

(DO NOT OPEN THIS QUESTION BOOKLET BEFORE TIME OR UNTIL YOU ARE ASKED TO DO SO)

(CPG-EE-2017)
Subject : PHYSICS

Code

A

Sr. No. 10949

SET-"A"

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

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Used for checking verification
Aniruddh Jaiswal
10.38am
25/6/17

seal opened at 10.38 am
Rajendra
25/6/17

Question No.	Questions
12.	<p>Atoms with $\frac{1}{2}$ nuclear spin can not have :</p> <p>(1) Hyperfine structure (2) Electric dipole interaction (3) Fine structure (4) None of these</p>
13.	<p>The average binding energy of a nucleon in a nucleus of the atom is :</p> <p>(1) 8 eV (2) 80 eV (3) 8 MeV (4) 80 MeV</p>
14.	<p>A particle of mass 'm', moves under the action of a central force whose potential is $V(r) = k m r^3$ ($k > 0$), then angular momentum for which the orbit will be a circle of radius 'a', about the origin is :</p> <p>(1) $m\sqrt{3ka}$ (2) $ma^2\sqrt{ka}$ (3) $ma^2\sqrt{3ka}$ (4) $ma\sqrt{ka}$</p>
15.	<p>The Lande g-factor for the 3P_1 level of an atom is :</p> <p>(1) $\frac{1}{2}$ (2) $\frac{3}{2}$ (3) $\frac{5}{2}$ (4) $\frac{7}{2}$</p>
16.	<p>If 50 kV is applied potential in an X-ray tube, then the minimum wavelength of X-rays produced is :</p> <p>(1) 0.2 nm (2) 2 nm (3) 0.2 Å (4) 2 Å°</p>

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17.	<p>According to Moseley's law the frequency of the characteristic X-ray radiation is proportional to the square of :</p> <p>(1) Atomic weight of the element (2) Atomic number of the element (3) Both (1) and (2) (4) None of these</p>
18.	<p>The continuous X-ray spectrum is the result of :</p> <p>(1) Photoelectric effect (2) Inverse photoelectric effect (3) Compton effect (4) Auger effect</p>
19.	<p>All vibrations producing a change in the electric dipole moment of molecule yield :</p> <p>(1) Raman Effect (2) Infrared spectra (3) UV spectra (4) X-ray spectra</p>
20.	<p>Semiconductor laser is made of :</p> <p>(1) Germanium (2) Silicon (3) GaAs based materials (4) Ruby crystal</p>
21.	<p>The separation between the first stokes and corresponding anti-stokes lines of the rotational Raman spectrum in terms of the rotational constant B is :</p> <p>(1) 12 B (2) 6 B (3) 4 B (4) 2 B</p>
22.	<p>The classical electron radius is of the order of :</p> <p>(1) 10^{-8} cm (2) 10^{-11} cm (3) 10^{-13} cm (4) 10^{-15} cm</p>

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23.	<p>The electrostatic attraction between the nucleus of one atom and the electrons of the other is called :</p> <p>(1) Coulomb forces (2) Gravitational (3) Strong forces (4) van der Waals forces</p>
24.	<p>Nuclear forces are :</p> <p>(1) Gravitational attractive (2) Electrostatic repulsive (3) Long range and strong attractive (4) Short range and strong attractive</p>
25.	<p>The maximum energy of deuteron coming from a cyclotron accelerator is 20 MeV. The maximum energy of protons that can be obtained from this accelerator is :</p> <p>(1) 10 MeV (2) 20 MeV (3) 30 MeV (4) 40 MeV</p>
26.	<p>The nuclear reaction :</p> $4 {}_1\text{H}^1 \rightarrow {}_2\text{He}^4 + 2 {}_{-1}\text{e}^0 + 26 \text{ MeV}$ <p>represents</p> <p>(1) Fusion (2) Fission (3) β-decay (4) γ-decay</p>
27.	<p>Half life of a radioactive material is 4 days. After 20 days, the fraction remaining undecayed is :</p> <p>(1) $\frac{1}{32}$ (2) $\frac{1}{20}$ (3) $\frac{1}{16}$ (4) $\frac{1}{8}$</p>

Question No.	Questions
28.	The sun releases energy by : (1) Nuclear Fission (2) Nuclear Fusion (3) Spontaneous Combustion (4) Hydro-thermal process.
29.	The particle which most easily penetrates through the nucleus of the atom is : (1) Neutron (2) Electron (3) Proton (4) Alpha particles
30.	Which of the following reaction forbidden ? (1) $\mu^- \rightarrow e^- + \nu_\mu + \bar{\nu}_e$ (2) $\pi^+ \rightarrow \mu^+ + \nu_\mu$ (3) $\pi^+ \rightarrow e^+ + \nu_e$ (4) $\mu^- \rightarrow e^+ + e^- + e^-$
31.	Choose the particle with zero Baryon number from the list given below : (1) Pion (2) Neutron (3) Proton (4) Δ^+
32.	How many atoms per unit cell are in hcp structure : (1) 1 (2) 2 (3) 4 (4) 6
33.	The one which is not compatible with crystal symmetry is : (1) One-fold symmetry (2) Three-fold symmetry (3) Five-fold symmetry (4) Six-fold symmetry
34.	The ratio of the volume of atoms to the total volume available in a simple cubic lattice is : (1) 74% (2) 66% (3) 52% (4) 84%

