

Hall Ticket Number

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Q.B. No.

100557

Booklet Code :

A

Marks : 100

DL-314-PHY

Time : 120 Minutes

Paper-II

Signature of the Candidate

Signature of the Invigilator

INSTRUCTIONS TO THE CANDIDATE

(Read the Instructions carefully before Answering)

1. Separate Optical Mark Reader (OMR) Answer Sheet is supplied to you along with Question Paper Booklet. Please read and follow the instructions on the OMR Answer Sheet for marking the responses and the required data.
2. The candidate should ensure that the **Booklet Code printed on OMR Answer Sheet and Booklet Code supplied are same.**
3. **Immediately on opening the Question Paper Booklet by tearing off the paper seal, please check for (i) The same booklet code (A/B/C/D) on each page. (ii) Serial Number of the questions (1-100), (iii) The number of pages and (iv) Correct Printing.** In case of any defect, please report to the invigilator and ask for replacement of booklet with same code within five minutes from the commencement of the test.
4. Electronic gadgets like Cell Phone, Calculator, Watches and Mathematical/Log Tables are not permitted into the examination hall.
5. **There will be 1/4 negative mark for every wrong answer.** However, if the response to the question is left blank without answering, there will be no penalty of negative mark for that question.
6. Record your answer on the OMR answer sheet by using Blue/Black ball point pen to darken the appropriate circles of (1), (2), (3) or (4) corresponding to the concerned question number in the OMR answer sheet. Darkening of more than one circle against any question automatically gets invalidated and will be treated as wrong answer.
7. Change of an answer is **NOT** allowed.
8. Rough work should be done only in the space provided in the Question Paper Booklet.
9. **Return the OMR Answer Sheet and Question Paper Booklet to the invigilator before leaving the examination hall.** Failure to return the OMR sheet and Question Paper Booklet is liable for criminal action.

This Booklet consists of 13 Pages for 100 Questions +2 page of Rough Work
+1 Title Page i.e. Total 16 pages

1. The curl of the vector $\vec{B} = x\hat{j}$ is :
- (1) Unit vector along x axis (2) Unit vector along y axis
(3) Unit vector along z axis (4) Unit vector in xy plane
2. If a force F is derivable from a potential function $V(r)$, where r is the distance from the origin of the coordinate system, it follows that :
- (1) $\nabla \times F = 0$ (2) $\nabla \cdot F = 0$
(3) $\nabla \cdot V = 0$ (4) $\nabla \times V = 0$
3. The value of $\int_{-1}^1 p_n(x)p_n(x)dx$, where p_n is Legendre Polynomial, is equal to :
- (1) Zero (2) 1
(3) $\frac{2}{2n+1}$ (4) $\frac{2}{4n^2-1}$
4. The value of Bessel function $J_{-\frac{3}{2}}\left(\frac{\pi}{2}\right)$ is :
- (1) 0 (2) $\frac{2}{\pi}$
(3) 1 (4) -1
5. The Fourier transformation of the function $f(x)$ is $F(k)$, then Fourier transform of $\frac{df}{dx}$ is :
- (1) $\frac{dF(k)}{dk}$ (2) $-ikF(k)$
(3) $ikF(k)$ (4) $\int F(k) dk$
6. If $f(s)$ is Laplace transform of $f(x)$, then Laplace transform of $f(ax)$, when a is constant, is :
- (1) $\frac{1}{s}f(s)$ (2) $\frac{1}{a}f\left(\frac{s}{a}\right)$
(3) $sf(s)$ (4) $af\left(\frac{s}{a}\right)$
7. Radioactive decay in a material follows the following statistical distribution :
- (1) Poisson (2) Normal
(3) Binomial (4) Maxwell
8. A particle is acted upon by two simple harmonic motions $x = A \sin(\omega t + \theta)$ and $y = A \sin(\omega t)$. The resultant path of the particle when $\theta = \pi/2$ is :
- (1) Straight line of slope A (2) Circle of radius A
(3) Ellipse (4) Parabola
9. If a relativistic particle of rest mass m_0 moves with momentum P , then its energy is :
- (1) $\sqrt{(p^2c^2 - m_0^2c^4)}$ (2) $p^2c^2 + m_0^2c^4$
(3) m_0c^2 (4) $\sqrt{(p^2c^2 + m_0^2c^4)}$
10. Lorentz transformations reduce to Galilean transformations when (v = velocity of light, c = velocity of light) :
- (1) $v \gg c$ (2) $v > c$
(3) $v < c$ (4) $v \ll c$

