

CET(PG)-2015

Sr. No. : 214018

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*

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In Words

O.M.R. Answer Sheet Serial No.

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Signature of the Candidate : _____

Subject : M.Sc. (Hons. School)–Biophysics

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 marks 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.**

1. **1 a.m.u. is equivalent to :**
(A) 1.66×10^{-24} kg (B) 1.66×10^{-25} kg
(C) 1.66×10^{-27} kg (D) 1.66×10^{-17} kg
2. **The active site of an enzyme is formed by a few of the enzyme's :**
(A) R groups of the amino acids (B) Amino groups of the amino acids
(C) Carboxyl groups of the amino acids (D) Exposed sulfur bonds
3. **Histone protein synthesis occurs during :**
(A) G1 phase (B) G2 phase
(C) S phase (D) Prophase
4. **DNA/chromosome replication takes place during :**
(A) G1-phase (B) G2 phase
(C) S-phase (D) Prophase
5. **Relationship between amino acid and protein is similar to α -helix is stabilized by H-bonds between the :**
(A) NH and CO group of side chain (B) NH and CO group of main chain
(C) NH and NH group of same chain (D) NH and CO groups of all chains
6. **What is true of fluid mosaic model ?**
(A) Phospholipid monolayer is present over protein layer
(B) Phospholipid bilayer is present over protein layer
(C) Protein embedded in phospholipid bilayer
(D) Phospholipid layer is sandwiched between two protein layers
7. **Ubiquinone is :**
(A) Protein co-enzyme (B) Non-protein co-enzyme
(C) Activator (D) Protein co-activator
8. **Cell membrane is not permeable to :**
(A) CO (B) Glutamic acid
(C) Glucose (D) Glucose-6-phosphate

9. **Phospholipid molecules of cell membrane possess :**
- (A) One polar head and one polar tail
 - (B) One nonpolar head and one nonpolar tail
 - (C) One polar head and two nonpolar tails
 - (D) One nonpolar head and two polar tails
10. **Assembly of 60 S and 40 S subunits of ribosome produces :**
- (A) 80S
 - (B) 70S
 - (C) 50S
 - (D) 100S
11. **Ion connected with forming cross-bridges is :**
- (A) Na^+
 - (B) Ca^{2+}
 - (C) K^+
 - (D) Mg^{2+}
12. **What is true of fluid mosaic model ?**
- (A) Phospholipid monolayer is present over protein layer
 - (B) Phospholipid bilayer is present over protein layer
 - (C) Protein embedded in phospholipid bilayer
 - (D) Phospholipid layer is sandwiched between two protein layers
13. **The ideal gamma ray energy for nuclear medicine imaging is between :**
- (A) 100-300 Mev
 - (B) 10-50 Kev
 - (C) 10-50 Mev
 - (D) 100-300 Kev
14. **Which of the following has highest LET ?**
- (A) Alpha rays
 - (B) Beta rays
 - (C) Gamma rays
 - (D) X-rays
15. **A single unit membrane surrounds the organelle :**
- (A) Nucleus
 - (B) Mitochondria
 - (C) Lysosome
 - (D) Chloroplast
16. **Mitochondria are semi-autonomous as they possess :**
- (A) DNA
 - (B) DNA and RNA
 - (C) DNA, RNA and ribosomes
 - (D) Proteins

17. **Telocentric chromosomes differ from acrocentric chromosomes in having :**
- (A) Terminal centromere as compared to subterminal centromere in the latter
 - (B) Terminal centromere as compared to medianly located centromere in the latter
 - (C) Subterminal centromere as compared to medianly located centromere in the latter
 - (D) Subterminal centromere as compared to submedian located centromere in the latter
18. **Loops of lampbrush chromosome possess :**
- (A) DNA, RNA and proteins
 - (B) DNA and RNA
 - (C) DNA and proteins
 - (D) DNA
19. **Which class of immunoglobulins can cross placenta ?**
- (A) IgG
 - (B) IgD
 - (C) IgM
 - (D) IgA
20. **Which of the following is the sensitive indicator of proteins ?**
- (A) Circular dichorism
 - (B) Gel chromatography
 - (C) Gel electrophoresis
 - (D) Affinity chromatography
21. **Which of the following is the molecular scissors in genetic engineering ?**
- (A) Exonucleases
 - (B) Primase
 - (C) Endonucleases
 - (D) DNA ligase
22. **ATP molecules combine with carrier molecules and allow passage of substances :**
- (A) Along concentration gradient
 - (B) Against concentration gradient
 - (C) In both the directions
 - (D) ATP is not required
23. **Organelle rich in manganese is :**
- (A) Ribosome
 - (B) Mitochondria
 - (C) Chloroplast
 - (D) Lysosome
24. **Method of Fourier transformation is not applied to :**
- (A) NMR
 - (B) X ray crystallography
 - (C) CT imaging
 - (D) Gamma ray spectroscopy
25. **Cause of glomerular filtration is :**
- (A) Dialysis
 - (B) Osmosis
 - (C) High pressure
 - (D) Albumin

