

Roll. No.

Question Booklet Number

O.M.R. Serial No.

--	--	--	--	--	--	--	--

M.Sc. (SEM.-III) (NEP) (SUPPLE.) EXAMINATION, 2024-25

PHYSICS

(Nuclear Physics-I)

Paper Code

B	0	1	0	9	0	3	T
---	---	---	---	---	---	---	---

**Question Booklet
Series**

A

Time : 1 : 30 Hours

Max. Marks : 75

Instructions to the Examinee :

1. Do not open the booklet unless you are asked to do so.
2. The booklet contains 100 questions. Examinee is required to answer 75 questions in the OMR Answer-Sheet provided and not in the question booklet. All questions carry equal marks.
3. Examine the Booklet and the OMR Answer-Sheet very carefully before you proceed. Faulty question booklet due to missing or duplicate pages/questions or having any other discrepancy should be got immediately replaced.
4. Four alternative answers are mentioned for each question as - A, B, C & D in the booklet. The candidate has to choose the correct / answer and mark the same in the OMR Answer-Sheet as per the direction :

(Remaining instructions on last page)

परीक्षार्थियों के लिए निर्देश :

1. प्रश्न-पुस्तिका को तब तक न खोलें जब तक आपसे कहा न जाए।
2. प्रश्न-पुस्तिका में 100 प्रश्न हैं। परीक्षार्थी को 75 प्रश्नों को केवल दी गई OMR आन्सर-शीट पर ही हल करना है, प्रश्न-पुस्तिका पर नहीं। सभी प्रश्नों के अंक समान हैं।
3. प्रश्नों के उत्तर अंकित करने से पूर्व प्रश्न-पुस्तिका तथा OMR आन्सर-शीट को सावधानीपूर्वक देख लें। दोषपूर्ण प्रश्न-पुस्तिका जिसमें कुछ भाग छपने से छूट गए हों या प्रश्न एक से अधिक बार छप गए हों या उसमें किसी अन्य प्रकार की कमी हो, उसे तुरन्त बदल लें।
4. प्रश्न-पुस्तिका में प्रत्येक प्रश्न के चार सम्भावित उत्तर- A, B, C एवं D हैं। परीक्षार्थी को उन चारों विकल्पों में से सही उत्तर छानना है। उत्तर को OMR उत्तर-पत्रक में सम्बन्धित प्रश्न संख्या में निम्न प्रकार भरना है :

(शेष निर्देश अन्तिम पृष्ठ पर)

1. The relation between nuclear radius and atomic mass no is :
 - (A) $R = R_0 A^{\frac{2}{3}}$
 - (B) $R = R_0 A^{\frac{3}{2}}$
 - (C) $R = R_0 A^{\frac{1}{3}}$
 - (D) $R = R_0 A^{\frac{1}{2}}$
2. Which of the following nucleus shows the peak in binding energy curve?
 - (A) ${}^3\text{Li}$
 - (B) ${}^4\text{He}$
 - (C) ${}^1\text{H}$
 - (D) ${}^{14}\text{Mg}$
3. Which of the following element have maximum Binding energy per nucleon?
 - (A) ${}^{56}\text{Fe}$
 - (B) ${}^{208}\text{Pb}$
 - (C) ${}^{20}\text{Ne}$
 - (D) ${}^{140}\text{Ce}$
4. The stable nucleus that has a radius half that of Fe^{56} is :
 - (A) Li^7
 - (B) Fe^{21}
 - (C) S^{16}
 - (D) Ca^{40}
5. Nuclear quadrupole moment is :
 - (A) Always positive
 - (B) Always negative
 - (C) Zero of spherical nuclide
 - (D) Always zero
6. A particle having no charge and almost no mass is :
 - (A) Positron
 - (B) Neutron
 - (C) Electron
 - (D) Neutrino
7. The nucleus of an atom consists of :
 - (A) Electrons and protons
 - (B) Electrons and neutrons
 - (C) Neutrons and protons
 - (D) Electrons, protons and neutrons
8. If M is the atomic mass and A is mass number then $\frac{M - A}{M}$ is called :
 - (A) Mass defect
 - (B) Packing fraction
 - (C) Binding energy
 - (D) Fermi energy
9. The average binding energy of a nucleus is :
 - (A) 8 eV
 - (B) 8 KeV
 - (C) 8 MeV
 - (D) 8 BeV
10. The density of nucleus is of the order of :
 - (A) $10^{24} \frac{\text{kg}}{\text{m}^3}$
 - (B) $10^{17} \frac{\text{kg}}{\text{m}^3}$
 - (C) $10^{14} \frac{\text{kg}}{\text{m}^3}$
 - (D) $10^3 \frac{\text{kg}}{\text{m}^3}$