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45.	<p>If the Lagrangian of a particle moving in one dimension is given by $L = \frac{x^2}{2x} - V(x)$ then Hamiltonian is :</p> <p>(1) $\frac{1}{2}xp^2 + V(x)$ (2) $\frac{x^2}{2x} + V(x)$</p> <p>(3) $\frac{1}{2}x^2 - V(x)$ (4) $\frac{p^2}{2x} - V(x)$</p>
46.	<p>How many degree of freedom a rigid body possess :</p> <p>(1) 3 (2) 6</p> <p>(3) 9 (4) Infinite</p>
47.	<p>When a cylinder rolls down without slipping on a plane, how many degrees of freedom it has :</p> <p>(1) 1 (2) 2</p> <p>(3) 3 (4) 4</p>
48.	<p>The mass of electron is double its rest mass than the velocity of electron is :</p> <p>(1) $\frac{C}{2}$ (2) $2C$</p> <p>(3) $\frac{\sqrt{3}C}{2}$ (4) $\sqrt{\frac{3}{2}}C$</p>
49.	<p>The first law of thermodynamics is the conservation of :</p> <p>(1) Momentum (2) Energy</p> <p>(3) Both (1) and (2) (4) None of these</p>

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55.	<p>A particle of mass 'm' undergoes harmonic oscillation with period T_0. A force 'f' proportional to the speed v of the particle, $f = -kv$, is introduced. If the particle continues to oscillate, the period with f acting is :</p> <p>(1) Larger than T_0 (2) Smaller than T_0 (3) Independent of k (4) Constantly changing</p>
56.	<p>Which of the following is equivalent to a unit of momentum ?</p> <p>(1) Newton-meter (2) Newton-Second (3) Joule-Second (4) None of the above</p>
57.	<p>A simple pendulum swings with a period of 1.5 s. What would be the period of the pendulum if the length of its string were doubled, the mass of its bob were cut in half, and the force of gravity were doubled ?</p> <p>(1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer.</p>
58.	<p>If the force is applied at the centre of the mass then torque is :</p> <p>(1) Zero (2) Maximum (3) 1 (4) Infinity</p>
59.	<p>Two cylinders of the same size but different masses roll down an incline, starting from the rest. Cylinder A has a greater mass. Which reaches the bottom first ?</p> <p>(1) A (2) B (3) Both at same time (4) Can not be determined</p>

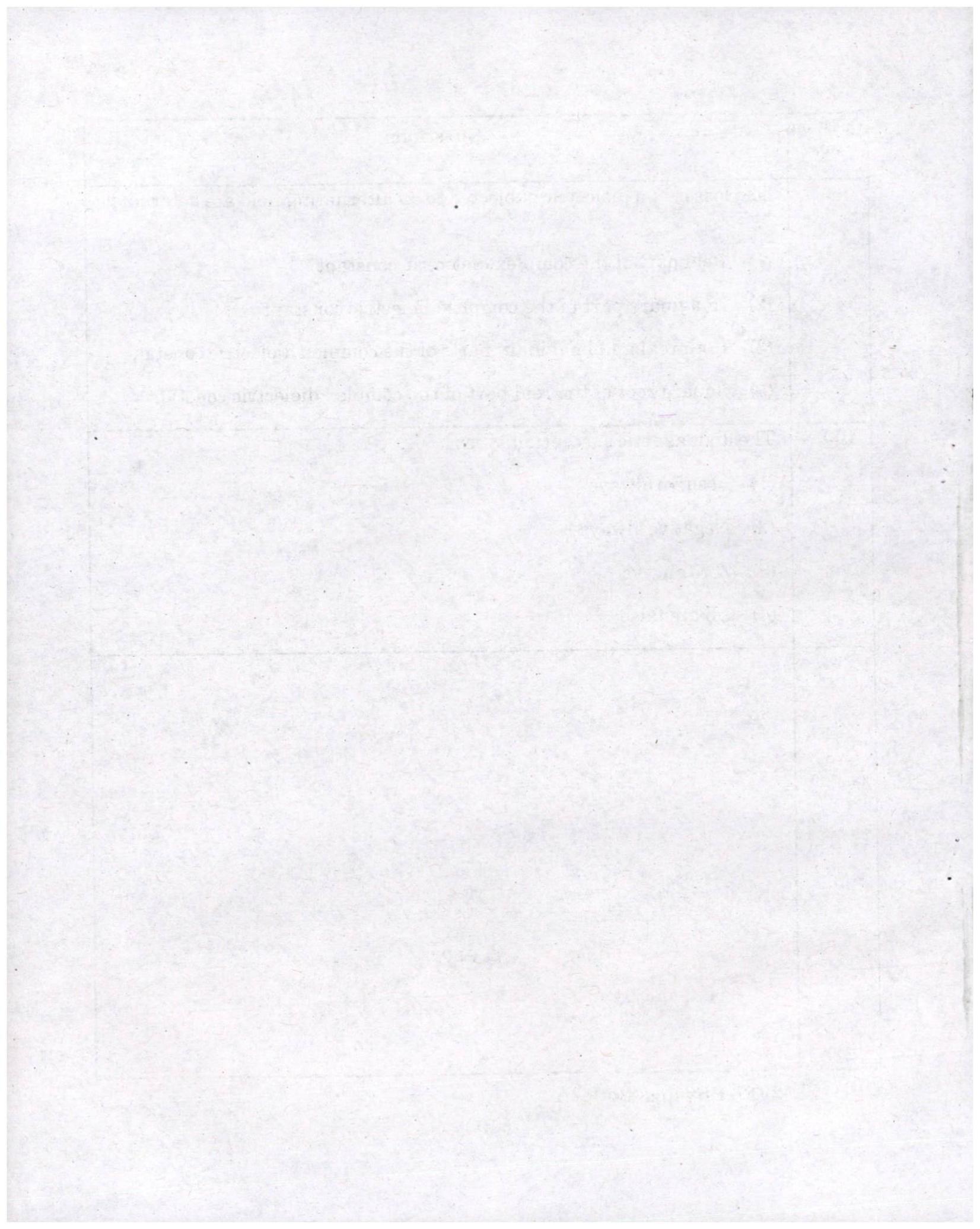
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60.	Steel is preferred for making springs over copper for the reason : (1) Steel is cheaper (2) Steel has greater value of Young's modulus (3) Young's modulus of copper is more than steel (4) Steel has higher density
61.	The first thermodynamic law is conservation of : (1) Momentum (2) Energy (3) Both (4) None of these
62.	Energy in a stretched wire is : (1) $\frac{1}{2}$ (load \times extension) (2) Load \times strain (3) Stress \times strain (4) $\frac{1}{2}$ (Stress \times strain)
63.	Which of the following set of Maxwell's relation is correct ? (U – Internal energy, G – Gibb's energy, H – enthalpy and F – Helmholtz free energy) (1) $T = \left(\frac{\partial U}{\partial V}\right)_S$ and $P = \left(\frac{\partial U}{\partial S}\right)_V$ (2) $V = \left(\frac{\partial H}{\partial P}\right)_S$ and $T = \left(\frac{\partial H}{\partial S}\right)_P$ (3) $P = \left(\frac{\partial G}{\partial V}\right)_T$ and $V = \left(\frac{\partial G}{\partial P}\right)_S$ (4) $P = \left(\frac{\partial F}{\partial S}\right)_T$ and $S = \left(\frac{\partial F}{\partial P}\right)_V$
64.	Pauli's exclusive principles is applicable to : (1) M.B. (2) F.D. (3) B.E. (4) None of these

