

CET(PG)-2015

Sr. No. : 204143

Question Booklet Series : A

Important : Please consult your Admit Card / Roll No. Slip before filling your Roll Number on the Test Booklet and Answer Sheet.

Roll No.

In Figures

In Words

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O.M.R. Answer Sheet Serial No.

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Signature of the Candidate : _____

Subject : M.Sc. (Hons. School/2 Year Course)-Biotechnology

Time : 90 minutes

Number of Questions : 75

Maximum Marks : 75

DO NOT OPEN THE SEAL ON THE BOOKLET UNTIL ASKED TO DO SO

INSTRUCTIONS

1. Write your Roll No. on the Question Booklet and also on the OMR Answer Sheet in the space provided and nowhere else.
2. Enter the Subject and Series Code of Question Booklet on the OMR Answer Sheet. Darken the corresponding bubbles with **Black Ball Point / Black Gel pen**.
3. Do not make any identification mark on the Answer Sheet or Question Booklet.
4. To open the Question Booklet remove the paper seal gently when asked to do so.
5. Please check that this Question Booklet contains 75 questions. In case of any discrepancy, inform the Assistant Superintendent within 10 minutes of the start of test.
6. Each question has four alternative answers (A, B, C, D) of which only one is correct. For each question, darken only one bubble (A or B or C or D), whichever you think is the correct answer, on the Answer Sheet with **Black Ball Point / Black Gel pen**.
7. If you do not want to answer a question, leave all the bubbles corresponding to that question blank in the Answer Sheet. No marks will be deducted in such cases.
8. Darken the bubbles in the OMR Answer Sheet according to the Serial No. of the questions given in the Question Booklet.
9. Negative marking will be adopted for evaluation i.e., 1/4th of the mark of the question will be deducted for each wrong answer. A wrong answer means incorrect answer or wrong filling of bubble.
10. For calculations, use of simple log tables is permitted. Borrowing of log tables and any other material is not allowed.
11. For rough work only the sheets marked "Rough Work" at the end of the Question Booklet be used.
12. The Answer Sheet is designed for **computer evaluation**. Therefore, if you do not follow the instructions given on the Answer Sheet, it may make evaluation by the computer difficult. **Any resultant loss to the candidate on the above account, i.e., not following the instructions completely, shall be of the candidate only.**
13. After the test, hand over the Question Booklet and the Answer Sheet to the Assistant Superintendent on duty.
14. In no case the Answer Sheet, the Question Booklet, or its part or any material copied/noted from this Booklet is to be taken out of the examination hall. Any candidate found doing so, would be expelled from the examination.
15. A candidate who creates disturbance of any kind or changes his/her seat or is found in possession of any paper possibly of any assistance or found giving or receiving assistance or found using any other unfair means during the examination will be expelled from the examination by the Centre Superintendent/Observer whose decision shall be final.
16. **Telecommunication equipment such as pager, cellular phone, wireless, scanner, etc., is not permitted inside the examination hall. Use of calculator is not allowed.**

SEAL

1. **The first ever amino acid decoded by Nirenberg and Matthaei using a RNA composed of poly-Uracil was :**
 (A) Phenylalanine (B) Methionine
 (C) Tyrosine (D) Glycine

2. **Which is the common metal ion present in Cytochrome C, Cytochrome P450 and ribonucleotide reductase ?**
 (A) Fe (B) Mo
 (C) Ni (D) Cu

3. **The Hardy-Weinberg distribution is a relationship between :**
 (A) Gene frequencies and Genotype frequencies
 (B) Gene frequencies and Phenotype frequencies
 (C) Gene pool and Genotype frequencies
 (D) Gene pool and Phenotype frequencies

4. **An increase in total absorbance at 260 nm for a DNA in solution is the result of :**
 (A) Denaturation (B) Renaturation
 (C) Destruction (D) Precipitation

5. **Meselson-Stahl experiment helped to decode information about :**
 (A) Distinguishing between Conservative and Dispersive replication only
 (B) Distinguishing between Closed circular DNA and Linear DNA replication
 (C) Distinguishing between Conservative and Semi-conservative replication
 (D) Distinguishing between Semi-conservative and Dispersive replication only

6. **All of the following statement are true for eukaryotic RNA polymerase, except :**
 (A) Catalyzes the synthesis of RNA
 (B) One RNA polymerase for all three types of RNA
 (C) Three types of RNA polymerase for all three types of RNA
 (D) In all of the reactions DNA is the template