11. According to Yukawa theory, the nuclear forces between the nucleons act through the exchange of:
- Positron
 - μ -meson
 - π -meson
 - K -meson
12. Which is not a magic number?
- 8
 - 12
 - 50
 - 58
13. The binding energy of α - particle in MeV is :
- 7
 - 28.3
 - 0
 - Infinite
14. In the binding energy curve, value of maximum binding energy per nucleon is :
- 8.5 MeV
 - 8.5 eV
 - 8.5 KeV
 - 8.5 BeV
15. The volume of nucleus is smaller than that of atom by a factor of :
- 10^5
 - 10
 - 10^{10}
 - 10^{12}
16. Which of the following statements is true for nuclear forces?
- They obey the inverse square law of distance
 - They obey the inverse third power law of distance
 - They are short range forces
 - They are equal in strength to the electromagnetic force
17. Semiempirical mass formula is also called as :
- The Weizsaecker formula
 - Frank-Condon formula
 - Baldwin formula
 - Gamow formula
18. The packing fraction is zero for :
- $^{12}_6\text{C}$
 - $^{16}_8\text{O}$
 - ^4_2He
 - $^{14}_7\text{N}$
19. Magnetic moment of proton and neutron are:
- $\mu_p = \frac{3}{2} \mu_N, \mu_n = 1.9 \mu_N$
 - $\mu_p = 2.7 \mu_N, \mu_n = 1.9 \mu_N$
 - $\mu_p = 2.7 \mu_N, \mu_n = -1.9 \mu_N$
 - $\mu_p = \frac{1}{3} \mu_N, \mu_n = 1.9 \mu_N$
20. The quadrupole moment of the nucleus is a :
- Tensor
 - Scalar
 - Vector
 - None of these

21. The binding energy per nucleon of helium nucleus is 7 MeV and that of deuteron is 1 MeV, then :
- (A) Helium nucleus is more stable
 (B) Deuteron nucleus is more stable
 (C) Both are less stable
 (D) Both are equally stable
22. The ratio of size of $^{208}_{82}\text{Pb}$ and $^{26}_{12}\text{Mg}$ nuclei is approximately :
- (A) 1
 (B) 4
 (C) 8
 (D) 16
23. The mean momentum of a nucleon in a nucleus with mass number A, varies as :
- (A) A
 (B) A^2
 (C) $A^{-\frac{2}{3}}$
 (D) $A^{-\frac{1}{3}}$
24. The order of magnitude of the binding energy per nucleon in a nucleus is :
- (A) 10^{-5} MeV
 (B) 10^{-3} MeV
 (C) 0.1 MeV
 (D) 10 MeV
25. In the Semiempirical mass formulae the observed parity of odd Z and odd N nuclei in nature is taken care of by the :
- (A) Surface energy term
 (B) Coulomb's energy term
 (C) δ -term
 (D) Asymmetry term
26. If the binding energy is large :
- (A) The nucleus is stable
 (B) The nucleus is unstable
 (C) The nucleus ruptures
 (D) None of these
27. If the nuclear radius of ^{27}Al is 3.6 fermi, the approximate nuclear radius of ^{64}Cu in fermi is:
- (A) 4.8
 (B) 3.6
 (C) 2.4
 (D) 1.2
28. An α -particle inside a nucleus is faced with a barrier of :
- (A) Height 5 MeV
 (B) Height 20 MeV
 (C) Varying height
 (D) No height
29. Beta decay is the :
- (A) Transformation of neutron to electron
 (B) Transformation of neutron to a proton or vice-versa
 (C) Transformation of electron to proton
 (D) Transformation of proton to electron