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65.	<p>The root mean square speed V_{rms} is :</p> <p>(1) $\left(\frac{8kT}{\pi m}\right)^{1/2}$ (2) $\left(\frac{2kT}{\pi m}\right)^{1/2}$</p> <p>(3) $\left(\frac{2kT}{m}\right)^{1/2}$ (4) $\left(\frac{3kT}{m}\right)^{1/2}$</p>
66.	<p>When ice melts and become water, the ice – water system undergoes a change such that :</p> <p>(1) Entropy decreases and internal energy increases</p> <p>(2) Entropy increases the internal energy decreases</p> <p>(3) Entropy and Internal energy of the system increases</p> <p>(4) Entropy and Internal energy of the system decreases</p>
67.	<p>In a system of 'N' non-interacting and distinguishable particles of spin 1 in thermodynamic equilibrium. The entropy of system is :</p> <p>(1) $2 k_b \ln 2$ (2) $3 k_b \ln 3$</p> <p>(3) $N k_b \ln 2$ (4) $N k_b \ln 3$</p>
68.	<p>Specific heat of metals can be expressed as :</p> <p>(1) T^3 (2) $AT + BT^2$</p> <p>(3) $AT^2 + BT^3$ (4) $AT + BT^3$</p>
69.	<p>Which of the following Maxwell's equation implies the absence of magnetic monopoles ?</p> <p>(1) $\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0}$ (2) $\vec{\nabla} \cdot \vec{B} = 0$</p> <p>(3) $\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$ (4) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$</p>

Question No.	Questions
70.	<p>Which of the following materials is used for making permanent magnets :</p> <p>(1) Platinum Cobalt (2) Alnico V (3) Carbon steel (4) All of the above</p>
71.	<p>All materials have :</p> <p>(1) Paramagnetic property (2) Ferrimagnetic property (3) Ferromagnetic property (4) Diamagnetic property</p>
72.	<p>A magnetic material has magnetization of 3200 A/m and flux density 0.005 webers/m². Its magnetization force is :</p> <p>(1) 780.9 A/m (2) 1560.1 A/m (3) 390.0 A/m (4) None of the above</p>
73.	<p>The unit of dipole moment is :</p> <p>(1) Coulomb (2) Coulomb-metre (3) Metre / coulomb (4) Coulomb-metre²</p>
74.	<p>How many edges are there in a quartz crystal, if there are 18 faces and 14 angles in it :</p> <p>(1) 30 (2) 15 (3) 55 (4) None of these</p>
75.	<p>The constant 'α' of a transistor is 0.95. What would be the change in the collector-current corresponding to a change of 0.4 mA in the base current in a common-emitter arrangement ?</p> <p>(1) 7.6 mA (2) 15.2 mA (3) 19.0 mA (4) None of the above</p>