7. **Identify the correct subunit composition of *E.coli* RNA polymerase core enzyme :**
 (A) Alpha₂, Beta, Beta', Omega (B) Alpha₂, Beta, Delta, Omega
 (C) Alpha₂, Beta', Sigma, Omega (D) Alpha, Beta, Sigma, Omega

- 8. Diakinesis in meiosis is marked by all of the following, except :**
- (A) Centromere splitting (B) Chiasmata visible
(C) Chromatids visible (D) Chromosomes detach from envelope
- 9. During base excision repair which enzymes combination work to repair damaged base :**
- (A) Glycosylases and polymerases (B) Polymerases and lyases
(C) Polymerases and isomerases (D) Glycosylases and lyases
- 10. A polyribosome is a :**
- (A) Complex of ribosomes (B) Complex of ribosomes and mRNA
(C) Complex of ribosomes, tRNA and mRNA (D) Complex of ribosomes and tRNA
- 11. The following neurotransmitters are derivatives of tyrosine except :**
- (A) Dopamine (B) Epinephrine
(C) Norepinephrine (D) Histamine
- 12. Which of the following are produced during mixed acid fermentation ?**
- (A) An acid and alcohol (B) An acid and ester
(C) An acid and Ketone (D) An acid and aldehyde
- 13. Actinomycin is an inhibitor of the process of transcription by :**
- (A) Intercalates between adjacent G-C base pairs through phenoxazone ring
(B) Intercalates between adjacent A-T base pairs through phenoxazone ring
(C) Intercalates between adjacent A-C base pairs through phenoxazone ring
(D) Intercalates between adjacent G-T base pairs through phenoxazone ring

14. The linking number in the super helix topology of DNA can be defined as :

- (A) Number of times that one strand winds around the other
- (B) Number of supercoil of DNA
- (C) Number of times that one strand links the other in $5' \rightarrow 3'$ direction
- (D) Number of times that one strand links the other in $3' \rightarrow 5'$ direction

15. The only prokaryotic enzyme that can introduce negative supercoils :

- (A) DNA Gyrase
- (B) DNA helicase
- (C) DNA lyase
- (D) DNA polymerase

16. The Klenow fragment has the following activities :

- (A) DNA Polymerase only
- (B) DNA polymerase and $3' \rightarrow 5'$ exonuclease
- (C) DNA polymerase and $5' \rightarrow 3'$ exonuclease
- (D) Both DNA $3' \rightarrow 5'$ and $5' \rightarrow 3'$ exonuclease

17. The enzyme Telomerase is a :

- (A) Protein
- (B) Modified protein
- (C) Ribonucleic acid
- (D) Ribonucleoprotein

18. The international sequences repository GenBank is :

- (A) Genetic sequence database
- (B) Genetic sequence analysing program
- (C) Genetic sequence creating program
- (D) Genetic sequence analysis funding agency

19. Blood group (A, B and O types) of a person is determined by sugars attached to :
- (A) Proteins and Bilirubin (B) Proteins and Lipids
(C) Lipids and Myoglobin (D) Lipids and Haemoglobin
20. The enzymes of lysosomes share which of the following important property ?
- (A) All have an optimal activity at a neutral pH
(B) All have an optimal activity at an acid pH
(C) All have an optimal activity at an alkaline pH
(D) All have an optimal activity at any pH
21. All of the following are true for Vitamin-E except :
- (A) Most important location where vitamin E exerts its antioxidant effect is lungs
(B) Red and white blood cells are also benefitted by its protective effect
(C) Four major forms of vitamin E exist
(D) Some forms of vitamin E are water soluble
22. Which of the following features help to identify the cells in metaphase during mitotic cell division ?
- (A) Chromosomes fully extended and located at equatorial planes
(B) Chromosomes fully condensed and located at equatorial planes
(C) Chromosomes fully extended and located at polar regions
(D) Chromosomes fully condensed and located at polar regions
23. The most abundant protein in the world is :
- (A) Ribulose biphosphate carboxylase (B) Haemoglobin
(C) Keratin (D) Collagen
24. The carbon dioxide acceptor in photosynthetic reaction is :
- (A) Pyruvate (B) Glycerol 1, 3 biphosphate
(C) Ribulose 1, 5 biphosphate (D) Glyceraldehyde
25. During Edman degradation phenyl isothiocynate reacts with which of the following group in a peptide ?
- (A) N-terminal amino group (B) C-terminal carboxyl group
(C) Side chain thiol group (D) Side chain hydroxyl group

