

CUET PG 2025 MATERIAL SCIENCE AND TECHNOLOGY Question Paper

Time Allowed :1 Hour 30 Mins	Maximum Marks :300	Total Questions :75
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General Instructions

Read the following instructions very carefully and strictly follow them:

1. The examination duration is 90 minutes. Manage your time effectively to attempt all questions within this period.
2. The total marks for this examination are 300. Aim to maximize your score by strategically answering each question.
3. There are 75 mandatory questions to be attempted in the Agro forestry paper. Ensure that all questions are answered.
4. Questions may appear in a shuffled order. Do not assume a fixed sequence and focus on each question as you proceed.
5. The marking of answers will be displayed as you answer. Use this feature to monitor your performance and adjust your strategy as needed.
6. You may mark questions for review and edit your answers later. Make sure to allocate time for reviewing marked questions before final submission.
7. Be aware of the detailed section and sub-section guidelines provided in the exam. Understanding these will aid in effectively navigating the exam.

1. The number of atoms per unit cell of SCC are:

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

2. Which of the following statements are correct:

- A. In SC structure $a = 2r$
- B. In SC structure $a = r/2$
- C. In BCC structure $a = 4r/\sqrt{3}$
- D. In FCC structure $a = 2\sqrt{2}r$

Where a is a lattice parameter and r is the atomic radius.

- (A) A, C and D
 (B) A, B and C
 (C) A, B, C and D
 (D) B, C and D

3. Which statements are correct for edge dislocation?

- A. An edge dislocation moves in the direction of the Burger vector.
 B. An edge dislocation involves an extra row of atoms above the slip plane.
 C. An edge of the atomic plane is formed internal of the crystal.
 D. The Burger vector of an edge dislocation is parallel to the dislocation line.

Choose the correct answer from the options given below:

- (A) A, B and D only
 (B) A, B and C only
 (C) A, B, C and D
 (D) B, C and D only

4. Match the LIST-I with LIST-II

LIST-I (Bonds)	LIST-II (Formations)
A. Ionic Bonds	Actual transfer of electrons from one atom to another atom
B. Metallic Bonds	Partial sharing of valence electrons by the neighboring atoms
C. Van der Waals Bonds	This type of bonding arises from dipolar interaction of crystals/molecules of the crystal.
D. Hydrogen Bonds	This type of interaction between the oppositely charged ends of permanently polarized molecules.

Choose the correct answer from the options given below:

- (A) A - I, B - II, C - III, D - IV
 (B) A - II, B - I, C - IV, D - III
 (C) A - I, B - II, C - IV, D - III
 (D) A - III, B - IV, C - I, D - II

5. Which of the following relations are correct for the cubic crystal:

- A. $a = b \neq c$
 B. $a = b = c$
 C. $\alpha = \beta = \gamma = 90^\circ$
 D. $\alpha \neq \beta = \gamma = 90^\circ$

Choose the correct answer from the options given below:

- (A) A and B only
 - (B) B and C only
 - (C) B and D only
 - (D) A and D only
-

6. Which of the following symmetry does not exist:

- (A) one fold symmetry
 - (B) two fold symmetry
 - (C) four fold symmetry
 - (D) five fold symmetry
-

7. Copper has FCC structure with a lattice constant $3.61 \text{ \AA}$. The radius of the copper atom is:

- (A) $1.28 \text{ \AA}$
 - (B) $1.26 \text{ \AA}$
 - (C) $1.23 \text{ \AA}$
 - (D) $1.29 \text{ \AA}$
-

8. The surface defects are two-dimensional defects, which have:

- A. Grain boundaries**
- B. Tilt boundaries**
- C. Twin boundaries**
- D. Stacking boundaries**

Choose the correct answer from the options given below:

- (A) A, B and C only
 - (B) A, C and D only
 - (C) A, B, C and D
 - (D) B, C and D only
-