30. Deuteron is the two nucleon bound system consisting of :
- Two protons and one electron
 - Two neutrons and one positron
 - One proton and one neutron with opposite spins
 - One proton and one neutron with parallel spins
31. If $\psi(x, y, z) = -\psi(-x, -y, -z)$ then it represents:
- Even parity
 - Odd parity
 - Both (A) and (B)
 - None of these
32. The selection rule for β -ray for allowed transitions :
- $I' = I + 1, I - 1$
 - $\Delta I = 0 \text{ or } \pm 1$
 - $\Delta I = 0$
 - $\Delta I = I + 3, +4$
33. The weak interaction is responsible for :
- β -decay
 - Neutron-neutron scattering
 - Hadrons
 - Heavy mesons
34. Which one is not fundamental interaction?
- Gravitational interaction
 - Electromagnetic interaction
 - Strong interaction
 - Frictional interaction
35. The selection rule for γ -rays photon is :
- $\Delta J = 0 \text{ to } \Delta J = 1$
 - $\Delta S = 0 \text{ to } \Delta S = 1$
 - $E_f = E_i = \hbar \omega$
 - None of these
36. In Fermi's theory of β -decay the important thing is :
- To find out Q value of β -transformation
 - To calculate the probability of β -transformation
 - To find out parity of β -transformation
 - None of these
37. Processes responsible for the absorption of γ -rays are :
- Photoelectric absorption
 - Compton scattering by the electrons in the atom
 - Production of electron-positron pairs as a result of the interaction between γ -rays and the electric fields of atomic nuclei
 - All of the above
38. Nuclei which are β -emitters lie :
- Below the line of β -stability
 - On the line of β stability
 - Above the line of β stability
 - Below the N=Z line

39. Which of the following is the correct form of Geiger-Nuttall law?
- (A) $\ln \lambda = A \ln R + B$
 (B) $\ln \lambda = A \ln R$
 (C) $\ln \lambda = \frac{\ln R}{B}$
 (D) $\lambda = R$
40. Gamow's theory of α -decay follows :
- (A) Stark effect
 (B) Tunnel effect
 (C) Screening effect
 (D) None of these
41. Which of the following is the correct form of Gamow's formula?
- (A) $T = e^{-a\sqrt{2m(V-E)}/\hbar}$
 (B) $T = e^{-a^2\sqrt{2m(V-E)}/\hbar}$
 (C) $T = e^{-2a\sqrt{2m(V-E)}/\hbar}$
 (D) None of these
42. Which of the following is violated from β -decay?
- (A) Angular momentum
 (B) Linear momentum
 (C) Parity conservation
 (D) Charge conservation
43. Nucleus of α -particle is represented by :
- (A) Helium nucleus
 (B) Hydrogen nucleus
 (C) Deuterium nucleus
 (D) Tritium nucleus
44. " α -emitters with large disintegration energy have short half-lives" which of the following law state this statement?
- (A) Fermi law
 (B) Geiger-Nuttall law
 (C) Gamow's law
 (D) None of these
45. Wu experiment indicates the violation of :
- (A) Angular momentum
 (B) Linear momentum
 (C) Parity conservation
 (D) Charge conservation
46. What are selection rules for fermi transition in β -decay :
- (A) $\Delta S = 0, \Delta J = 0$
 (B) $\Delta S = 0, \Delta J = 1$
 (C) $\Delta S = 1, \Delta J = 0$
 (D) $\Delta S = 1, \Delta J = 1$
47. The nucleus having mass number 240 decays by the α -emission to the ground state of its daughter nucleus. The Q-value is 5.26 MeV, the energy of α -particle is :
- (A) 4.17 MeV
 (B) 5.17 MeV
 (C) 5.26 MeV
 (D) 4.26 MeV

48. Correct expression for total binding energy B of a nucleus ($a_1, a_2, a_3, a_4 > 0$) :

(A)
$$B = a_1 A - a_2 A^{\frac{2}{3}} - a_3 \frac{z(z-1)}{A^{\frac{1}{3}}} - a_4 \frac{(A-2Z)^2}{A} + \delta$$

(B)
$$B = a_1 A + a_2 A^{\frac{2}{3}} - a_3 \frac{z(z-1)}{A^{\frac{1}{3}}} - a_4 \frac{(A-2Z)^2}{A} + \delta$$

