

CET-(PG)2015

Sr. No. :

239131

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. (Two Year Course)-Nuclear Medicine

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. A radionuclide with a 2 hour effective half life and a 6 hour physical half life has a biological half life of how many hours ?

- (A) 3 (B) 4
(C) 5 (D) 6

2. The occupational dose limit expressed as mSv for the fetus of a pregnant radiation worker is :

- (A) 5 (B) 10
(C) 15 (D) 20

3. Perchlorate discharge test in case of thyroid is useful in the assessment of :

- (A) Hyperthyroidism (B) Iodine deficient goitre
(C) Organification defect (D) Acute thyroiditis

4. The gastric emptying time of solid meal in normal person is :

- (A) 45-60 min (B) 60-75 min
(C) 75-90 min (D) 90-105 min

5. How much % of cardiac output is received by kidneys ?

- (A) 15 (B) 25
(C) 30 (D) 45

6. The lactoferrin is produced by :

- (A) Spermatogonia (B) Reticulocytes
(C) Amebocytes (D) Neutrophils

7. Which of the following has a higher frequency ?

- (A) FM rays (B) IR rays
(C) UV rays (D) Beta rays

8. Which of the following requires an injection of radionuclide for imaging ?

- (A) PET (B) Ultrasound
(C) CT (D) X-rays

9. Which of the following is produced when there is a fall in blood pressure ?

- (A) TSH (B) Prolactin
(C) Renin (D) Relaxin

10. Cardiac stress is induced by :

- (A) Methionine (B) Cytosine
(C) Adenosine (D) Guanine

11. What is released from the nucleus during electron capture decay ?

- (A) Beta Particle (B) Proton
(C) Neutron (D) Neutrino

12. Thymidine ^3H is composed of :

- (A) Base (B) Base and Sugar
(C) Base and Phosphate (D) Base and Phosphate and Sugar

13. What % of $^{99\text{m}}\text{Tc}$ labelled diphosphonate localizes in bone ?

- (A) 30 (B) 40
(C) 50 (D) 60

14. What is the ratio of gray to white matter uptake with ^{123}I -IMP ?

- (A) 3-4% (B) 5-6%
(C) 7-8% (D) 9-10%

15. Which of the following is not an immunodeficient strain ?

- (A) BALB/c (B) RAG
(C) SCID (D) NOD

16. Production of transgenic animals require transfections of :

- (A) Glial Cells (B) Germ Cells
(C) Embryos (D) Bone Marrow Cells

17. Dolly the first mammalian clone was born in which year ?
(A) 1993 (B) 1994
(C) 1995 (D) 1996
18. Which of the following does not use Fourier Transformation ?
(A) PET (B) PET-CT
(C) MRI (D) Rectilinear Scanner
19. Blood coagulation requires which of the following ?
(A) Zinc (B) Selenium
(C) Potassium (D) Calcium
20. The expression of effective dose equivalent is :
(A) Sievert (B) Rad
(C) Roentgen (D) QF
21. Nuclear medicine imaging requires which of the following ?
(A) Electrons (B) X-Rays
(C) Beta Rays (D) Gamma Rays
22. One Gray as expressed in J/kg, is equal to
(A) 0.1 (B) 1.0
(C) 10 (D) 100
23. Principal gamma ray energy of ^{51}Cr is :
(A) 320 eV (B) 320 Kev
(C) 320 MeV (D) 320 GeV
24. Physical half life of $^{99\text{m}}\text{Tc}$:
(A) 2 Hours (B) 4 Hours
(C) 6 Hours (D) 8 Hours
25. The unit of exposure is :
(A) Roentgen (B) Sievert
(C) Gray (D) RBE

26. During DNA replication, bonds are broken between :
 (A) Phosphate groups (B) Nitrogen Bases
 (C) Sugar and Phosphate (D) Pentose Sugars
27. Sprain is caused due to excessive pulling of :
 (A) Nerves (B) Tendons
 (C) Ligaments (D) Muscles
28. Which of the following vitamins is required for the production of erythrocytes ?
 (A) B-12 (B) A
 (C) K (D) E
29. ^{32}P is an emitter of which of the following radiations ?
 (A) Beta (B) Alpha
 (C) Gamma (D) Positrons
30. SI unit of radioactivity is :
 (A) Ci (B) Bq
 (C) Roentgen (D) Rad
31. Width of DNA molecule in Å nearly is :
 (A) 5 (B) 10
 (C) 15 (D) 20
32. Which of the following injected radionuclide can be used for pain palliation in bone metastasis ?
 (A) ^{131}I (B) ^{137}Cs
 (C) ^{153}Sm (D) ^{89}Sr
33. The worn out red blood cells are stored in :
 (A) Bone Marrow (B) Myocytes
 (C) Spleen (D) Liver

34. GI bleeding scintigraphy with ^{99m}Tc -red blood cells delivers dose to whole body in mGy :
- (A) 0.004 (B) 0.04
(C) 0.4 (D) 4
35. What is the approximate biological half of ^{99m}Tc in the blood ?
- (A) 15 min (B) 30 min
(C) 45 min (D) 60 min
36. The P wave of electrocardiogram is associated with :
- (A) Contraction of Atria (B) Contraction of ventricles
(C) Depolarization of atrial muscular tissue (D) Repolarization of SA node
37. The level of thyroxine in 100 ml of blood :
- (A) 4-10 pgm (B) 4-10 ngm
(C) 4-10 ug (D) 4-10 mg
38. The elute from a ^{99}Mo generator is :
- (A) sodium molybdate (B) sodium pertechnetate
(C) alumina (D) alumina molybdate
39. Cross section — a measure of probability of a nuclear reaction is measured in :
- (A) Microns (B) Å
(C) Ev (D) Barn
40. Which phase of cell cycle is most radiosensitive ?
- (A) Interphase (B) Metaphase
(C) Anaphase (D) Telophase
41. Maximum permissible annual dose in mSv from radiation exposure to occupational workers is :
- (A) 50 (B) 75
(C) 100 (D) 125