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76.	At any temperature the energy of the molecules of an ideal gas is : (1) Only P.E. (2) Only K.E. (3) Both K.E. and P.E. (4) None of these
77.	One kilogram of ice melts at 0°C into water at the same temperature. The change in entropy is : (1) 0 (2) Infinite (3) 0.293 (4) 293
78.	The contents of which memory degrade with every read operation ? (1) EAROM (2) PROM (3) EPROM (4) All of the above
79.	A system call is a method by which a program makes a request to the : (1) Input management (2) Output management (3) Interrupt processing (4) Operating system
80.	Which of the following is invalid in FORTRAN ? (1) $P + Q +$ (2) $\text{DO } 100001 = 1, 5$ (3) $\text{DIMENSION } \times (30, 20)$ (4) CONTINUE
81.	A floating point number consists of : (1) Mantissa only (2) Base only (3) An exponent (4) All of the above
82.	The chief reason why digital computers use complemental subtraction is : (1) Simplifies their circuitary (2) Is a very simple process (3) Can handle negative numbers easily (4) Avoids direct subtraction

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99.	<p>The losses in a dielectric subjected to an alternating field are determined by :</p> <ol style="list-style-type: none">(1) Real part of the complex dielectric constant(2) Imaginary part of the complex dielectric constant(3) Both real and imaginary parts of the complex dielectric constant(4) Square root of the real part of the complex dielectric constant.
100.	<p>The diamagnetic susceptibility is :</p> <ol style="list-style-type: none">(1) Positive always(2) Negative always(3) Zero always(4) All are false



(Total No. of printed pages : 20)

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10958

Sr. No. _____

Code

B

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10958

(7-2-51-207)

Subject: PHYSICS



Code

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Question No.	Questions
1.	<p>The maximum number of electrons in a sub-shell with orbital quantum number l is :</p> <p>(1) $2l + 1$ (2) $2l - 1$ (3) $2(2l + 1)$ (4) $2(2l - 1)$</p>
2.	<p>Atoms with $\frac{1}{2}$ nuclear spin can not have :</p> <p>(1) Hyperfine structure (2) Electric dipole interaction (3) Fine structure (4) None of these</p>
3.	<p>The average binding energy of a nucleon in a nucleus of the atom is :</p> <p>(1) 8 eV (2) 80 eV (3) 8 MeV (4) 80 MeV</p>
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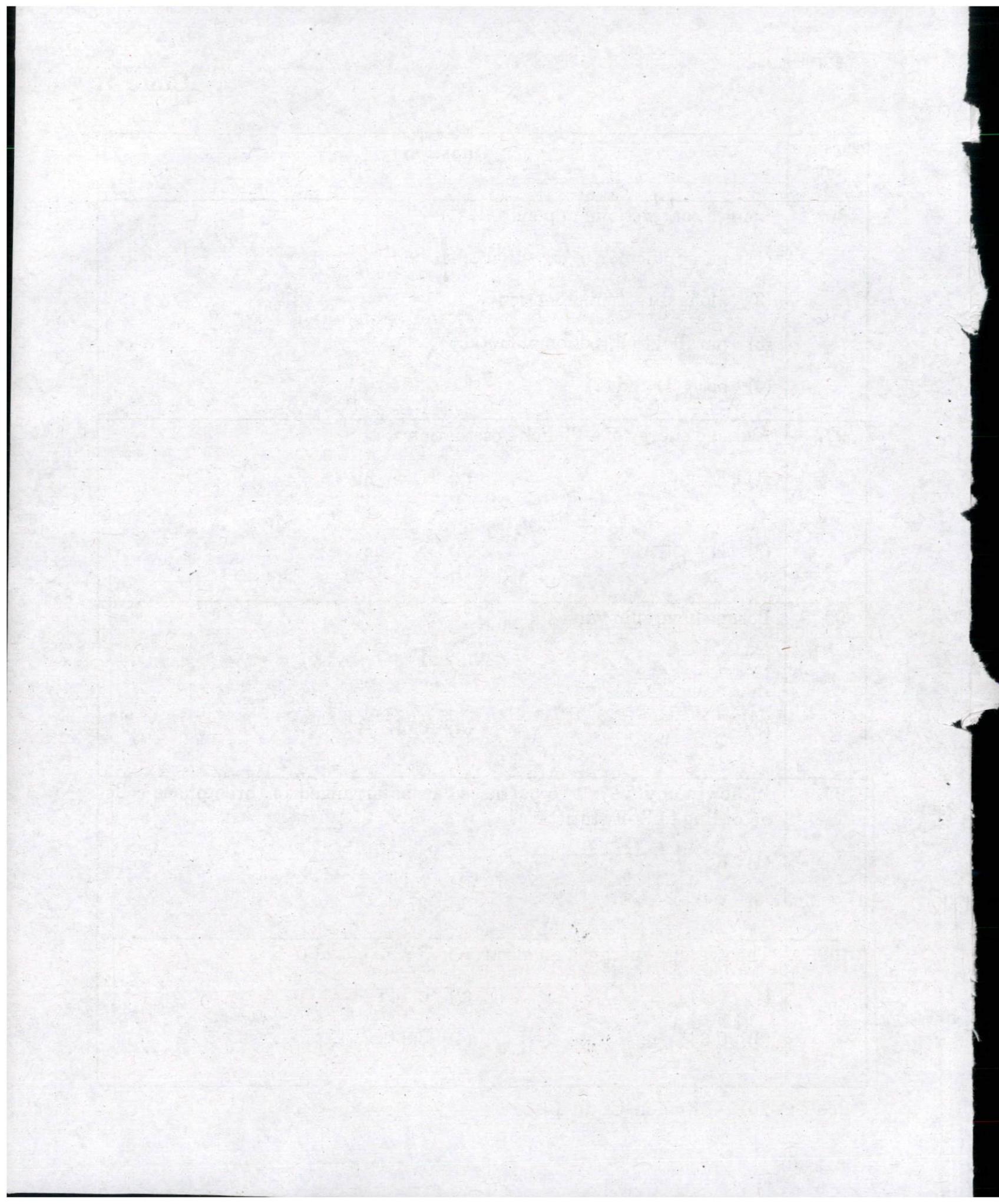
Question No.	Questions
34.	<p>Two beams of coherent light travel different paths arriving at point P. If the maximum constructive interference is to occur at point P, the two beams must :</p> <p>(1) Arrive 180° out of phase (2) Arrive 90° out of phase (3) Travel paths must differ by a whole number of wavelengths (4) Travel paths that differ by an odd number of half-wavelengths</p>
35.	<p>A particle of mass 'm' undergoes harmonic oscillation with period T_0. A force 'f' proportional to the speed v of the particle, $f = -kv$, is introduced. If the particle continues to oscillate, the period with f acting is :</p> <p>(1) Larger than T_0 (2) Smaller than T_0 (3) Independent of k (4) Constantly changing</p>
36.	<p>Which of the following is equivalent to a unit of momentum ?</p> <p>(1) Newton-meter (2) Newton-Second (3) Joule-Second (4) None of the above</p>
37.	<p>A simple pendulum swings with a period of 1.5 s. What would be the period of the pendulum if the length of its string were doubled, the mass of its bob were cut in half, and the force of gravity were doubled ?</p> <p>(1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer.</p>