(C)
$$B = a_1 A + a_2 A^{\frac{1}{3}} - a_3 \frac{z(z-1)}{A^{\frac{1}{3}}} - a_4 \frac{(A-2Z)^2}{A} + \delta$$

(D)
$$B = a_1 A - a_2 A^{\frac{1}{3}} - a_3 \frac{z(z-1)}{A^{\frac{1}{3}}} - a_4 \frac{(A-2Z)^2}{A} + \delta$$

49. In Fermi's theory, the probability of alpha decay is most sensitive to which factor?

- (A) Mass of the alpha particle
- (B) Width of the potential barrier
- (C) Height of the Coulomb barrier
- (D) Energy of the emitted alpha particle

50. According to Fermi's theory, why do alpha particles have a narrow energy spectrum?

- (A) They are emitted from a fixed energy level

- (B) The Coulomb barrier filters out low-energy particles
- (C) The tunneling probability is sharply energy-dependent
- (D) Alpha particles lose energy during escape

51. What role does the potential barrier play in Fermi's explanation of alpha decay?

- (A) It accelerates the alpha particle
- (B) It confines the alpha particle inside the nucleus
- (C) It determines the decay product
- (D) It absorbs the alpha particle

52. Which particle is emitted during beta-minus decay, as explained in Gamow's framework?

- (A) Proton
- (B) Neutron
- (C) Electron
- (D) Alpha particle

53. In the context of gamma decay, what does the term "multipolarity" refer to?

- (A) The number of gamma photons emitted per decay
- (B) The angular momentum carried by the gamma photon
- (C) The number of nucleons involved in the transition
- (D) The energy difference between nuclear states

54. Which selection rule governs allowed gamma transitions in terms of angular momentum?
- (A) $\Delta J = 0, \pm 1$ (but not $0 \rightarrow 0$)
 (B) $\Delta L = \pm 2$ only
 (C) $\Delta S = \pm 1$
 (D) $\Delta J =$ any integer
55. The lifetime of a nuclear excited state undergoing gamma decay is inversely proportional to :
- (A) The square of the transition energy
 (B) The transition probability per unit time
 (C) The mass of the nucleus
 (D) The number of emitted gamma photons
56. Which of the following best describes the difference between electric and magnetic multipole transitions in gamma decay?
- (A) Electric transitions involve spin flips, magnetic do not
 (B) Magnetic transitions are always more probable than electric ones
 (C) Electric transitions arise from charge distribution, magnetic from current distribution
 (D) Magnetic transitions change the parity of the nucleus
57. What is the significance of internal conversion in the context of gamma decay?
- (A) It increases the energy of the emitted gamma photon
 (B) It allows the nucleus to decay without emitting a gamma photon
 (C) It changes the atomic number of the nucleus
 (D) It leads to the emission of a neutrino
58. In a nuclear reaction, which of the following quantities is strictly conserved?
- (A) Binding energy
 (B) Number of protons
 (C) Total energy and momentum
 (D) Mass number of reactants
59. Which of the following best describes the Q-value of a nuclear reaction?
- (A) The number of neutrons emitted
 (B) The energy required to initiate the reaction
 (C) The net energy released or absorbed during the reaction
 (D) The cross-section of the reaction
60. What does the term 'cross-section' in nuclear physics quantify?
- (A) The probability of a nuclear reaction occurring
 (B) The size of the atomic nucleus
 (C) The energy of emitted particles
 (D) The angular momentum of the nucleus