42. Quaternary structure of proteins is supported by :
- (A) Peptided bonds (B) Disulphides linkages
(C) Hydrophobic Interactions (D) Electostatic interactions
43. Which of the following has highest pH ?
- (A) Gastric juice (B) Pancreatic juice
(C) Intestinal gland secretions (D) Bile in gall bladder
44. The half life of ^{68}Ge in days is :
- (A) 71 (B) 171
(C) 271 (D) 1271
45. Which one of the following does not change length during muscle contraction ?
- (A) A band (B) I band
(C) H zone (D) sarcomere
46. How much % of Humans genome is shared with the mouse ?
- (A) 70 (B) 80
(C) 90 (D) 100
47. Nude mice have greatly reduced number of :
- (A) B lymphocytes (B) T lymphocytes
(C) Natural killer cells (D) Eosinophils
48. Appropriate energy of gamma rays used in imaging is :
- (A) 100-300 ev (B) 100-300 Kev
(C) 100-300 Mev (D) 100-300 Gev
49. Physical half life of ^{18}F in minutes is :
- (A) 0.11 (B) 1.1
(C) 11 (D) 110
50. Which of the following indicates conformation of proteins ?
- (A) Circular Dichroism (B) Ascending paper chromatography
(C) Gel Filtration (D) Gel Electrophoresis

51. What % of ^{99m}Tc diphosphanate localizes in bone ?
 (A) 30 (B) 40
 (C) 50 (D) 60
52. What is the dose of ^{67}Ga in mCi for tumour localization ?
 (A) 1.0 (B) 5
 (C) 10 (D) 15
53. Which of the following enzymes is required for the organification of iodide ?
 (A) Polymerase (B) Peroxidase
 (C) Catalase (D) Monoamine Oxidase
54. Radiocolloids are cleared from the circulation by :
 (A) RBCs (B) Hepatocytes
 (C) Kupffer Cells (D) Monocytes
55. The proteins that run the fastest in SDA-PAGE are :
 (A) Small in Size (B) Large in Size
 (C) Negatively Charged (D) Positively Charged
56. The regions of DNA in a eukaryotic gene that encode for a polypeptide are called :
 (A) Enhancers (B) Introns
 (C) Exons (D) Leader Sequence
57. Micro array analysis is used :
 (A) To identify new genes (B) To check the quality of gene expression
 (C) To measure copy number (D) To quantify gene expression
58. Which of the following is involved to study the atomic structure of proteins using X-ray crystallography ?
 (A) Electrons (B) Protons
 (C) Neutrons (D) Nucleons
59. Which of the following procedures is not used to characterize DNA molecule ?
 (A) Light scattering (B) Viscometry
 (C) X-Ray fluorescence (D) Birefringence

60. Vibration property of molecules is assessed by :
 (A) SEM (B) TEM
 (C) IR Spectroscopy (D) HPLC
61. Northern Blotting is used for the separation of :
 (A) Protein (B) DNA
 (C) Plasmids (D) mRNA
62. The enzyme responsible for continuing DNA replication in prokaryotes, once it is initiated :
 (A) DNA Gyrase (B) DNA Polymerase I
 (C) DNA Polymerase III (D) Polymerase Beta
63. The anisotropy of the steady state fluorescence emission depends on :
 (A) Volume of the sample used (B) Volume of the fluorescent dye
 (C) Concentration of the fluorescent dye (D) Concentration of the fluorescent dye and sample
64. Genetically modified DNA fragments are called :
 (A) Mitochondrial DNA (B) Ribosomal DNA
 (C) Recombinant DNA (D) S DNA
65. Standard deviation is the square of :
 (A) Variance (B) Mode
 (C) Standard Error (D) Median
66. Which of the following leukocytes are expressed more in hypersensitivity reactions ?
 (A) Neutrophils (B) Eosinophils
 (C) Monocytes (D) Lymphocytes
67. Red Blood cells appear normal in :
 (A) Isotonic solution (B) Hypertonic solution
 (C) Hypotonic solution (D) Hyperosmotic solution
68. Testosterone is secreted by :
 (A) Spermatoocyte (B) Leydig cells
 (C) Both (A) and (B) (D) Spermatoogonium

69. The number of oxygen molecules carried by one Hemoglobin molecule is :

- (A) 1 (B) 2
(C) 3 (D) 4

70. Gamma rays differ from X-rays on the basis of :

- (A) Mass (B) Charge
(C) Mass and Charge both (D) Origin

71. The radioactivity was discovered by :

- (A) Curie (B) Roentgen
(C) Bacquerel (D) Einstein

72. Which of the following is weakest ?

- (A) Ionic (B) Covalent
(C) Hydrogen (D) Van der Waal

73. One Bacquerel is :

- (A) 27.03 Pico curie (B) 27.03 Nano curie
(C) 27.03 Micro curie (D) 27.03 Millicurie

74. One rad is equal to the absorption of :

- (A) 0.1 Gy (B) 0.01 Gy
(C) 1 Gy (D) 10 Gy

75. ^{14}C is a :

- (A) Beta emitter (B) Gamma emitter
(C) Alpha emitter (D) Both Gamma and Beta emitter