11. When a system undergoes an infinitesimal change, then the change in enthalpy of the system is :
- (1) $dH = TdS - VdP$ (2) $dH = TdS + VdP$
 (3) $dH = SdT + pdV$ (4) $dH = SdT - pdV$
12. When a system undergoes a reversible adiabatic change, the physical quantity which will not change, is :
- (1) pressure (2) volume
 (3) temperature (4) entropy
13. Consider the transition of liquid water to steam as water boils at a temperature of 100°C under a pressure of 1 atmosphere. Which one of the following quantities does *not* change discontinuously at the transition ?
- (1) The Gibbs free energy (2) The internal energy
 (3) The entropy (4) The specific volume
14. If the number density of a free electron gas in three dimensions is increased eight times, its Fermi temperature will :
- (1) increase by a factor of 4 (2) decrease by a factor of 4
 (3) increase by a factor of 8 (4) decrease by a factor of 8
15. Ten grams of ice at 0°C is added to a beaker containing 30 grams of water at 25°C . What is the final temperature of the system when it comes to thermal equilibrium ? (The specific heat of water is $1 \text{ cal/gm}^\circ\text{C}$ and latent heat of melting of ice is 80 cal/gm) :
- (1) 0°C (2) 7.5°C
 (3) 12.5°C (4) -1.25°C
16. Three identical spin $\frac{1}{2}$ fermions are to be distributed in two non-degenerate distinct energy levels. The number of ways this can be done is :
- (1) 8 (2) 4
 (3) 3 (4) 2
17. A Carnot cycle operates as a heat engine between two bodies of equal heat capacity until their temperatures become equal. If the initial temperatures of the bodies are T_1 and T_2 , respectively and $T_1 > T_2$, then their common final temperature is :
- (1) T_1 (2) $T_1 T_2$
 (3) $\sqrt{T_1 T_2}$ (4) $\sqrt{T_1/T_2}$
18. If the wavelength of maximum energy of radiation of a black body is 4800\AA , the surface temperature of the black body in degree kelvin is :
- (1) 5080 (2) 6040
 (3) 7020 (4) 8080
19. The order of error in the Simpson rule for numerical integration with step size h is :
- (1) h (2) h^2
 (3) h^3 (4) h^4
20. Newton-Raphson formula of Successive approximation to find the approximate value of a root of the equation $f(x) = 0$ is :
- (1) $x_{n+1} = x_n - \frac{f(x_n)}{f'(x_n)}$ (2) $x_{n+1} = x_n - \frac{f'(x_n)}{f(x_n)}$
 (3) $x_{n+1} = x_n + \frac{f(x_n)}{f'(x_n)}$ (4) $x_{n+1} = x_n - \frac{f'(x_n)}{f(x_n)}$