61. Which of the following reactions is an example of a fusion process?
- (A) $U_{235} + n \rightarrow Ba + Kr + 3n$
- (B) $D + T \rightarrow He_4 + n$
- (C) $C_{14} \rightarrow N_{14} + e^-$
- (D) $Th_{232} + n \rightarrow Th_{233}$
62. Which reaction type is characterized by a projectile being absorbed and a compound nucleus forming before decay?
- (A) Elastic scattering
- (B) Direct reaction
- (C) Compound nucleus reaction
- (D) Photodisintegration
63. In a Kurie plot, what does the x-axis typically represent?
- (A) Beta particle momentum
- (B) Beta particle kinetic energy
- (C) Neutrino energy
- (D) Total decay energy
64. What does the slope of the Kurie plot near the endpoint provide information about?
- (A) The decay constant
- (B) The neutrino flavour
- (C) The endpoint energy and possible neutrino mass
- (D) The atomic number of the daughter nucleus
65. Which theoretical framework supports the derivation of Sargent's Law?
- (A) Bohr's atomic model
- (B) Gamow's tunneling theory
- (C) Fermi's theory of beta decay
- (D) Yukawa's meson exchange theory
66. What physical quantity does Sargent's Law help estimate in experimental beta decay studies?
- (A) Nuclear binding energy
- (B) Neutrino mass
- (C) Atomic number of daughter nucleus
- (D) Decay constant or half-life
67. What is the Mössbauer Effect?
- (A) Emission of gamma rays with continuous energy spectrum
- (B) Recoil-free resonant emission and absorption of gamma rays by nuclei in a solid
- (C) Beta decay of unstable isotopes in gaseous form
- (D) Neutrino emission during nuclear transitions
68. Which isotope is most famously used in Mössbauer spectroscopy?
- (A) C-14
- (B) Fe-57
- (C) U-235
- (D) Tc-99m
69. Which theoretical assumption is critical for the Kurie plot to yield a straight line for allowed beta transitions?
- (A) Constant nuclear matrix element
- (B) Variable Fermi function
- (C) Zero neutrino mass
- (D) High Z-value of the nucleus

70. What does the term “multi-polarity” in gamma decay refer to?
- (A) The number of gamma photons emitted per decay
 - (B) The angular momentum carried by the emitted gamma ray
 - (C) The number of neutrons involved in the transition
 - (D) The energy of the gamma ray
71. Which of the following transitions is typically the most probable in gamma decay?
- (A) Magnetic quadrupole (M2)
 - (B) Electric quadrupole (E2)
 - (C) Magnetic dipole (M1)
 - (D) Electric dipole (E1)
72. What is the parity change associated with electric multipole transitions of odd L?
- (A) No change in parity
 - (B) Parity always changes
 - (C) Parity change depends on spin
 - (D) Parity change only for even L
73. Which decay mode is most commonly associated with the transition of a nuclear isomer to a lower energy state?
- (A) Beta-minus decay
 - (B) Alpha decay
 - (C) Gamma decay or internal conversion
 - (D) Electron capture
74. Which nuclear property most influences the relative strength of Fermi vs. Gamow-Teller transitions?
- (A) Nuclear temperature
 - (B) Neutron-to-proton ratio
 - (C) Nuclear spin configuration and isospin symmetry
 - (D) Atomic number
75. Which experimental technique is most effective for distinguishing Fermi and Gamow-Teller transitions?
- (A) Mössbauer spectroscopy
 - (B) Angular correlation measurements of emitted particles
 - (C) Rutherford scattering
 - (D) X-ray fluorescence
76. Which of the following nuclear transitions is forbidden for both Fermi and Gamow-Teller types?
- (A) $0^+ \rightarrow 0^+$
 - (B) $0^+ \rightarrow 1^+$
 - (C) $1^+ \rightarrow 0^+$
 - (D) $0^+ \rightarrow 0^-$
77. In nuclear fission, what is the typical energy released per fission event of U-235?
- (A) ~200 MeV
 - (B) ~0.1 MeV
 - (C) ~1 MeV
 - (D) ~1000 MeV