26. **Type I hypersensitivity is mediated by :**
(A) Mast cells and IgE
(B) Mast cells and IgG
(C) B cells and IgA
(D) B cells and IgG
27. **All of the following are inhibitors of electron transport chain except :**
(A) Rotenone
(B) Cyanide
(C) Antimycin A
(D) Nystatin
28. **Myosin is a motor protein because it can :**
(A) Convert chemical energy of ATP hydrolysis into mechanical energy
(B) Convert chemical energy of GTP hydrolysis into mechanical energy
(C) Convert mechanical energy into chemical energy of ATP synthesis
(D) Convert mechanical energy into chemical energy of GTP synthesis
29. **In alcoholic fermentation the steps of Pyruvate degradation are :**
(A) Pyruvate \rightarrow Acetaldehyde + $\text{CO}_2 \rightarrow$ Ethanol
(B) Pyruvate \rightarrow Lactate \rightarrow Ethanol + CO_2
(C) Pyruvate \rightarrow Phosphoenolpyruvate \rightarrow Ethanol + CO_2
(D) Pyruvate \rightarrow Acetic acid + $\text{CO}_2 \rightarrow$ Ethanol
30. **The oxygen binding affinity of Haemoglobin is reduced in the presence of :**
(A) 1, 2 - Bisphosphate glycerate
(B) 1, 3 - Bisphosphate glycerate
(C) 2, 3 - Bisphosphate glycerate
(D) 1, 2, 3 - Trisphosphate glycerate
31. **Chitin, the major structural polysaccharide in the exoskeleton of crabs is a polymer of :**
(A) N-Acetyl fructosamine
(B) N-Acetyl Glucosamine
(C) N-Acetyl Galactosamine
(D) N-Acetyl Mannosamine
32. **Identify the cellular location of enzymes of citric acid cycle :**
(A) Nucleus
(B) Cytoplasm
(C) Mitochondria
(D) Endoplasmic reticulum
33. **The nick translation is brought about by :**
(A) Peptidyl transferase
(B) RNA polymerase
(C) DNA Polymerase I
(D) Riboenzyme

34. Which word best describes the reaction catalysed by a Restriction endonuclease ?

- (A) Hydrolysis
(B) Redox reaction
(C) Phosphoryl group transfer
(D) Isomerization

35. During therapeutic cloning which of the following step is performed ?

- (A) Nucleus from egg is replaced by nucleus of sperm and then embryo is generated
(B) Nucleus from sperm is replaced by nucleus of somatic cell and then embryo is generated
(C) Nucleus from egg is replaced by nucleus of somatic cell and then embryo is generated
(D) Somatic cell nucleus from testes and ovary are used to generate embryo

36. Which chemical reactivity best describes the action of DNA ligases ?

- (A) Synthesis of DNA polymers
(B) Synthesis of RNA polymers
(C) Formation of a phosphodiester bond
(D) Formation of a peptide bond

37. The first genome sequence project was accomplished in which of the following species ?

- (A) *H influenzae*
(B) *D melanogaster*
(C) *S cerevisiae*
(D) *A thaliana*

38. Which of the following is key component of hot start PCR ?

- (A) Use of radioactive primers
(B) Starting the PCR in hot laboratory
(C) Keeping Taq polymerase inactive till the primers are annealed properly
(D) Keeping the PCR tubes at 90 °C for two hrs before starting PCR

39. The superfamily of heme containing proteins functioning to detoxify xenobiotics are :

- (A) Cytochrome P460
(B) Cytochrome P450
(C) Cytochrome P440
(D) Cytochrome P420

40. All of the following enzymes equip the cells with antioxidant mechanism except :

- (A) Superoxide dismutase
(B) Catalase
(C) Glutathione peroxidase
(D) Malate dehydrogenase