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61.	<p>The electric field at the centre of a uniformly charged conductor is :</p> <p>(1) $\frac{qr}{4\pi\epsilon_0 R^3}$ (2) $\frac{q}{4\pi\epsilon_0 r^2}$</p> <p>(3) Zero (4) $\frac{q}{4\pi\epsilon_0 R^2}$</p>
62.	<p>The time base of a CRO is developed by :</p> <p>(1) Sawtooth waveform (2) Square waveform</p> <p>(3) Triangular waveform (4) Sinusoidal waveform</p>
63.	<p>The ripple factor in a rectifier circuit means :</p> <p>(1) Amount of a.c. voltage present in output</p> <p>(2) Amount of d.c. voltage in the output</p> <p>(3) Change in d.c. voltage when input a.c. changes</p> <p>(4) Change in d.c. voltage when the load changes</p>
64.	<p>The cathode of a zener diode in a voltage regulator is normally :</p> <p>(1) More positive than the anode</p> <p>(2) More negative than the anode</p> <p>(3) At +0.7 V</p> <p>(4) Grounded</p>

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66.	<p>How many degree of freedom a rigid body possess :</p> <p>(1) 3 (2) 6</p> <p>(3) 9 (4) Infinite</p>
67.	<p>When a cylinder rolls down without slipping on a plane, how many degrees of freedom it has :</p> <p>(1) 1 (2) 2</p> <p>(3) 3 (4) 4</p>
68.	<p>The mass of electron is double its rest mass than the velocity of electron is :</p> <p>(1) $\frac{C}{2}$ (2) $2C$</p> <p>(3) $\frac{\sqrt{3}C}{2}$ (4) $\sqrt{\frac{3}{2}}C$</p>
69.	<p>The first law of thermodynamics is the conservation of :</p> <p>(1) Momentum (2) Energy</p> <p>(3) Both (1) and (2) (4) None of these</p>

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75.	<p>The root mean square speed V_{rms} is :</p> <p>(1) $\left(\frac{8kT}{\pi m}\right)^{1/2}$ (2) $\left(\frac{2kT}{\pi m}\right)^{1/2}$</p> <p>(3) $\left(\frac{2kT}{m}\right)^{1/2}$ (4) $\left(\frac{3kT}{m}\right)^{1/2}$</p>
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79.	<p>Which of the following Maxwell's equation implies the absence of magnetic monopoles ?</p> <p>(1) $\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0}$ (2) $\vec{\nabla} \cdot \vec{B} = 0$</p> <p>(3) $\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$ (4) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$</p>

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80.	Which of the following materials is used for making permanent magnets : (1) Platinum Cobalt (2) Alnico V (3) Carbon steel (4) All of the above
81.	The ionization potential of hydrogen atom is 13.6 volts. The energy required to remove an electron from the second orbit of hydrogen is : (1) 3.4 eV (2) 6.8 eV (3) 13.6 eV (4) 27.0 eV
82.	Davisson and Germer experiment relates to : (1) Interference (2) Electron diffraction (3) Polarization (4) Quantization
83.	The degree of degeneracy for the three dimensional isotropic harmonic oscillator are : (1) n^2 (2) $\frac{1}{2} (2n + 1) (2n + 2)$ (3) $\frac{1}{2} (n + 1) (n + 2)$ (4) $2n + 1$
84.	The de-Broglie hypothesis is associated with : (1) Wave nature of electrons (2) Wave nature of α -particles (3) Wave nature of radiation (4) Wave nature of all material particles



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10325

Subject: Physics

The following is a list of questions for the subject of Physics. The questions are arranged in order of increasing difficulty. The first question is the easiest and the last question is the most difficult. The questions are as follows:

1. A ball is thrown vertically upwards with an initial velocity of 20 m/s. Calculate the maximum height reached by the ball.
2. A car starts from rest and accelerates uniformly to a speed of 30 m/s in 10 seconds. Calculate the distance travelled by the car during this time.
3. A block of mass 5 kg is pushed up a smooth inclined plane of length 10 m and height 6 m. Calculate the work done by the pushing force.
4. A particle moves in a circular path of radius 0.5 m with a constant angular velocity of 2 rad/s. Calculate the linear velocity of the particle.
5. A particle moves in a circular path of radius 0.5 m with a constant linear velocity of 1 m/s. Calculate the angular velocity of the particle.
6. A particle moves in a circular path of radius 0.5 m with a constant angular velocity of 2 rad/s. Calculate the centripetal acceleration of the particle.
7. A particle moves in a circular path of radius 0.5 m with a constant linear velocity of 1 m/s. Calculate the centripetal force acting on the particle.
8. A particle moves in a circular path of radius 0.5 m with a constant angular velocity of 2 rad/s. Calculate the period of revolution of the particle.
9. A particle moves in a circular path of radius 0.5 m with a constant linear velocity of 1 m/s. Calculate the frequency of revolution of the particle.
10. A particle moves in a circular path of radius 0.5 m with a constant angular velocity of 2 rad/s. Calculate the angle subtended by the arc of length 1 m at the center of the circle.
11. A particle moves in a circular path of radius 0.5 m with a constant linear velocity of 1 m/s. Calculate the angle subtended by the arc of length 1 m at the center of the circle.
12. A particle moves in a circular path of radius 0.5 m with a constant angular velocity of 2 rad/s. Calculate the angle subtended by the arc of length 1 m at the center of the circle.
13. A particle moves in a circular path of radius 0.5 m with a constant linear velocity of 1 m/s. Calculate the angle subtended by the arc of length 1 m at the center of the circle.
14. A particle moves in a circular path of radius 0.5 m with a constant angular velocity of 2 rad/s. Calculate the angle subtended by the arc of length 1 m at the center of the circle.
15. A particle moves in a circular path of radius 0.5 m with a constant linear velocity of 1 m/s. Calculate the angle subtended by the arc of length 1 m at the center of the circle.

10325

Question No.	Questions
1.	<p>The electric field at the centre of a uniformly charged conductor is :</p> <p>(1) $\frac{qr}{4\pi\epsilon_0 R^3}$ (2) $\frac{q}{4\pi\epsilon_0 r^2}$</p> <p>(3) Zero (4) $\frac{q}{4\pi\epsilon_0 R^2}$</p>
2.	<p>The time base of a CRO is developed by :</p> <p>(1) Sawtooth waveform (2) Square waveform</p> <p>(3) Triangular waveform (4) Sinusoidal waveform</p>
3.	<p>The ripple factor in a rectifier circuit means :</p> <p>(1) Amount of a.c. voltage present in output</p> <p>(2) Amount of d.c. voltage in the output</p> <p>(3) Change in d.c. voltage when input a.c. changes</p> <p>(4) Change in d.c. voltage when the load changes</p>
4.	<p>The cathode of a zener diode in a voltage regulator is normally :</p> <p>(1) More positive than the anode</p> <p>(2) More negative than the anode</p> <p>(3) At +0.7 V</p> <p>(4) Grounded</p>
5.	<p>If the Lagrangian of a particle moving in one dimension is given by</p> <p>$L = \frac{\dot{x}^2}{2x} - V(x)$ then Hamiltonian is :</p> <p>(1) $\frac{1}{2}xp^2 + V(x)$ (2) $\frac{x^2}{2x} + V(x)$</p> <p>(3) $\frac{1}{2}x^2 - V(x)$ (4) $\frac{p^2}{2x} - V(x)$</p>