26. A molecule of hemoglobin carries how many oxygen molecules ?
- (A) 1 (B) 2
(C) 3 (D) 4
27. Which spectroscopy is used to detect -SH group and disulphide linkages in proteins ?
- (A) CD spectroscopy (B) Fluorescence spectroscopy
(C) NMR spectroscopy (D) FTIR spectroscopy
28. The protein component of Rhodopsin molecule is :
- (A) 11-cis retinal (B) 11-trans retinal
(C) Retinene (D) Scotopsin
29. In gene therapy, DNA is inserted into a cell to compensate for :
- (A) The absence of plasmids (B) Mutant alleles
(C) Holes in the DNA made by viruses (D) They lack copy of DNA
30. The smallest neuromodulator substances :
- (A) Nitric oxide (B) Acetylcholine
(C) Aniline (D) Calmoduline
31. Which of the following is not secreted directly into the blood stream ?
- (A) Steroid hormone (B) Neurotransmitter
(C) Peptide hormone (D) Neurohormone
32. To determine the molecular weight of unknown protein, the most appropriate technique would be :
- (A) ^1H NMR spectroscopy (B) ^{13}C NMR spectroscopy
(C) Mass spectroscopy (D) IR spectroscopy
33. X-rays differ from gamma rays on the basis of :
- (A) Charge (B) Mass
(C) Wavelength (D) Origin
34. Which of the following has least frequency ?
- (A) Infrared rays (B) Gamma rays
(C) Microwaves (D) Ultraviolet rays

35. One gray is equal to :

- (A) 1 rad (B) 100 rad
(C) 100 roentgen (D) 10 rads

36. Membrane fluidity is controlled by :

- (A) Fatty acid composition
(B) Fatty acid composition and cholesterol content
(C) Cholesterol content
(D) Glycerol composition

37. Na/K ATPase pump drives :

- (A) Na out and K into the cell (B) Both Na and K out of the cell
(C) Na in and K out of the cell (D) Both Na and K into the cell

38. A Ramachandran plot :

- (A) Represents the sterically allowed conformations of a polypeptide backbone
(B) Gives the frequency of occurrence of amino acids
(C) Predicts the α helical structure from amino acid sequence
(D) Shows the X ray diffraction pattern from amino acid sequence

39. The sticky ends of the fragmented DNA molecule are made up of :

- (A) Calcium salts (B) Endonucleases
(C) Unpaired base (D) Methyl groups

40. Bremsstrahlung radiation are called :

- (A) X-rays with fixed energy (B) Gamma rays with fixed energy
(C) X-rays with variable energy (D) Gamma rays with variable energy

41. Stages in proper sequence of Prophase I are :

- (A) Zygotene, leptotene, pachytene, diakinesis and diplotene
(B) Leptotene, zygotene, pachytene, diplotene, diakinesis
(C) Leptotene, pachytene, zygotene, diakinesis, diplotene
(D) Diplotene, diakinesis, pachytene, zygotene and leptotene

42. **Go state of cell denotes :**
- (A) Exit of cell from cell cycle (B) Check point before entering next phase
(C) Death of cell (D) Temporary pause
43. **A unit of radiation exposure 'roentgen' expresses the :**
- (A) Ionization of air (B) Interaction of charged particles
(C) Radioactivity (D) Binding energy
44. **Which one is the most radiosensitive cell out of the following ?**
- (A) Lymphocytes (B) Monocytes
(C) Neutrophils (D) Basophils
45. **Protein whose concentration increases in aging is :**
- (A) Keratin (B) Myosin
(C) Collagen (D) Glutelin
46. **Relationship between amino acid and protein is similar to one found between :**
- (A) Glucose and fructose (B) Nucleotides and nucleic acids
(C) Nucleosides and nucleic acid (D) Purines and pyrimidines
47. **The vitamin nicotinamide can be synthesized in our body from :**
- (A) Tyrosine (B) Tryptophan
(C) Valine (D) Phenylalanine
48. **Which of the following cells are implicated in immunity against cancers ?**
- (A) Natural killer cells (B) Neutrophils
(C) Helper cells (D) T lymphocytes
49. **In bacteria the respiratory enzymes are located on :**
- (A) Plasmid (B) Episome
(C) Mesosome (D) Nucleoid
50. **An amino acid metabolized by brain only is :**
- (A) Alanine (B) Glutamic acid
(C) Methionine (D) Phenylalanine