SEAL

41. The purine rich sequences ~ 10 nucleotides upstream from start codon of prokaryotic mRNAs, helping to position the ribosome to initiate translation :
- (A) CCAAT box (B) TATA box
(C) Shine-Dalgarno sequence (D) Kozak sequence
42. The "orphan" Genes are the genes with :
- (A) No known function
(B) Arbitrary function
(C) Opposite function in prokaryotes and eukaryotes
(D) Variant function in variant conditions
43. The following list represents the moderately repetitive sequences in the Human Genome except :
- (A) Long interspersed nuclear elements (B) Short interspersed nuclear elements
(C) Long terminal repeats (D) Gene cluster elements
44. Which of the following statements are not true for the antibodies ?
- (A) Each antibody has light as well as heavy chain
(B) Each light chain has variable and constant regions
(C) Variable regions of light chains only form the antigen binding sites
(D) Existence of J region increases the amount of diversity
45. The cells that have undergone genetic modifications to grow indefinitely are called :
- (A) Primary cell culture (B) Secondary cell culture
(C) Cell strain (D) Cell line
46. During the technique of Two-Dimensional gel electrophoresis :
- (A) Isoelectric focusing is followed by SDS-PAGE
(B) Isoelectric focusing is followed by Native PAGE
(C) SDS-PAGE is followed by Isoelectric focusing
(D) Native-PAGE is followed by Isoelectric focusing
47. To perform enzymatic amplification of genomic DNA by Polymerase chain reaction all of the following are required except :
- (A) Taq polymerase (B) Reverse transcriptase
(C) Primers (D) Mixture of deoxy ribonucleotides

48. An individual who has both the alleles of his phenotypically different parents for a trait is :

- (A) Homozygous (B) Heterozygous
(C) Dominant (D) Recessive

49. The cells which cannot undergo meiotic division are :

- (A) Diploid cells (B) Sperm forming cells
(C) Ovum generating cells (D) Haploid cells

50. RNA editing is best represented as :

- (A) Discrete changes to specific nucleotide sequences within a RNA molecule after it has been generated by RNA polymerase by removal of introns
(B) Discrete changes to specific nucleotide sequences within a RNA molecule after it has been generated by RNA polymerase by addition of a modified G nucleotide at 5' end
(C) Discrete changes to specific nucleotide sequences within a RNA molecule after it has been generated by RNA polymerase by addition of poly A tail at 3' end
(D) Discrete changes to specific nucleotide sequences within a RNA molecule after it has been generated by RNA polymerase by mutating a base within RNA

51. The tRNA has the anticodon UAC the mRNA codon usage would be :

- (A) GUA (B) AUG
(C) UUA (D) GUG

52. Which of the following sets of recombinant DNA technology tool incorrectly paired with its applications ?

- (A) DNA polymerase — Copies DNA sequences in PCR
(B) Restriction endonuclease — production of DNA fragments for cloning purpose
(C) Reverse transcriptase — production of cDNA
(D) DNA topoisomerase — Creating sticky ends by specific cuts

53. The commercial availability of Single Cell Proteins (SCP), in spite of being attractive source of nutrients for human, is ailing due to :
- (A) Increased formation of phosphoric acid from high Nucleic acid contamination of SCP
 - (B) Increased formation of uric acid from high Nucleic acid contamination of SCP
 - (C) Increased formation of hydrogen peroxide from high Nucleic acid contamination of SCP
 - (D) Increased formation of Glycolic acid from high Nucleic acid contamination of SCP
54. Which of the following gene is not part of *lac operon* of *E.coli* ?
- (A) Genes for inducible enzymes of lactose metabolism
 - (B) Genes for the repressor a regulatory protein
 - (C) Gene for RNA polymerase
 - (D) The promoter site where RNA polymerase binds
55. What is the use of aminopterin in HAT selection of monoclonal antibodies ?
- (A) To block synthesis of purines by *De novo* pathway in hybridoma clones
 - (B) To block synthesis of pyrimidines by salvage pathway in hybridoma clones
 - (C) To block synthesis of purines by *De novo* pathway in spleen cells
 - (D) To block synthesis of purines from salvage pathway in myeloma cells
56. The most commonly used dyes to detect signals in DNA microarray analysis are :
- (A) Ethidium bromide dye
 - (B) Propidium iodide dye
 - (C) Cyanin dyes
 - (D) Coomassie brilliant blue dye
57. The long DNA molecules of ~ 10 Mb can be resolved using which of the following forms of electrophoresis ?
- (A) Standard Agarose gel electrophoresis
 - (B) SDS-polyacrylamide gel electrophoresis
 - (C) Native polyacrylamide gel electrophoresis
 - (D) Pulsed field gel electrophoresis