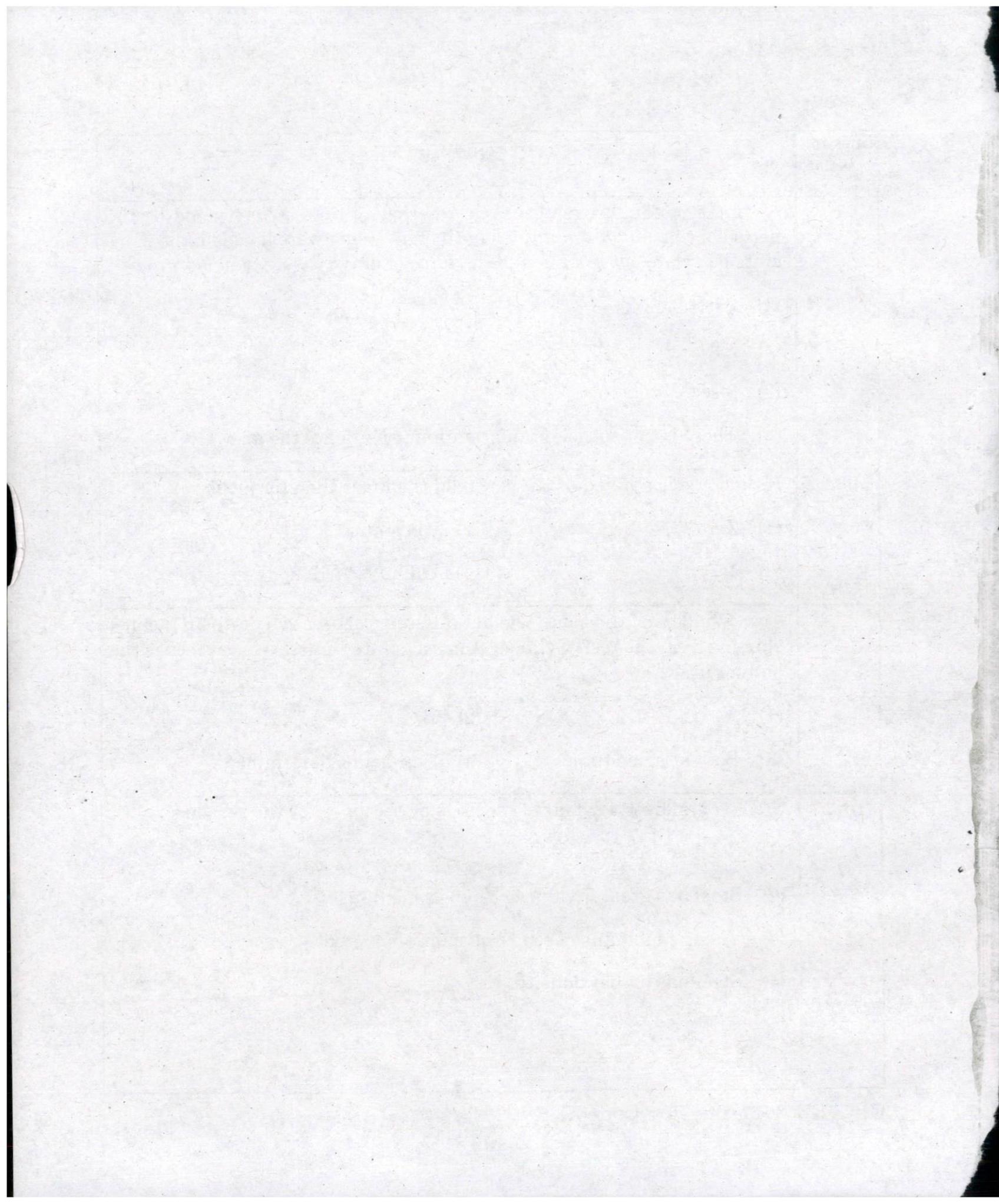
Question No.	Questions
42.	Energy in a stretched wire is : (1) $\frac{1}{2}$ (load \times extension) (2) Load \times strain (3) Stress \times strain (4) $\frac{1}{2}$ (Stress \times strain)
43.	Which of the following set of Maxwell's relation is correct ? (U – Internal energy, G – Gibb's energy, H – enthalpy and F – Helmholtz free energy) (1) $T = \left(\frac{\partial U}{\partial V}\right)_S$ and $P = \left(\frac{\partial U}{\partial S}\right)_V$ (2) $V = \left(\frac{\partial H}{\partial P}\right)_S$ and $T = \left(\frac{\partial H}{\partial S}\right)_P$ (3) $P = \left(\frac{\partial G}{\partial V}\right)_T$ and $V = \left(\frac{\partial G}{\partial P}\right)_S$ (4) $P = \left(\frac{\partial F}{\partial S}\right)_T$ and $S = \left(\frac{\partial F}{\partial P}\right)_V$
44.	Pauli's exclusive principles is applicable to : (1) M.B. (2) F.D. (3) B.E. (4) None of these
45.	The root mean square speed V_{rms} is : (1) $\left(\frac{8kT}{\pi m}\right)^{1/2}$ (2) $\left(\frac{2kT}{\pi m}\right)^{1/2}$ (3) $\left(\frac{2kT}{m}\right)^{1/2}$ (4) $\left(\frac{3kT}{m}\right)^{1/2}$

Question No.	Questions
51.	Choose the particle with zero Baryon number from the list given below : (1) Pion (2) Neutron (3) Proton (4) Δ^+
52.	How many atoms per unit cell are in hcp structure : (1) 1 (2) 2 (3) 4 (4) 6
53.	The one which is not compatible with crystal symmetry is : (1) One-fold symmetry (2) Three-fold symmetry (3) Five-fold symmetry (4) Six-fold symmetry
54.	The ratio of the volume of atoms to the total volume available in a simple cubic lattice is : (1) 74% (2) 66% (3) 52% (4) 84%
55.	The reciprocal lattice of a simple cubic lattice is : (1) Monoclinic (2) Triclinic (3) Cubic (4) Orthorhombic
56.	The specific heat of a solid (atomic weight-M), for unit mass is C_v . Its atomic specific heat C_v will be : (1) C_v/M (2) M/C_v (3) MC_v (4) C_v

Question No.	Questions
68.	The contents of which memory degrade with every read operation ? (1) EAROM (2) PROM (3) EPROM (4) All of the above
69.	A system call is a method by which a program makes a request to the : (1) Input management (2) Output management (3) Interrupt processing (4) Operating system
70.	Which of the following is invalid in FORTRAN ? (1) P + Q + (2) DO 100001 = 1, 5 (3) DIMENSION \times (30, 20) (4) CONTINUE
71.	A floating point number consists of : (1) Mantissa only (2) Base only (3) An exponent (4) All of the above
72.	The chief reason why digital computers use complemental subtraction is : (1) Simplifies their circuitary (2) Is a very simple process (3) Can handle negative numbers easily (4) Avoids direct subtraction
73.	The Fourier transform of product of two time functions $[f_1(t) f_2(t)]$ is given by : (1) $[f_1(w) + f_2(w)]$ (2) $[f_1(w) / f_2(w)]$ (3) $[f_1(w) * f_2(w)]$ (4) $[f_1(w) \times f_2(w)]$
74.	The magnitude spectrum of a Fourier transform of a real-valued time signal has one of the following symmetry : (1) NO (2) ODD (3) EVEN (4) CONJUGATE