21. Match the following :
- | | | |
|--------------------------------|-----|-----------------------------------|
| (A) Bisection method | (1) | Solution of simultaneous equation |
| (B) Euler's method | (2) | Solution of polynomial equations |
| (C) Simpson rule | (3) | Solution of differential equation |
| (D) Gauss-Jordan method | (4) | Numerical integration |
| (1) (A-2), (B-3), (C-4), (D-1) | (2) | (A-1), (B-2), (C-3), (D-4) |
| (3) (A-2), (B-1), (C-4), (D-3) | (4) | (A-2), (B-4), (C-3), (D-1) |
22. $A^{ijk}{}_{lm} B^m{}_i$ is a tensor of rank :
- | | |
|-------|-------|
| (1) 3 | (2) 5 |
| (3) 7 | (4) 6 |
23. The partial differential equation $\frac{\partial^2 y}{\partial x^2} = a^2 \frac{\partial^2 y}{\partial t^2}$ is :
- | | |
|-----------------------|----------------------|
| (1) Bessel's equation | (2) Fourier equation |
| (3) Wave equation | (4) Laplace equation |
24. Fourier law of heat conduction is best represented by :
- | | |
|------------------------------|-----------------------------|
| (1) $Q = -k A \frac{dt}{dx}$ | (2) $Q = k A \frac{dx}{dt}$ |
| (3) $Q = -k A$ | (4) $Q = k \frac{dt}{dx}$ |
25. Tensor of rank zero is :
- | | |
|------------|-------------------|
| (1) scalar | (2) column vector |
| (3) matrix | (4) row vector |
26. The Hamilton's canonical equation of motion in terms of Poisson Brackets are
- | | |
|--|--|
| (1) $\dot{q} = \{q, H\}; \dot{P} = \{p, H\}$ | (2) $\dot{q} = \{H, q\}; \dot{P} = \{H, p\}$ |
| (3) $\dot{q} = \{H, p\}; \dot{P} = \{H, p\}$ | (4) $\dot{q} = \{p, H\}; \dot{P} = \{q, H\}$ |
27. Let (p, q) and (P, Q) be two pairs of canonical variables. The transformation $Q = q^\alpha \text{Cos}(\beta p), P = q^\alpha \text{Sin}(\beta p)$, is canonical, if :
- | | |
|-------------------------------|-------------------------------|
| (1) $\alpha = 2, \beta = 1/2$ | (2) $\alpha = 2, \beta = 2$ |
| (3) $\alpha = 1, \beta = 1$ | (4) $\alpha = 1/2, \beta = 2$ |
28. Let A, B and C be functions of phase space variables (coordinates and momenta of a mechanical system). The Poisson bracket $\{A, \{B, C\}\} - \{\{A, B\}, C\}$, is equal to :
- | | |
|-----------------------|-----------------------|
| (1) 0 | (2) $\{B\{C, A\}\}$ |
| (3) $\{A, \{C, B\}\}$ | (4) $\{\{C, A\}, B\}$ |
29. A particle of unit mass moves along the x-axis under the influence of a potential, $V(x) = x(x - 2)^2$. The particle is found to be in stable equilibrium at the point $x = 2$. The time period of oscillation of the particle is :
- | | |
|--------------|------------|
| (1) $\pi/2$ | (2) π |
| (3) $2\pi/3$ | (4) 2π |
30. Given that the linear transformation of a generalized coordinate q and the corresponding momentum p , $Q = q + 4ap, P = q + 2p$ is canonical, the value of the constant a is :
- | | |
|-------|---------|
| (1) 0 | (2) 0.5 |
| (3) 1 | (4) 2 |

31. First order phase transition is an :
- (1) isothermal and isochoric process
 - (2) isothermal and adiabatic process
 - (3) adiabatic process
 - (4) isothermal and isobaric process
32. Which of the following is *not* a property of Bose-Einstein condensate ?
- (1) zero viscosity
 - (2) superfluidity
 - (3) superconductivity
 - (4) high density
33. Which of the following is a Boson ?
- (1) electron
 - (2) proton
 - (3) meson
 - (4) ${}^3_2\text{He}$
34. Which of the following experimental techniques measures the changes in volume of the sample ?
- (1) TGA
 - (2) DSC
 - (3) DTA
 - (4) Dilatometry
35. Lagrangian of a particle of mass m attached to a spring of constant K moving along x -axis is :
- (1) $\frac{1}{2}m\dot{x}^2 + Kx^2$
 - (2) $\frac{1}{2}m\dot{x}^2 + \frac{1}{2}Kx^2$
 - (3) $\frac{1}{2}m\dot{x}^2 - \frac{1}{2}Kx^2$
 - (4) $\frac{1}{2}m\dot{x}^2 - Kx^2$
36. A particle of mass m and charge q is moving in an electromagnetic field of scalar potential ϕ and vector potential A with velocity v . Then the Hamiltonian of the particle is :
- (1) $\frac{1}{2}mv^2 - q(\phi - \frac{1}{c}v \cdot A)$
 - (2) $\frac{1}{2}mv^2 + q(\phi - \frac{1}{c}v \cdot A)$
 - (3) $\frac{1}{2}mv^2 - q(\phi + \frac{1}{c}v \cdot A)$
 - (4) $\frac{1}{2}mv^2 + q(\phi + \frac{1}{c}v \cdot A)$
37. If the state of a particle is specified in a space by six coordinates (three position coordinates x, y, z and three momentum coordinates p_x, p_y, p_z), then the space is called :
- (1) coordinate space
 - (2) point space
 - (3) phase space
 - (4) volume space

38. The force, which is always directed away or towards a fixed centre and magnitude of which is a function only of the distance from the fixed centre, is known as :

- (1) Coriolis force (2) Centripetal force
(3) Centrifugal force (4) Central force

