA
 - (C) Polysome
 - (D) Ergosome
- 124 The association of DNA with histones forms
- (A) Chromosomes
 - (B) Chromatids
 - (C) Protein
 - (D) Chromatin
- 125 Maximum condensation of the DNA occurs in the cell cycle stage
- (A) G1
 - (B) Mitosis
 - (C) S
 - (D) G2
- 126 Structural Maintenance of Chromosomes (SMC) proteins are essential for
- (A) Successful chromosome transmission
 - (B) Successful chromatid transmission
 - (C) Successful DNA replication
 - (D) Successful transcription process
- 127 The cohesins are associated with chromosomes _____
- (A) During G1 stage only
 - (B) During G2 stage only
 - (C) During S stage only
 - (D) Always

- 128 The bacterial non-chromosomal circular DNA is _____
- (A) Plasmid
 - (B) Osmid
 - (C) Operon
 - (D) Cosmid
- 129 The plasmids that are capable of free replication or integration into the bacterial genome are called
- (A) Episomes
 - (B) Polysomes
 - (C) Factors
 - (D) Nucleoids
- 130 Orphan genes are a subset of _____
- (A) Taxonomically-restricted genes (TRGs)
 - (B) Junk genes
 - (C) Pol genes
 - (D) Env genes
- 131 Which one is true about transmission electron microscopy?
- (A) Electron that are reflected back from the specimen is imaged
 - (B) Electron that are absorbed is used for imaging
 - (C) Electron that passed through the specimen is imaged
 - (D) None of the above
- 132 The cluster of regulatory gene of prokaryotes are present in
- (A) Caspid
 - (B) Operons
 - (C) Plasmid
 - (D) Regulating factor
- 133 Helix-Turn-Helix (HTH) is a
- (A) Functional motif capable of binding DNA that may regulate gene expression
 - (B) Structural motif not capable of binding DNA but may regulate gene expression
 - (C) Structural motif capable of binding DNA that may regulate gene expression
 - (D) Structural motif capable of binding DNA and don't regulate gene expression
- 134 Gene regulation can occur at
- (A) only the transcription level
 - (B) only at the translation level
 - (C) only at the gene structure level
 - (D) at all levels of genetic information flow
- 135 In the inducible operons, transcription should normally be
- (A) Not altered
 - (B) Turned on
 - (C) Turned off
 - (D) Either turned on or off

- 136 The number of alpha helices in a homeodomain motif is _____
(A) 2
(B) 1
(C) 4
(D) 3
- 137 The number of domains present in the SR proteins that regulate splicing is _____
(A) 1
(B) 2
(C) 3
(D) 4
- 138 The typical number of nucleotides in siRNAs is _____
(A) 15-20
(B) 30-40
(C) 21-25
(D) 50-60
- 139 Mutations are _____
(A) Nonheritable changes
(B) Beneficial alterations
(C) Harmful alterations
(D) Heritable changes
- 140 The type of gene mutation that results in alteration in a single nucleotide in the DNA sequence is called _____
(A) Base substitution
(B) Insertion
(C) Deletion
(D) Duplication
- 141 Spinal and bulbar muscular atrophy is the result of which trinucleotide repeats sequence _____
(A) GAC
(B) UAC
(C) CAG
(D) CGG
- 142 The mutation resulting in different amino acid in the protein is called _____
(A) Missense mutation
(B) Forward Mutation
(C) Reverse Mutation
(D) Sense mutation
- 143 Replication errors are repaired by _____
(A) Mismatch repair system
(B) Direct repair system
(C) Base-excision repair system
(D) Nucleotide-excision repair system