78. Which condition is necessary for a self-sustaining chain reaction in a nuclear reactor?
- (A) Neutron absorption must exceed neutron emission
 - (B) The multiplication factor (k) must be less than 1
 - (C) The reactor must operate at cryogenic temperatures
 - (D) The multiplication factor (k) must be equal to or greater than 1
79. Which of the following isotopes is not typically fissile with thermal neutrons?
- (A) U-235
 - (B) Pu-239
 - (C) Th-232
 - (D) U-233
80. What is the role of a moderator in a thermal nuclear reactor?
- (A) To absorb excess neutrons
 - (B) To slow down fast neutrons to thermal energies
 - (C) To increase the temperature of the reactor core
 - (D) To shield against gamma radiation
81. What is the primary reason nuclear fusion requiring extremely high temperatures?
- (A) To ionize the fusion fuel
 - (B) To overcome the Coulomb barrier between nuclei
 - (C) To increase the neutron absorption cross-section
 - (D) To reduce the mass defect
82. Why is Bremsstrahlung radiation a concern in fusion reactors?
- (A) It increases the fusion cross-section
 - (B) It enhances plasma confinement
 - (C) It leads to energy loss from the plasma
 - (D) It causes neutron activation of reactor walls
83. In a nuclear reaction $A + a \rightarrow B + b$, how is the Q-value calculated?
- (A) $Q = (\text{mass of } A + \text{mass of } a) - (\text{mass of } B + \text{mass of } b)$
 - (B) $Q = (\text{mass of } B + \text{mass of } b) - (\text{mass of } A + \text{mass of } a)$
 - (C) $Q = (\text{mass of } A - \text{mass of } B) \times C^2$
 - (D) $Q = (\text{mass of } b - \text{mass of } a) \times C^2$
84. Which of the following reactions has a positive Q-value?
- (A) Endothermic reactions
 - (B) Reactions requiring external energy
 - (C) Exothermic reactions
 - (D) Neutron capture with no gamma emission
85. Which experimental method is commonly used to determine Q-values of nuclear reactions?
- (A) Rutherford scattering
 - (B) Mass spectrometry
 - (C) Mössbauer spectroscopy
 - (D) X-ray diffraction

86. In Bohr-Wheeler theory, what is the significance of the fission barrier?
- (A) It prevents neutron capture
 - (B) It represents the energy required to split the nucleus
 - (C) It determines the number of fission fragments
 - (D) It is the energy of the emitted gamma rays
87. How does Bohr-Wheeler theory treat the compound nucleus formed after neutron absorption?
- (A) As a rigid sphere with fixed energy levels
 - (B) As a quantum harmonic oscillator
 - (C) As a thermally equilibrated system with statistical decay probabilities
 - (D) As a point particle with no internal structure
88. Which component in a nuclear reactor is primarily responsible for controlling the rate of the chain reaction?
- (A) Moderator
 - (B) Coolant
 - (C) Control rods
 - (D) Pressure vessel
89. Why are delayed neutrons essential for reactor control?
- (A) They allow time for mechanical and electronic control systems to respond
 - (B) They increase the energy output
 - (C) They reduce the need for control rods
 - (D) They prevent fuel depletion
90. In which fundamental interaction is parity violation most prominently observed?
- (A) Gravitational interaction
 - (B) Electromagnetic interaction
 - (C) Strong nuclear interaction
 - (D) Weak nuclear interaction
91. Which of the following particles always exhibits left-handed helicity in weak interactions?
- (A) Proton
 - (B) Electron
 - (C) Neutrino
 - (D) Photon
92. What is the primary purpose of the molecular beam resonance method in atomic and nuclear physics?
- (A) To measure the mass of molecules
 - (B) To determine the velocity of gas particles
 - (C) To study magnetic moments and energy level transitions
 - (D) To observe chemical reactions in vacuum

93. In a nuclear reaction $A(a,b)B$, what does the notation represent?
- (A) A decays into B by emitting particles a and b
 - (B) Projectile a hits target A, ejects particle b, and forms residual nucleus B
 - (C) A and B fuse to form a compound nucleus
 - (D) Particle b is absorbed by nucleus A to form B
94. Which of the following best describes a compound nucleus reaction mechanism?
- (A) Direct interaction with immediate particle emission
 - (B) Formation of an intermediate nucleus that decays after a short time
 - (C) Elastic scattering without energy loss
 - (D) Fusion followed by fission
95. The value of 1 barn is :
- (A) $10^{-28} m^2$
 - (B) $10^{-28} cm^2$
 - (C) $10^{28} m^2$
 - (D) $10^{28} cm^2$
96. In a beta-minus decay, which conservation law ensures the emission of an antineutrino?
- (A) Conservation of energy
 - (B) Conservation of angular momentum
 - (C) Conservation of lepton number
 - (D) Conservation of baryon number
97. In a nuclear reaction $A + a \rightarrow B + b$, which of the following must be conserved for the reaction to be physically allowed?
- (A) Mass number only
 - (B) Atomic number only
 - (C) Both mass number and atomic number
 - (D) Neither mass nor atomic number
98. Which assumption is fundamental to the derivation of the single-level Breit-Wigner formula?
- (A) Multiple overlapping resonances
 - (B) Non-interacting particles
 - (C) Constant potential energy
 - (D) Only one dominant resonance contributes significantly
99. Which of the following isotopes is commonly used as fuel in Pressurized Heavy Water Reactors (PHWR)?
- (A) U-238
 - (B) Pu-239
 - (C) U-235
 - (D) Natural uranium
100. What determines the nuclear spin of an atomic nucleus?
- (A) The total number of protons
 - (B) The sum of orbital and intrinsic angular momenta of nucleons
 - (C) The atomic mass number
 - (D) The number of neutrons only