39. Gauss's law can be applied to :

- (1) Plane surface (2) Curved surface
(3) Any surface (4) Closed surface

40. The work done in moving a charge along an equipotential surface is :

- (1) Depends on the path taken (2) Greater than zero
(3) Equal to zero (4) Negative

41. The potential inside a charged hollow sphere is :

- (1) zero (2) same as that on the surface
(3) less than that on the surface (4) none of these

42. Which of the following equation is a form of Ohm's law :

- (1) $J = \sigma E$ (2) $\nabla V = E$
(3) $D = \epsilon E$ (4) $\nabla \cdot D = \rho$

43. Equation $\nabla^2 V = -\rho/\epsilon$ is called the :

- (1) Poisson's equation (2) Laplace equation
(3) Continuity equation (4) Stokes equation

44. Kirchoff's current law for direct currents is implicit in the following expression :

- (1) $\nabla \cdot D = \rho$ (2) $\int J \cdot n \, ds = 0$
(3) $\nabla \cdot B = 0$ (4) $\nabla \times H = J - \frac{\partial D}{\partial t}$

45. The inconsistency of continuity equation for time varying fields was corrected by Maxwell and the correction applied was to law as

- (1) Ampere's law, $\frac{\partial D}{\partial t}$ (2) Gauss's law, J
(3) Faraday's law, $\frac{\partial B}{\partial t}$ (4) Ampere's law, $\frac{\partial \rho}{\partial t}$

46. "No two electrons in the same atom can have all its quantum numbers the same."
This statement is based on the work of :
- (1) Louis de Broglie (2) Werner von Heisenberg
(3) Albert Einstein (4) Wolfgang Pauli
47. The momentum of a photon of energy $h\nu$ (here c is velocity of light) and wavelength λ is :
- (1) h/λ (2) $h\nu/c$
(3) $h\nu/\lambda$ (4) $h\lambda\nu$
48. The number of orbitals in a shell with $n = 3$ is
- (1) 3 (2) 6
(3) 9 (4) 18
49. Particles in degenerate energy levels all have the same :
- (1) momentum (2) quantum numbers
(3) energy (4) velocity
50. The ground state energy of a harmonic oscillator is :
- (1) $E - \hbar\omega$ (2) $E = \hbar\omega/2$
(3) $E = (2/3)\hbar\omega$ (4) $E = 0$
51. The wave function for a particle in a one-dimensional box is $\psi(x) = A \sin(n\pi x/L)$. Which statement is *correct* ?
- (1) $\psi(x)$ gives the probability of finding the particle at x .
(2) $\psi^2(x)$ gives the probability of finding the particle at x .
(3) $\psi^2(x) dx$ gives the probability of finding the particle between x and $x + dx$.
(4) $\int |\psi(x)|^2 dx$ gives the probability of finding the particle at a particular value of x .
52. If the commutator $[A, B] = 1$, then the commutator $[A, B^2]$ is equal to :
- (1) A (2) B
(3) 2A (4) 2B

53. Spin angular momentum of an electron is :
- (1) Always the same, $h/2$
 - (2) Integral multiples of h
 - (3) Always the same, h
 - (4) half integral multiples of $(n + 1/2)h$, where n is an integer
54. Which of the following questions is Lorentz invariant ?
- (1) $(E \times B)^2$
 - (2) $E^2 + B^2$
 - (3) $E^2 - B^2$
 - (4) $E^2 \cdot B^2$
55. The magnetic field corresponding to vector potential $\vec{A} = ix + jy + kz$ (where i, j, k are unit vectors) is :
- (1) Zero
 - (2) infinity
 - (3) $ix + jy + kz$
 - (4) $ix + jy$
56. A free particle described by a plane wave and moving in the positive z -direction undergoes scattering by a potential :
- $$V = V_0 \text{ if } r \leq R$$
- $$V = 0 \text{ if } r > R$$
- If V_0 is changed to $2V_0$, keeping R fixed, then the differential scattering cross-section, in the Born approximation :
- (1) increases to four times the original value
 - (2) increases to twice the original value
 - (3) decreases to half the original value
 - (4) decreases to one-fourth the original value
57. For TE_{10} mode, if the wave guide is filled with air and the broader dimension of the wave guide is 2 cm, then the cutoff frequency is :
- (1) 5 MHz
 - (2) 7.5 MHz
 - (3) 7.5 GHz
 - (4) 5 GHz
58. The skin effect in waves guides causes a current to flow :
- (1) At the center of wave guide
 - (2) Near the surface of the conductor
 - (3) At the outer surface of the wave guide
 - (4) Uniformly through the wave guide