9. Vacancies of the crystal may arise due to:

- (A) thermal vibrations
- (B) optical vibrations
- (C) quantum vibrations

(D) vacuum fluctuations

10. Match the LIST-I with LIST-II

LIST-I (Parameters)	LIST-II (Expressions)
A. Potential energy of a system of two atoms	I. $\alpha = \sum_j \pm \frac{1}{p_{ij}}$
B. Madelung constant	II. $U_{ij} = \pm \frac{q^2}{r}$
C. Coulomb electrostatic energy	III. $U = -\frac{A}{r^2} + \frac{B}{r^{10}}$
D. Cohesive energy	IV. $U_{ij} = \lambda e^{-r_{ij}/\rho} \pm \frac{q^2}{r_{ij}}$

Choose the correct answer from the options given below:

- (A) A - II, B - I, C - III, D - IV
(B) A - III, B - II, C - I, D - IV
(C) A - I, B - II, C - IV, D - III
(D) A - III, B - I, C - II, D - IV

11. The energies involved in the process of domain growth are:

- A. Exchange energy**
B. Anisotropic energy
C. Domain Wall energy
D. Magnetostrictive energy

Choose the correct answer from the options given below:

- (A) A, B and C only
(B) A, C and D only
(C) A, B, C and D
(D) B, C and D only

12. The potential energy of a system of two atoms is given by the expression $U = -A/r^2 + B/r^{10}$. A stable molecule is formed with the release of 8.0 eV of energy, when the interatomic distance is 2.8 Å. The values of A and B are:

- (A) $A = 1.22 \times 10^{-37} \text{ J m}^2$ and $B = 9.52 \times 10^{-115} \text{ J m}^{10}$
(B) $A = 1.22 \times 10^{-23} \text{ J m}^2$ and $B = 1.52 \times 10^{-115} \text{ J m}^{10}$
(C) $A = 1.22 \times 10^{-23} \text{ J m}^2$ and $B = 2.52 \times 10^{-115} \text{ J m}^{10}$
(D) $A = 1.22 \times 10^{-27} \text{ J m}^2$ and $B = 3.53 \times 10^{-115} \text{ J m}^{10}$
-

13. The steps involved in determining the Miller indices are:
A. Take the reciprocal of these intercepts.
B. Simplify the fraction.
C. Enclose the obtained numbers into parentheses.
D. Find the intercepts of the plane on the crystallographic axes.
Choose the correct answer from the options given below:

- (A) A, D, C, B
 - (B) A, B, D, C
 - (C) B, A, D, C
 - (D) D, A, B, C
-

14. The correct statements about SC lattice are:
A. The number of atoms per unit cell is 1
B. Its packing factor is 0.52
C. Iron is an example of SC lattice
D. Its Coordination Number is 6
Choose the correct answer from the options given below:

- (A) A, B and C only
 - (B) B and D only
 - (C) A, B, C and D
 - (D) A, B and D only
-

15. Diamond exhibits which type of structures:

- (A) Hexagonal and orthorhombic
 - (B) Orthorhombic and tetragonal
 - (C) Trigonal and monoclinic
 - (D) Cubic and hexagonal
-

16. The vector form of Bragg's law is used in the construction of:

- (A) Brillouin zone
 - (B) Extended Zone
 - (C) Reduced Zone
 - (D) Periodic zone
-

17. In Laue's technique of X-ray diffraction, a single crystal is held stationary and the beam of white radiation of wavelength λ is inclined at which condition with glancing angle (θ):

- (A) θ is fixed while λ varies
 - (B) λ is fixed while θ varies
 - (C) λ is fixed while both θ and distance varies
 - (D) θ is fixed while both λ and distance varies
-