Rough Work

Example :

Question :

Q.1 (A) ● (C) (D)

Q.2 (A) (B) ● (D)

Q.3 (A) ● (C) (D)

5. Each question carries equal marks. Marks will be awarded according to the number of correct answers you have.
6. All answers are to be given on OMR Answer Sheet only. Answers given anywhere other than the place specified in the answer sheet will not be considered valid.
7. Before writing anything on the OMR Answer Sheet, all the instructions given in it should be read carefully.
8. After the completion of the examination, candidates should leave the examination hall only after providing their OMR Answer Sheet to the invigilator. Candidate can carry their Question Booklet.
9. There will be no negative marking.
10. Rough work, if any, should be done on the blank pages provided for the purpose in the booklet.
11. To bring and use of log-book, calculator, pager & cellular phone in examination hall is prohibited.
12. In case of any difference found in English and Hindi version of the question, the English version of the question will be held authentic.

Impt. On opening the question booklet, first check that all the pages of the question booklet are printed properly. If there is any discrepancy in the question Booklet, then after showing it to the invigilator, get another question Booklet of the same series.

उदाहरण :

प्रश्न :

प्रश्न 1 (A) ● (C) (D)

प्रश्न 2 (A) (B) ● (D)

प्रश्न 3 (A) ● (C) (D)

5. प्रत्येक प्रश्न के अंक समान हैं। आपके जितने उत्तर सही होंगे, उन्हीं के अनुसार अंक प्रदान किये जायेंगे।
6. सभी उत्तर केवल ओ०एम०आर० उत्तर-पत्रक (OMR Answer Sheet) पर ही दिये जाने हैं। उत्तर-पत्रक में निर्धारित स्थान के अलावा अन्यत्र कहीं पर दिया गया उत्तर मान्य नहीं होगा।
7. ओ०एम०आर० उत्तर-पत्रक (OMR Answer Sheet) पर कुछ भी लिखने से पूर्व उसमें दिये गये सभी अनुदेशों को सावधानीपूर्वक पढ़ लिया जाये।
8. परीक्षा समाप्ति के उपरान्त परीक्षार्थी कक्ष निरीक्षक को अपनी OMR Answer Sheet उपलब्ध कराने के बाद ही परीक्षा कक्ष से प्रस्थान करें। परीक्षार्थी अपने साथ प्रश्न-पुस्तिका ले जा सकते हैं।
9. निगेटिव मार्किंग नहीं है।
10. कोई भी रफ कार्य, प्रश्न-पुस्तिका में, रफ-कार्य के लिए दिए खाली पेज पर ही किया जाना चाहिए।
11. परीक्षा-कक्ष में लॉग-बुक, कैल्कुलेटर, पेजर तथा सेल्युलर फोन ले जाना तथा उसका उपयोग करना वर्जित है।
12. प्रश्न के हिन्दी एवं अंग्रेजी रूपान्तरण में भिन्नता होने की दशा में प्रश्न का अंग्रेजी रूपान्तरण ही मान्य होगा।

महत्वपूर्ण: प्रश्नपुस्तिका खोलने पर प्रथमतः जाँच कर देख लें कि प्रश्नपुस्तिका के सभी पृष्ठ भलीभाँति छपे हुए हैं। यदि प्रश्नपुस्तिका में कोई कमी हो, तो कक्षनिरीक्षक को दिखाकर उसी सिरीज की दूसरी प्रश्नपुस्तिका प्राप्त कर लें।