59. Fine structure of the spectral lines is due to :
- (1) Spin-orbit coupling (2) Isotope effect
 (3) Relativistic effect (4) Electric field interaction
60. If α and β are the matrices of relativistic Dirac equation, which of the following is *false* :
- (1) α and β anti-commute in pairs
 (2) trace of α and β is zero
 (3) eigen values of α and β are ± 1
 (4) dimensions of α and β are always odd
61. Which of the following equations is a first order differential equation in space and time ?
- (1) Klein-Gordon equation (2) Dirac equation
 (3) Schrodinger's equation (4) de Broglie equation
62. Transition of anomalous Zeeman into normal Zeeman effect is called :
- (1) Stark effect (2) Lamb shift
 (3) Raman Effect (4) Paschen-Back effect
63. Fine structure of hydrogen spectra can be explained by considering :
- (1) relativistic effect (2) spin orbit interaction
 (3) spin-spin interaction (4) spin lattice interaction
64. Observe the following solids and their energy gap (E_g) :

Solid	E_g (in eV)
a	1.2
b	5.6
c	2.9
d	0.7
e	3.2

All these solids are irradiated with light of 400 nm. Which of the above solids exhibit photoconductivity ?

- (1) a, b, c (2) a, d, e
 (3) a, c, d (4) c, d, e

65. IR Absorption is due to :
- (1) vibrations of atoms in a molecule
 - (2) transitions of electrons
 - (3) rotation of atoms
 - (4) all of the above
66. The transition $J = 0$ to $J = 1$ in a HCl molecule occurs at $10.68 / \text{cm}$. The rotational constant B value is :
- (1) Zero
 - (2) 5.34
 - (3) 10.68
 - (4) 20.36
67. In vibrational spectra of a diatomic molecule if $\Delta J = J' - J = 1$, then the resulting transitions belong to :
- (1) P branch
 - (2) R branch
 - (3) Q branch
 - (4) S branch
68. In a Raman experiment excitation line is 18315 cm^{-1} and stokes line is 18116 cm^{-1} , then the anti-stokes line is at :
- (1) 199 cm^{-1}
 - (2) 18116 cm^{-1}
 - (3) 18315 cm^{-1}
 - (4) 18514 cm^{-1}
69. The atomic mass number is equivalent to which of the following ?
- (1) The number of neutrons in the atom
 - (2) The number of protons in the atom
 - (3) The number of nucleons in the atom
 - (4) The number of α -particles in the atom
70. How many nucleons are in the ${}^{20}_{10}\text{Ne}$ atom ?
- (1) 12
 - (2) 30
 - (3) 18
 - (4) 20
71. An isotope with a high Binding Energy per nucleon :
- (1) will decay in a short period of time
 - (2) is very unstable
 - (3) is very stable
 - (4) has very few electrons

72. Which of the following about the gamma ray is *true* ?
- (1) It carries a positive charge
 - (2) It carries a negative charge
 - (3) It can be deflected by a magnetic field
 - (4) It has zero rest mass and a neutral charge
73. What is the missing element from the given equation ${}^{226}_{88}\text{Ra} \rightarrow ? + {}^4_2\text{He}$:
- (1) ${}^{230}_{86}\text{Rn}$
 - (2) ${}^{220}_{86}\text{Rn}$
 - (3) ${}^{228}_{86}\text{Rn}$
 - (4) ${}^{222}_{86}\text{Rn}$
74. Semi-empirical mass formula is called :
- (1) Weizsaecker formula
 - (2) Gamow formula
 - (3) Fermi formula
 - (4) Pauli formula
75. When two light nuclei combine to form a heavy nucleus, the value of binding energy per nucleon will :
- (1) decrease
 - (2) increase
 - (3) remain unchanged
 - (4) have sum of the binding energy of individual nuclei
76. The ${}^{238}_{92}\text{U}$ decays by the emission of eight alpha particles and six beta particles, at the end the mass number (Z) and atomic number (A) of the final product is :
- (1) 82,206
 - (2) 84,224
 - (3) 88,206
 - (4) 76,200
77. Fundamental particles Pions are :
- (1) Bosons
 - (2) Fermions
 - (3) Leptons
 - (4) Byrons
78. Which of the following is a particle and anti-particle pairs :
- (1) proton-positron
 - (2) proton-neutron
 - (3) neutron-neutrino
 - (4) electron-positron