18. The shortest wavelength, present in X-rays produced by an accelerating potential of 50kV, is:

- (A) 25 Å
 - (B) 2.5 Å
 - (C) 0.25 Å
 - (D) 0.025 Å
-

19. The number of distinct space groups possible in 3-dimensions is:

- (A) 240
 - (B) 220
 - (C) 230
 - (D) 250
-

20. The coordination number and volume of unit cell of hexagonal closed packed structure are respectively:

- (A) 6 and $\left(\frac{3\sqrt{3}}{4}a^2\right)c^2$
 - (B) 8 and $\left(\frac{4\sqrt{3}}{5}a^2\right)c^3$
 - (C) 10 and $\left(\frac{4\sqrt{3}}{5}a^2\right)c^2$
 - (D) 12 and $\left(\frac{3\sqrt{3}}{2}a^2\right)c$
-

21. Which type of liquid crystal has its structure twisted about the helical axis lying perpendicular to the orientation of molecules?

- (A) Nematic liquid crystal
 - (B) Smectic liquid crystal
 - (C) Lyotropic liquid crystal
 - (D) Cholesteric liquid crystal
-

22. The magnitude of the reciprocal lattice vector is related to interplaner spacing d_{hkl} :

- (A) proportional to d_{hkl}
 - (B) inversely proportional to d_{hkl}
 - (C) proportional to $(d_{hkl})^2$
 - (D) inversely proportional to $(d_{hkl})^2$
-

23. Inter-planer spacing for a (034) plane in a simple cubic, whose lattice constant is 4.5×10^{-10} m, is:

- (A) 9×10^{-10} m
 - (B) 9×10^{-11} m
 - (C) 8×10^{-10} m
 - (D) 10^{-10} m
-

24. The reciprocal lattice for a body centered cubic crystal is:

- (A) body centered cubic crystal
 - (B) face centered cubic crystal
 - (C) simple cubic crystal
 - (D) diamond structure
-

25. The value of specific heat at constant volume (C_V) for diatomic molecules is:

- (A) $\frac{5}{2}R$
 - (B) $\frac{5}{3}R$
 - (C) $\frac{7}{2}R$
 - (D) $\frac{3}{2}R$
-

26. According to the Entropy hypothesis, which one of the following statements is correct:

- (A) Entropy is intensive property and entropy of system is sum of entropy of its parts.
(B) Entropy can be produced, or in the limit of a reversible process be conserved, but entropy can never be destroyed.
(C) Entropy is not transferred with heat, but there is entropy transfer associated with energy transfer as work.
(D) Entropy can not measures the amount of microscopic randomness.
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27. Match the LIST-I with LIST-II

LIST-I (Basic Laws)	LIST-II (Properties)
A. First Law of Thermodynamics	I. Concept of temperature
B. Second Law of Thermodynamics	II. Concept of internal energy
C. Third Law of Thermodynamics	III. Concept of entropy
D. Zeroth Law of Thermodynamics	IV. Nernst Theorem

Choose the correct answer from the options given below:

- (A) A - II, B - III, C - IV, D - I
(B) A - I, B - III, C - II, D - IV
(C) A - I, B - II, C - IV, D - III
(D) A - III, B - IV, C - I, D - II
-

28. Match the LIST-I with LIST-II

LIST-I (Thermal Process)	LIST-II (Statement)
A. Isothermal process	I. Which occurs at constant volume
B. Adiabatic Process	II. Which occurs at constant pressure
C. Isobaric Process	III. Which occurs at constant temperature
D. Isochoric process	IV. No heat transfer during the thermodynamic process

Choose the correct answer from the options given below:

- (A) A - I, B - II, C - III, D - IV
(B) A - III, B - IV, C - II, D - I
(C) A - I, B - II, C - IV, D - III
(D) A - III, B - IV, C - I, D - II
-

29. Which of the following are the correct statements about laws of thermodynamics:

- A. The first law does not indicate the direction in which the change can occur.
B. The first law indicates the direction in which the change can occur.
C. The second law does not indicate the direction in which the change occurs.
D. The second law indicates the direction in which the change can occur.
Choose the correct answer from the options given below:

- (A) A and D only
(B) A, B and D only
(C) A, B, C and D
(D) B, C and D only
-

30. Select the correct sequence:

- A. Zeroth law of thermodynamics
B. First law of thermodynamics
C. Second law of thermodynamics
D. Third law of thermodynamics

Choose the correct answer from the options given below:

- (A) A, B, C, D
(B) B, C, A, D
(C) B, A, D, C
(D) C, B, D, A
-

31. How does the gas constant R is related to the universal gas constant $\bar{R}$ and molecular mass M ?

- (A) $R = \frac{\bar{R}^2}{M}$
(B) $R = \frac{\bar{R}}{M^2}$
(C) $R = \frac{\bar{R}}{M}$
(D) $R = \frac{\bar{R}^2}{M^3}$
-

32. Choose the correct sequence of operations in the Carnot cycle.

- A. Isothermal expansion of gas.
B. Isothermal compression of gas.
C. Adiabatic compression of gas.
D. Adiabatic expansion of gas.

Choose the correct answer from the options given below:

- (A) A, B, C, D
(B) A, C, B, D

- (C) B, A, D, C
(D) A, D, B, C
-

33. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. If heat is added to the system	I. $Q < 0$
B. If heat is removed from the system	II. $W > 0$
C. If work is done on the system	III. $Q > 0$
D. If work is done by the system	IV. $W < 0$

Choose the correct answer from the options given below:

- (A) A - III, B - I, C - IV, D - II
(B) A - I, B - III, C - II, D - IV
(C) A - I, B - II, C - IV, D - III
(D) A - III, B - IV, C - II, D - I
-

34. The speed of sound in a fluid is the velocity at which a weak pressure wave propagates in the medium.

- (A) Isothermally
(B) Adiabatically
(C) Isobarically
(D) Isentropically
-

35. The ideal gas, which is a model for gas used in constant volume gas thermometers, for which $P = \rho RT$. This equation illustrates that there are only independent intensive thermodynamic properties for a simple fluid.

- (A) one
(B) two
(C) three
(D) four
-

36. The breaking stress of a wire depends on:

- (A) length of the wire
(B) radius of the wire

- (C) material of the wire
 - (D) shape of the cross-section of the wire
-

37. Under the elastic limit, Poisson's ratio is:

- (A) The ratio of the lateral strain to the longitudinal strain
 - (B) The ratio of the longitudinal strain to the lateral strain
 - (C) The ratio of the lateral stress to the longitudinal stress
 - (D) The ratio of the longitudinal stress to the lateral stress
-

38. The elastic energy density of a stretched wire is given by:

- (A) Stress $\times$ strain
 - (B) stress/ strain
 - (C) $1/2 \times$ stress $\times$ strain
 - (D) strain/stress
-

39. Which of the following option is correct related to the application of elastic hysteresis?

- (A) shock absorber
 - (B) eddy current absorber
 - (C) shock transmitter
 - (D) eddy current transmitter
-

40. Which statements are true for total internal reflection?

- A. The angle of incidence must be greater than the critical angle
- B. light goes from an optically denser medium to an optically rarer medium.
- C. light goes from an optically rarer medium to an optically denser medium.
- D. The critical angle depends on the refractive index of both media.

Choose the correct answer from the options given below:

- (A) A, B and C only
 - (B) A, B and D only
 - (C) A, B, C and D
 - (D) B, C and D only
-

41. Match the LIST-I with LIST-II

LIST-I (Aberrations)	LIST-II (Consequences)
A. Spherical aberration	I. image of a point object as a disc
B. Coma	II. spreading of the image along the principal axis
C. Astigmatism	III. Line object is not imaged into a line
D. Distortion	IV. Image of a point object is a blurred surface

Choose the correct answer from the options given below:

- (A) A - IV, B - I, C - II, D - III
- (B) A - I, B - II, C - III, D - IV
- (C) A - IV, B - I, C - III, D - II
- (D) A - III, B - IV, C - I, D - II

42. Which statements are true about wave propagation through a medium:

- A. Frequency changes in a non-linear medium but remains constant in a linear medium.**
- B. Frequency changes in a linear medium but remains constant in a non-linear medium.**
- C. $R + T = 1$, where R is the reflection coefficient and T is the transmission coefficient**
- D. $R + T > 1$, where R is the reflection coefficient and T is the transmission coefficient**

Choose the correct answer from the options given below:

- (A) A and D only
- (B) A and C only
- (C) A, B, C and D
- (D) B, C and D only

43. Paramagnetic materials behaves as diamagnetic materials :

- (A) above Curie temperature
- (B) below Curie temperature
- (C) at normal temperature
- (D) at very high temperature

44. What is the effect of temperature on magnetic susceptibility of ferromagnetic materials?

- (A) increases with increasing temperature.
 - (B) remains unchanged with increasing temperature.
 - (C) decreases with increasing temperature.
 - (D) Sometimes increases and sometimes decreases depending on the environment.
-

45. Domain theory explains:

- (A) diamagnetism
 - (B) paramagnetism
 - (C) ferromagnetism
 - (D) superconductivity
-

46. Antiferromagnetic materials have magnetic susceptibility in the range:

- (A) -10^{-3} to -10^{-5}
 - (B) 10^{-2} to 10^{-5}
 - (C) -10^2 to -10^5
 - (D) 10^2 to 10^5
-

47. Which of the following is true for hard magnetic materials:

- (A) both coercivity and retentivity are high
 - (B) coercivity is high and retentivity is low
 - (C) both coercivity and retentivity are low
 - (D) coercivity is low and retentivity is high
-

48. The density of zinc is $7.13 \times 10^3 \text{ kg/m}^3$ and its atomic weight is 65.4. The fermi energy of Zinc is:

(Given that the effective mass of the electron in zinc is $0.85m_e$)

- (A) 9.43 eV
 - (B) 4.93 eV
 - (C) 94.3 eV
 - (D) 49.3 eV
-

49. In 3-dimensional system, the mean energy of an electron in electron gas at absolute zero is ----- of fermi energy, $E_f(0)$ at absolute zero.

- (A) $\frac{4}{3}$
- (B) $\frac{3}{4}$
- (C) $\frac{3}{2}$
- (D) $\frac{1}{4}$

50. Which of the following statements are correct for the Sommerfeld model:

- A. The free electrons are valence electrons of the composing atoms.
- B. The potential energy of an electron at rest inside the metal is assumed to be higher than that of an electron outside the metal.
- C. In this model, the mutual repulsion between the electrons is neglected.
- D. The potential energy for an electron is periodic.

Choose the correct answer from the options given below:

- (A) A, B and D only
- (B) A, C and D only
- (C) B, C and D only
- (D) A, B and C only

51. Given below are two statements, one is labelled as Assertion (A) and other one labelled as Reason (R).

Assertion (A): In the absence of an electric field, the electron gas is in an equilibrium state described by equilibrium distribution functions, viz the fermi-Dirac distribution function for a degenerate electron gas and Maxwell-Boltzmann distribution function for a non-degenerate electron gas.

Reason (R): In a conductor, the number of electrons moving in opposite directions is always the same, their average velocity in any direction is zero and consequently, the distribution functions are symmetric about the axis of ordinates.

In light of the above statements, choose the correct answer from the options given below.

- (A) (A) is false but (R) is true.
- (B) (A) is true but (R) is false.
- (C) Both (A) and (R) are true but (R) is NOT the correct explanation of (A).
- (D) Both (A) and (R) are true and (R) is the correct explanation of (A).

52. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. Mobility of electrons (μ)	I. $Ne^2\tau/m$
B. Drift velocity of electrons (v_d)	II. μE
C. Electrical conductivity of conduction electrons (σ)	III. $\mu m/e$
D. Relaxation time of electrons (τ)	IV. $1/\rho ne$

Choose the correct answer from the options given below:

- (A) A - I, B - II, C - IV, D - III
- (B) A - I, B - III, C - II, D - IV
- (C) A - IV, B - II, C - I, D - III
- (D) A - III, B - IV, C - I, D - II

53. According to Weidemann-Franz-Lorentz Law, the theoretical value of Lorentz number (L) for metals is:

- (A) 2.45×10^{-10} Watt ohm/deg²
- (B) 2.45×10^{-18} Watt ohm/deg²
- (C) 2.45×10^{-8} Watt ohm/deg²
- (D) 2.45×10^{-14} Watt ohm/deg²

54. The effective density of states of electrons (N_c) at the conduction band edge of the intrinsic semiconductor varies with temperature, as:

- (A) $T^{2/3}$
- (B) $T^{3/2}$
- (C) $T^{4/3}$
- (D) $T^{5/2}$

55. Which current does not contribute to a uniformly doped semiconductor:

- (A) Single-Phase Current
- (B) Drift Current
- (C) Diffusion Current
- (D) Direct Current

56. For temperature greater than 0 K, the fermi level is the level where the probability of occupation of electrons is:

- (A) $1/2$
- (B) $1/6$
- (C) $1/8$
- (D) $1/4$

57. According to the Bloch theorem, which of the following equations is the correct form for Bloch functions:

- (A) $\psi(x) = e^{\pm ikx} + u_k(x)$
- (B) $\psi(x) = e^{\pm ikx} - u_k(x)$
- (C) $\Psi(x) = e^{\pm ikx \cdot r} u_k(x, r)$
- (D) $\psi(\mathbf{r}) = e^{\pm i\mathbf{k} \cdot \mathbf{r}} u_k(\mathbf{r})$

58. In the Kronig penny Model, the energy of the lowest band at wave vector $\mathbf{k} = 0$ is given by $E = \frac{\hbar^2 P}{4\pi^2 m a^2}$. This value of energy holds for which condition of Kronig penny potential (P):

- (A) $P \ll 1$
- (B) $P \gg -1$
- (C) $P = 1$
- (D) $P \gg 1$

59. Choose the correct statement for the first Brillouin zone in two dimensions:

- A. The region in $\mathbf{k}$ space that the electrons can occupy without being diffracted is called the First Brillouin zone.
- B. For $k \leq \pi/a$ electrons can not move freely in any direction inside the square without being diffracted.
- C. For $k = \pi/a$ electrons are prevented from moving in the x or y directions due to diffraction.
- D. For $k \leq \pi/a$ electrons can move perpendicularly inside the square.

Choose the correct answer from the options given below:

- (A) A, B and D only
- (B) A and B only
- (C) A and C only
- (D) B, C and D only

60. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. Brillouin Zone	Provides the understanding of the origin of allowed and forbidden bands in solids.
B. Extended Zone Scheme	The electrons in a crystal behave like free electrons for most of the k values except when it approaches $n\pi/a$.
C. Periodic Zone Scheme	The E-k curve for several values of n reduced into the first zone for a simple cubic lattice with vanishing potential.
D. Reduced Zone Scheme	The E-K curve is not continuous and has discontinuities at $k = \pm n\pi/a$, where $n = 1, 2, 3, \dots$

Choose the correct answer from the options given below:

- (A) A - III, B - II, C - I, D - IV
- (B) A - I, B - IV, C - III, D - II
- (C) A - I, B - III, C - IV, D - II
- (D) A - III, B - I, C - IV, D - II

61. The effective mass of an electron is _____ in the lower part of the band and _____ near the zone boundary ($k \sim \pi/a$).