51. Which of the following amino acids is unable to form a proper peptide bond ?
- (A) Glutamine (B) Asparagines
(C) Glycine (D) Proline
52. Which of the following amino acids is not utilized by brain ?
- (A) Valine (B) Glycine
(C) Methionine (D) Phenylalanine
53. How many types of proteins can be formed from 100 amino acids ?
- (A) 20^{100} (B) 100^{20}
(C) 100^{100} (D) 2000
54. Beta cells of islets of langerhans produce which of the following ?
- (A) Glucagon (B) Somatostatin
(C) Insulin (D) Trypsinogen
55. The motor protein kinesin moves vesicles along microtubules towards :
- (A) The Minus end (B) The Plus end
(C) Either end (D) Centrosome
56. In the receptor mediated endocytosis the membrane vesicles are initially enclosed in :
- (A) Calmodulin (B) Clathrin
(C) Syndesmin (D) Dystrophin
57. Connexons are characteristic feature of :
- (A) Trans golgi network (B) The rough endoplasmic reticulum
(C) The smooth endoplasmic reticulum (D) Gap junction
58. Which of the following is true ?
- (A) Bcl-2 is pro-apoptotic and Bax is anti-apoptotic
(B) Bcl-2 is anti-apoptotic and Bax is pro-apoptotic
(C) Bcl-2 is pro-apoptotic and Bax is also pro-apoptotic
(D) Bcl-2 is anti-apoptotic and Bax is also anti-apoptotic
59. The most common antigen presenting cell are referred to as :
- (A) Macrophages (B) Helper T cells
(C) Reticulocytes (D) Mast cells

60. Which of the following bonds is weakest ?
- (A) Covalent Bond (B) Ionic Bond
(C) Hydrogen Bond (D) Van der Waal Bond
61. Number of genes present in human genome is :
- (A) 15,000 (B) 22,000
(C) 27,000 (D) 30,000
62. The main buffer in cells are :
- (A) $\text{CH}_3\text{COONH}_4$ (B) NaH_2PO_4 and Na_2HPO_4
(C) H_2CO_3 and NaHCO_3 (D) Na and K
63. Which of the following can be detected in a magnetic field ?
- (A) Gamma rays (B) Beta rays
(C) Radio waves (D) Ultra-violet rays
64. $1 \mu\text{Ci}$ is equal to :
- (A) 37 MBq (B) 3.7 MBq
(C) 0.037 MBq (D) 0.37 MBq
65. The radionuclide $^{99\text{m}}\text{Tc}$ exists in how many oxidation states ?
- (A) 3 (B) 4
(C) 7 (D) 5
66. Which of the sequences of atoms can be found in backbones of polypeptides ?
- (A) C-N-N-C (B) C-C-C-N
(C) C-C-N-C (D) N-C-C-C
67. T wave of ECG represents :
- (A) Depolarization of atria (B) Repolarization of atria
(C) Depolarization of ventricles (D) Repolarisation of ventricles
68. The connected series of fluid-filled cavities that are found throughout the brain are known as the
- (A) Subarachnoid spaces (B) Ventricles
(C) Vesicles (D) Rete mirabile

69. A second messenger is :

- (A) A neuromodulator that is released along with a neurotransmitter
- (B) A neurotransmitter that binds with more than one type of receptor
- (C) A chemical that enhances the effects of neurotransmitter at the receptor
- (D) A chemical in the postsynaptic cell that is activated following receptor stimulation via a G protein

70. The function of inner ear is :

- (A) To collect and channel sound vibrations
- (B) To generate nerve impulse (action potential) for hearing and equilibrium
- (C) Drain excess fluid from middle ear to throat
- (D) Transmit sound vibrations from eardrum to malleus, incus and stapes

71. Rotational movement of head is sensed by :

- (A) Semicircular canals
- (B) Vestibuli
- (C) Ear drum
- (D) Middle ear

72. Which of these is not a tumour suppressor gene ?

- (A) Rb
- (B) ras
- (C) BRCA1
- (D) APC

73. The light sources used in fibre optic communication are :

- (A) LEDs
- (B) semiconductor lasers
- (C) phototransistors
- (D) both (A) and (B)

74. The percentage of ultrasound reflected at an air/liquid interface is :

- (A) 100%
- (B) High
- (C) Low
- (D) None

75. The bonding that is involved in the formation of protein secondary, tertiary, and quaternary structure as well as protein folding and protein-protein interactions is:

- (A) Hydrogen bonding
- (B) Disulfide bonding
- (C) Electrostatic interactions
- (D) Hydrophobic interactions