79. In PN-junction, the depletion region is depleted of :
- (1) free holes (2) free electrons
(3) immobile ions (4) mobile ions
80. Diode in which current decreases (in certain voltage range) with increase of voltage is :
- (1) junction diode (2) zener diode
(3) tunnel diode (4) light emitting diode
81. In Common Emitter NPN transistor amplifier which of the following is *correct* ?
- (1) Input junction is forward biased and output junction is reverse biased
(2) Both input and output junctions are reverse biased
(3) Both input and output junctions are forward biased
(4) All of the above
82. In CE configuration of transistor amplifier h_{fe} is :
- (1) forward current gain (2) reverse current gain
(3) input impedance (4) output admittance
83. Which of the following devices is a voltage controlled device ?
- (1) diode (2) BJT
(3) FET (4) UJT
84. Emitter follower is used for :
- (1) amplification (2) attenuation
(3) impedance matching (4) all of these
85. Inductors are used in the feedback circuit of the following oscillator :
- (1) Phase shift (2) Hartley
(3) Colpitts (4) Wien bridge
86. Condition to be fulfilled for sustained oscillations is :
- (1) $A\beta = 1; \theta = 0$ (2) $A\beta = 1; \theta = 90$
(3) $A\beta = 1; \theta = 180$ (4) $A\beta = 0; \theta = 180$

87. Astable multivibrator has number of stable states.
- (1) 0 (2) 1
(3) 2 (4) 3
88. In an ideal op-amp slew rate should be :
- (1) zero (2) infinity
(3) large (4) minimum
89. Which flip-flop plays a vital role by functioning as the basic building block of a ripple counter ?
- (1) S-R flip-flop (2) J-K flip-flop
(3) D flip-flop (4) T flip-flop
90. If a , b and c are unit cell lattice vectors, then the volume of the unit cell is given by :
- (1) $a \cdot (b \times c)$ (2) $a(bc)$
(3) $a \times (b \cdot c)$ (4) $a \times (b \times c)$
91. The Brillouin zone boundary represents the locus of propagation vector K -values that are Bragg reflected, the first order Bragg reflections will be contained in :
- (1) $K_x = \pm\pi/a$ and $K_y = \pm\pi/a$ (2) $K_x = \pm 2\pi/a$ and $K_y = \pm 2\pi/a$
(3) $K_x = \pm a$ and $K_y = a$ (4) $K_x = \pm 2a$ and $K_y = \pm 2a$
92. The stress associated with the screw dislocations is :
- (1) compression (2) tension
(3) shear (4) elastic
93. According to Wideman Franz law, the ratio of thermal conductivity to electrical conductivity is proportional to absolute temperature where the proportionality constant is known as :
- (1) Reynolds number (2) Lorentz number
(3) Avogadro number (4) Renault number

94. During a superconducting to normal conductor transition, the superconducting sample gradually becomes paramagnetic form diamagnetic nature, then the superconductor is superconductor
- (1) Type I (2) Type II
 (3) Type I and Type II (4) Mixed transition
95. According to Mathieison rule :
- (1) The total resistivity of metal is the difference of resistivities due to phonon and impurity scattering.
 (2) The total resistivity of metal is the sum of resistivities due to phonon and impurity scattering
 (3) The ratio of thermal and electrical conductivity is constant
 (4) The thermal conductivity of the metals is constant
96. Which of the following is a direct semiconductor ?
- (1) Silicon (2) Germanium
 (3) Gallium Arsenide (4) Cadmium
97. Which of the following are three-dimensional defects ?
- (1) vacancies (2) dislocations
 (3) stacking faults (4) voids
98. Which of the following is an exothermic reaction ?
- (1) melting (2) crystallization
 (3) sublimation (4) vaporization
99. NMR is the study of resonance at frequencies.
- (1) visible light (2) UV light
 (3) radio (4) microwave
100. ESR signal sensitivity increases with temperature and magnetic field.
- (1) increasing, decreasing (2) decreasing, decreasing
 (3) decreasing, increasing (4) increasing, increasing

Space for Rough Work

Space for Rough Work