- (A) positive and negative
- (B) negative and positive
- (C) positive and increases
- (D) negative and decreases

62. In which type of metals, there is overlapping of valence band with the conduction band?

- (A) Monovalent metals
- (B) Divalent metals
- (C) Trivalent metals
- (D) Tetravalent metals

63. The electronic contribution of specific heat of copper at 300K is:
(Given that the fermi energy of copper is 7.05eV, and it is assumed to be temperature independent)

- (A) 210 J kmol⁻¹ K⁻¹
- (B) 165 J kmol⁻¹ K⁻¹
- (C) 190 J kmol⁻¹ K⁻¹

(D) $150 \text{ J kmol}^{-1} \text{ K}^{-1}$

64. The characteristic length of nano-materials is:

- (A) between 200-300 nm
 - (B) between 300-400 nm
 - (C) less than 100 nm
 - (D) greater than 500 nm
-

65. Surface area to volume ratio of materials:

- (A) Decreases with decrease in characteristic dimension of materials
 - (B) Increases with decrease in characteristic dimension of materials
 - (C) No effect of characteristics dimension of materials
 - (D) Increases with increase in characteristic dimension of materials
-

66. Match the LIST-I with LIST-II

LIST-I (Quantum structures)	LIST-II (Delocalization dimensions)
A. Bulk conductor	I. 0
B. Quantum well	II. 3
C. Quantum wire	III. 1
D. Quantum dot	IV. 2

Choose the correct answer from the options given below:

- (A) A - I, B - II, C - III, D - IV
 - (B) A - I, B - III, C - II, D - IV
 - (C) A - II, B - IV, C - III, D - I
 - (D) A - II, B - I, C - IV, D - III
-

67. Electronic magic numbers of atoms are:

- A. 2
- B. 15
- C. 10
- D. 18

Choose the correct answer from the options given below:

- (A) A, B and D only
- (B) A, B and C only

- (C) B, C and D only
(D) A, C and D only
-

68. As the particle size reduces, the optical absorption spectra shifts towards:

- (A) Red
(B) Green
(C) Blue
(D) Yellow
-

69. Carbon nanotube shows magneto-resistive effects:

- (A) at high temperature
(B) at low temperature
(C) at room temperature
(D) at very high temperature
-

70. Match the LIST-I with LIST-II

LIST-I	LIST-II
A. Field emission	I. detector of gases
B. Chemical sensor	II. strength of plastic composites
C. Mechanical Reinforcement	III. serve as heat sink
D. Computer	IV. flat panel display

Choose the correct answer from the options given below:

- (A) A - I, B - II, C - III, D - IV
(B) A - II, B - III, C - IV, D - I
(C) A - IV, B - III, C - II, D - I
(D) A - IV, B - I, C - II, D - III
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71. Lithography is:

- (A) Top-down method used in preparation of nanostructure
(B) Bottom-up method used in preparation of nanostructure
(C) Top-down method used in preparation of bulk structure
(D) Bottom-up method used in preparation of bulk structure

72. Scanning Tunneling Microscopy is based on:

- (A) Classical -mechanical phenomenon
- (B) Quantum -mechanical phenomenon
- (C) Mechanical Phenomenon
- (D) Classical phenomenon

73. Which statement is true for Scanning Tunneling Microscopy:

- (A) Tunneling current between the surface and the probe
- (B) Alternating current between the surface and the probe
- (C) The electromagnetic radiation between the surface and the probe
- (D) Direct current between the surface and the probe

74. Atomic Force Microscopy is a modified version of:

- (A) Scanning Electron Microscopy
- (B) Transmission Electron Microscopy
- (C) Positron Emmision Tomography
- (D) Scanning Tunneling Microscopy

75. Atomic Force Microscopy monitors:

- (A) Current between the surface and the probe
 - (B) Force between the surface and the probe
 - (C) Electromagnetic radiation between the surface and the probe
 - (D) distance between the surface and the probe
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