- 144 Restriction enzymes were discovered in the late _____
(A) 1960s
(B) 1970s
(C) 1975s
(D) 1980s
- 145 The type II restriction enzyme that results in blunt fragment end product is _____
(A) BamH II
(B) CofII
(C) EcoRII
(D) PvuII
- 146 During DNA electrophoresis, the fragments that travel fastest are _____
(A) Largest fragments
(B) Charged Fragments
(C) Intermediate sized fragments
(D) Smallest fragments
- 147 Using suitable host cell to produce multiple gene copies is called _____
(A) Gene transfection
(B) Gene cloning
(C) Gene recombination
(D) Gene rearrangement
- 148 Movement and continuous exchange of genes between two hosts is best achieved by _____
(A) Yeast artificial chromosomes
(B) Expression vectors
(C) Shuttle vectors
(D) Bacterial artificial chromosomes
- 149 A library with only the gene sequences that can be transcribed is called _____
(A) Genomic library
(B) DNA library
(C) RNA library
(D) cDNA library
- 150 DNA fingerprinting uses _____
(A) Variable number of tandem repeats (VNTRs)
(B) Multiple alleles
(C) Restriction fragment length polymorphisms (RFLPs)
(D) Directed mutagenesis
- 151 The process of replacing a short segment of plasmid DNA with a synthetic double stranded oligonucleotide is called _____
(A) Site directed mutagenesis
(B) Oligonucleotide-Directed Mutagenesis
(C) Polynucleotide-Directed Mutagenesis
(D) Cassette mutagenesis

- 152 BAL 31 nuclease enzyme is used to _____
- (A) Degrade DNA at the 3' end
 - (B) Degrade RNA at the 5' end
 - (C) Dephosphorylate RNA at only 5' ends
 - (D) Dephosphorylate DNA at the 3' and 5' ends
- 153 Five stocks of *Labeo Rohita* were crossed with each other and the better-growing hybrids were selected by following the family selection - Give the name of Hybrid breed
- (A) Jayanti Rohu
 - (B) Hybrid Rohu
 - (C) *Labeo* Jayanti Rohu
 - (D) *Labeo* Jayanti
- 154 Which authority regulates GM Foods in India?
- (A) The Food Safety and Standards Authority of India
 - (B) The Food Standard and Safety Authority of India
 - (C) MoEFCC
 - (D) ICAR
- 155 An attempt was made for Cloning, sequencing and expression of cDNA encoding growth hormone from Indian catfish (*Heteropneustes fossilis*) using which PCR primers that representing the conserved regions of fish
- (A) RH sequences the 3' region of catfish RH cDNA (540 bp)
 - (B) LH sequences the 3' region of catfish LH cDNA (540 bp)
 - (C) GH sequences the 3' region of catfish GH cDNA (540 bp)
 - (D) EH sequences the 3' region of catfish EH cDNA (540 bp)
- 156 Temperature-dependent sex determination (TSD) mean
- (A) Is a type of environmental sex determination in which the temperatures experienced during embryonic/larval development determine the sex of the offspring
 - (B) Is a type of environmental sex determination in which the temperatures experienced during puberty determine the sex of the off spring
 - (C) Is a type of environmental sex determination in which the temperatures experienced during fertilization of egg determine the sex of the offspring
 - (D) Is a type of environmental sex determination in which the temperatures experienced during puberty and/or fertilization of egg development determine the sex of the offspring
- 157 *Dunaliella bardawil*, A single-celled, photosynthetic green marine algae is known for
- (A) Caloriphic value
 - (B) Production of β -carotenoids and glycerol in harsh condition
 - (C) Production of β -carotenoids
 - (D) Production of glycerol in harsh condition
- 158 What are Phlorotannins?
- (A) Phenolic compound produce by plants
 - (B) polyphenolic compound produce by plant
 - (C) polyphenolic polymers synthesized only by brown algae
 - (D) polyphenolic polymers synthesized only by red algae

- 159 Haematococcus pluvialis is a freshwater algae known for the production of _____
- (A) Alpha-tocopherol
 - (B) Beta-carotene
 - (C) Selenium
 - (D) Astaxanthin
- 160 What is the maximum cultivation light intensities for Pmax for Phaeodactylum tricornutum
- (A) 320 $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$
 - (B) 220 $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$
 - (C) 300 $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$
 - (D) 200 $\mu\text{mol photons m}^{-2} \text{ s}^{-1}$
- 161 Which metal is required to induce carotenoid enhancement in Coccomyxa onubensis?
- (A) Zn
 - (B) Cd
 - (C) Cu
 - (D) Fe
- 162 Which micro algae can be used as potential Molybdenum remediation from a media?
- (A) Scenedesmus chlorelloides
 - (B) Coccomyxa onubensis
 - (C) Phaeodactylum tricornutum
 - (D) Dunaliella bardawil
- 163 Novel food law for specific regulation of microalgae and seaweed was introduced by
- (A) FAO 1997
 - (B) USEPA 1997
 - (C) ICAR 1997
 - (D) European Union in 1997
- 164 The most common diacyl precursors of glycerolipids in microalgae is
- (A) Eicosapentaenoic
 - (B) cis-7,cis-10-Hexadecadienoic
 - (C) Phosphatidic acid (PA)
 - (D) Pentacosanoic
- 165 Kelp cultivation is also increasingly used for _____
- (A) Alternative food source
 - (B) Biomitigation of coastal eutrophication
 - (C) Carbon sequestration
 - (D) Biofuel production
- 166 Biosynthetic genes for the production of Guanidinium toxins is controversial in dinoflagellates may represent _____
- (A) Single or multiple horizontal gene transfer (HGT)
 - (B) Single gene transfer
 - (C) Multiple horizontal gene transfer (HGT)
 - (D) No gene transfer