58. Isolation of certain form of bacteria can be performed by following physical methods, except :
- (A) Heat treatment (B) Incubation temperature
(C) pH of medium (D) Use of inhibitory chemicals
59. The Gram-positive bacteria are different from Gram-negative bacteria in following aspects except :
- (A) Gram positive have a much greater amount of peptidoglycan in their cell walls
(B) The walls of some of the Gram positive bacteria contain teichoic acid
(C) Gram positive can easily be destroyed by lysozyme
(D) Cytoplasmic membrane is absent in Gram negative but present in Gram positive
60. The B form of DNA exhibits the following characteristics except :
- (A) It is a left-handed helix
(B) The strands of the helix are wrapped around an axis with a diameter of 20 Å
(C) Building blocks are purines and pyrimidine bases
(D) Every complete turn of the helix covers a distance of 34 Å
61. The measurement of bacterial growth can be done by following methods except :
- (A) Turbidimetric (B) Nitrogen determination
(C) Microscopic count (D) Transformation
62. During anaerobic state, the main purpose of fermentation involves which of the following ?
- (A) Regeneration of NAD^+ from NADH permitting continuous glycolysis
(B) Glucose oxidation to generate reducing equivalents
(C) Regeneration of NADP^+ from NADPH permitting continuous glycolysis
(D) Regeneration of FAD from FADH_2 permitting continuous glycolysis
63. Karyotype not compatible with survival of human embryo represent :
- (A) Total number of genes (B) Ploidy level of species
(C) Frequency of induced mutations (D) Single nucleotide polymorphism

64. Cancer cells show all the following except :

- (A) Unlimited number of cell divisions
- (C) Growth without external signals

- (B) Polyploidy
- (D) Severe contact inhibition

65. *Bacillus thuringiensis* is used for production of :

- (A) Fungicidal protein
- (C) Insecticidal protein

- (B) Bactericidal proteins
- (D) Interferon gamma

66. Iodine used during gram staining acts as :

- (A) A stain
- (C) A fixative

- (B) A mordant
- (D) A dehydrant

67. Fredric Sanger won the nobel prize for which of the discoveries ?

- (A) For sequencing of Φ X174 virus and nucleotide sequencing of insulin
- (B) For sequencing Φ X174 virus and amino acid sequencing of insulin
- (C) For amino acid sequencing of somatostatin and amino acid sequencing of insulin
- (D) For nucleotide sequencing of somatostatin and nucleotide sequencing of insulin

68. All of the following species are petroleum degrading species except :

- (A) *Penicillium*
- (C) *Candida*

- (B) *Nocardia*
- (D) *Micrococcus*

69. All the following techniques are used in determining DNA protein interactions, except :

- (A) Electrophoretic mobility shift assay
- (C) DNA foot printing

- (B) Chromatin yeast one hybrid system
- (D) DNA fingerprinting

70. The genetic change that occur in more than 1 percent of the population is represented as :

- (A) Gene Polymorphism
- (C) Gene Redundancy

- (B) Gene Duplication
- (D) Genetic Mutation

71. Which of the following best represent Proto-oncogene in normal cells ?
- (A) Code for proteins those lead to halting of cellular proliferation
 - (B) Code for proteins those initiate cellular apoptosis
 - (C) Code for proteins those are involved in stimulating cell division
 - (D) Code for proteins those suppress cell cycle at G1/S transition
72. More than 1000 repeats of CTG triplet would be seen in severely affected individuals with :
- (A) Fragile X-Syndrome
 - (B) Retinblastoma
 - (C) Myotonic Dystrophy
 - (D) Xeroderma pigmentosum
73. Biotechnology product Streptokinase produced by several species of streptococci is available commercially for :
- (A) Causing transfer of phosphate group on to human proteins
 - (B) Causing thrombolysis in humans
 - (C) Causing spermicidal action in humans
 - (D) Causing mucolytic action in humans
74. Which of the following represents batch fermentation ?
- (A) An open system
 - (B) Submerged system
 - (C) Closed system
 - (D) Feeder batch system
75. The medium used to differentiate lactose and non-lactose fermenters is :
- (A) Sugar medium
 - (B) MacConkeys medium
 - (C) Citrate medium
 - (D) Stuart's medium