- 167 Substrate for RNA transcription is
(A) dNTPs
(B) rNTPs
(C) Purines
(D) Pyrimidines
- 168 MW of Histone protein H2A (Da) is
(A) 21,990
(B) 13,990
(C) 12,990
(D) 11,990
- 169 What is Nucleosome?
(A) Fundamental subunit of ribosome
(B) Fundamental subunit of Nucleous
(C) Fundamental subunit of Nucleotide
(D) Fundamental subunit of Chromatin
- 170 The inhibitor protein for CDC25A is
(A) P15
(B) P21
(C) P51
(D) P19
- 171 Bacterial antibiotic resistance genes is usually transferred by
(A) Translocation
(B) Conjugation
(C) Transformation
(D) Transduction
- 172 What is Leucine zipper
(A) Common DNA binding functional protein
(B) Common DNA binding non regulatory protein
(C) Common RNA binding regulatory protein
(D) Common RNA binding non regulatory protein
- 173 The mutation resulting in producing a new phenotype is called
(A) Reverse Mutation
(B) Loss-of-function mutation
(C) gain-of-function mutation
(D) Forward Mutation
- 174 Suppressor mutations is
(A) Occurs in suppressive gene
(B) Occurs in operon gene
(C) Occurs in same gene and establish the original sequence
(D) Occurs in a functional gene

- 175 The restriction enzyme HaeIII is isolated from
(A) *Haemophilus aegyptius*
(B) *Haemophilus influenzae*
(C) *Bacillus amyloliquefaciens*
(D) *Nocardia otitidis-caviarum*
- 176 Southern blotting uses the blotting of
(A) Native single stranded DNA
(B) Denatured double stranded DNA
(C) Denatured single stranded DNA
(D) Native double stranded DNA
- 177 Why Zebrafish is popular model to study embryology
(A) Embryos are nearly transparent
(B) Embryos are non transparent
(C) Embryos are nearly opaque
(D) Embryos are larger in size
- 178 The scientific name of pearl oyster is
(A) *Meretrix meretrix*
(B) *Pinctada fucata*
(C) *Crassostrea madrasensis*
(D) *Lamellidens marginalis*
- 179 Luciferase enzyme is isolated from
(A) Seaweed
(B) Squid
(C) *Aequorea victoria*
(D) *Vibrio fischeri*
- 180 The promoter region used for aqua advantage salmon is
(A) GFP promoter
(B) HSP promoter
(C) AFP promoter
(D) CMV promoter
- 181 DNA polymerase I was discovered by
(A) Franklin
(B) Kerry Mullis
(C) Batson
(D) Arthur Kornberg
- 182 Which type of DNA binding dye is used in Real time PCR ?
(A) Specific binding dye
(B) Ethidium bromide
(C) Non specific binding dye
(D) Any type

- 183 Scientific name of GIFT tilapia is
(A) *Oreochromis mossambicus*
(B) *Oreochromis niloticus*
(C) *Labeo rohita*
(D) *Oreochromis oreochromis*
- 184 Which one is used for absolute quantification of target without requirement of standard?
(A) Real time PCR
(B) Semiquantative PCR
(C) Digital droplet PCR
(D) Western blotting
- 185 The name of 1st commercially available PCR machine is
(A) Baby blue
(B) Mr. cycle thermal cycler
(C) Son of cycle Thermalcycler
(D) DNA thermal cycler 1
- 186 Runt deforminty syndrome in shrimp is caused by
(A) WSSV
(B) TSV
(C) MBV
(D) IHNV
- 187 Recognition sequence of Hind III
(A) AACTT
(B) AAGCTT
(C) AACCTT
(D) AACGTT
- 188 Which one is not the part of Trizol reagent
(A) Phenol
(B) Guanidinium thiocyanate
(C) Chloroform
(D) None of the above
- 189 Which one is polymer of fructose?
(A) Dextrin
(B) Starch
(C) Glycogen
(D) Inulin
- 190 Toad skin is caused due to deficiency of
(A) Essential amino acid
(B) Fat soluble vitamin
(C) Essential fatty acid
(D) Insulin

- 191 Digital droplet PCR is
(A) End point detection
(B) Real time detection
(C) Post PCR agarose gel electrophoresis
(D) Relative quantification
- 192 Protogynous fish species
(A) Seabass
(B) Tilapia
(C) Grouper
(D) Goldfish
- 193 GnRH is
(A) Glycopeptide
(B) Neuropeptide
(C) Lipoprotein
(D) Enzyme
- 194 In higher animals, the DNA is
(A) AT type
(B) GC type
(C) GC and AT type both
(D) Same as bacteria
- 195 Kit based DNA isolation are mainly based on
(A) Calcium column
(B) Silica column
(C) Salting out
(D) None of the above
- 196 Technique used to find out structure of protein
(A) Crystallography
(B) SDS PAGE
(C) Chromatography
(D) MALDI
- 197 Test used to analyse genotoxicity is
(A) RFLP
(B) Mutagenesis test
(C) Oxidase test
(D) Comet assay
- 198 Hormone used for all male production in fish
(A) 17 alpha MT
(B) 17 beta MT
(C) Ovatide
(D) Estrogen

- 199 Cyst of brine shrimp hatch out as
- (A) Protozoa
 - (B) Mysis
 - (C) Nauplii
 - (D) Zoea
- 200 Technique used for knockout of gene from genome
- (A) RNA interference
 - (B) Crispr/cas 9
 - (C) RE digestion
 - (D) All of the above

Marine Biotechnology
Provisional Answer Key

Q.No	Option	Q.No	Option	Q.No	Option	Q.No	Option
1	A	51	B	101	D	151	D
2	C	52	D	102	A	152	D
3	A	53	A	103	A	153	A
4	C	54	A	104	D	154	A
5	A	55	C	105	C	155	C
6	B	56	B	106	B	156	A
7	A	57	D	107	C	157	B
8	C	58	C	108	B	158	C
9	B	59	A	109	D	159	D
10	C	60	C	110	C	160	B
11	B	61	B	111	D	161	C
12	A	62	C	112	A	162	A
13	D	63	D	113	A	163	D
14	C	64	D	114	B	164	C
15	B	65	C	115	B	165	B
16	C	66	D	116	C	166	A
17	B	67	B	117	D	167	B
18	C	68	A	118	A	168	B
19	D	69	C	119	D	169	D
20	A	70	D	120	B	170	B
21	B	71	C	121	C	171	D
22	C	72	A	122	A	172	A
23	D	73	B	123	D	173	C
24	B	74	B	124	D	174	C
25	D	75	D	125	B	175	A
26	A	76	A	126	A	176	C
27	A	77	B	127	D	177	A
28	B	78	B	128	A	178	B
29	A	79	C	129	A	179	D
30	C	80	A	130	A	180	C
31	C	81	B	131	C	181	D
32	A	82	D	132	B	182	C
33	C	83	B	133	C	183	B
34	C	84	C	134	D	184	C
35	C	85	C	135	B	185	D
36	D	86	C	136	D	186	D
37	B	87	B	137	B	187	B
38	A	88	D	138	C	188	C
39	B	89	A	139	D	189	D
40	C	90	B	140	A	190	C
41	D	91	B	141	C	191	A
42	C	92	D	142	A	192	D
43	B	93	C	143	A	193	B
44	C	94	C	144	A	194	A
45	D	95	B	145	D	195	B
46	B	96	D	146	B	196	A
47	A	97	A	147	A	197	D
48	B	98	B	148	C	198	A
49	D	99	D	149	D	199	C
50	B	100	B	150	A	200	B