Question No.	Questions
75.	Mass of 700 N man moving in a car at 66 km h^{-1} is : (1) 70 kg (2) 100 kg (3) Infinite (4) Zero
76.	Length contraction happens only : (1) perpendicular to direction of motion (2) along direction of motion (3) parallel to direction of motion (4) both (1) and (2)
77.	Average energy of a Planck's oscillation is : (1) $E = hv$ (2) $E = n hv$ (3) $E = \frac{hv}{(e^{hv/kT} - 1)}$ (4) $E = mc^2$
78.	Bosons have spin value : (1) 0 (2) 1 (3) $\frac{1}{2}$ (4) 0 or 1
79.	In how many ways two particles can be arranged in three phase cells according to B-E statistics ? (1) 6 (2) 9 (3) 3 (4) 27
80.	The average energy of an electron in Fermi gas at 0° K is (1) 0.24 f (2) 0.44 f (3) 0.64 f (4) 0.8 f

Question No.	Questions
97.	<p>A simple pendulum swings with a period of 1.5 s. What would be the period of the pendulum if the length of its string were doubled, the mass of its bob were cut in half, and the force of gravity were doubled ?</p> <p>(1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer.</p>
98.	<p>If the force is applied at the centre of the mass then torque is :</p> <p>(1) Zero (2) Maximum (3) 1 (4) Infinity</p>
99.	<p>Two cylinders of the same size but different masses roll down an incline, starting from the rest. Cylinder A has a greater mass. Which reaches the bottom first ?</p> <p>(1) A (2) B (3) Both at same time (4) Can not be determined</p>
100.	<p>Steel is preferred for making springs over copper for the reason :</p> <p>(1) Steel is cheaper (2) Steel has greater value of Young's modulus (3) Young's modulus of copper is more than steel (4) Steel has higher density</p>



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(CPG-EE-2017)

Subject : PHYSICS

10956

Sr. No. _____

Code

D

SET-“A”

Time : 1½ Hours

Total Questions : 100

Max. Marks : 100

Roll No. _____ (in figure) _____ (in words)

Name : _____ Date of Birth : _____

Father's Name : _____ Mother's Name : _____

Date of Examination : _____

(Signature of the candidate)

(Signature of the Invigilator)

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seal opened at
10:38
25/6/17

used for the marking verification
25/6/17
Anirudh Jyoti
10-25/6/17

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(CPG-EE-2017)

Subject : PHYSICS

10956

Gr. No.



Code

SET - A

Time : 1 1/2 Hours Total Questions : 100 Max. Marks : 100

Roll No. (in figures) (in words)

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Question No.	Questions
1.	All materials have : (1) Paramagnetic property (2) Ferrimagnetic property (3) Ferromagnetic property (4) Diamagnetic property
2.	A magnetic material has magnetization of 3200 A/m and flux density 0.005 webers/m ² . Its magnetization force is : (1) 780.9 A/m (2) 1560.1 A/m (3) 390.0 A/m (4) None of the above
3.	The unit of dipole moment is : (1) Coulomb (2) Coulomb-metre (3) Metre / coulomb (4) Coulomb-metre ²
4.	How many edges are there in a quartz crystal, if there are 18 faces and 14 angles in it : (1) 30 (2) 15 (3) 55 (4) None of these
5.	The constant ' α ' of a transistor is 0.95. What would be the change in the collector-current corresponding to a change of 0.4 mA in the base current in a common-emitter arrangement ? (1) 7.6 mA (2) 15.2 mA (3) 19.0 mA (4) None of the above
6.	At any temperature the energy of the molecules of an ideal gas is : (1) Only P.E. (2) Only K.E. (3) Both K.E. and P.E. (4) None of these

Question No.	Questions
7.	One kilogram of ice melts at 0°C into water at the same temperature. The change in entropy is : (1) 0 (2) Infinite (3) 0.293 (4) 293
8.	The contents of which memory degrade with every read operation ? (1) EAROM (2) PROM (3) EPROM (4) All of the above
9.	A system call is a method by which a program makes a request to the : (1) Input management (2) Output management (3) Interrupt processing (4) Operating system
10.	Which of the following is invalid in FORTRAN ? (1) $P + Q +$ (2) $\text{DO } 100001 = 1, 5$ (3) $\text{DIMENSION} \times (30, 20)$ (4) CONTINUE
11.	Constructive interference happens when two waves are : (1) Out of phase (2) Zero amplitude (3) In phase (4) In front
12.	What principle is responsible for the fact that certain sunglasses can reduce glare from reflected surfaces ? (1) Refraction (2) Polarization (3) Diffraction (4) Total internal reflection
13.	Light of wavelength 575 nm falls on a double-slit and third order bright fringe is seen at an angle of 6.5 degrees. What is the separation between double slits ? (1) $5.0 \mu\text{m}$ (2) $10 \mu\text{m}$ (3) $15 \mu\text{m}$ (4) $20 \mu\text{m}$

Question No.	Questions
14.	<p>Two beams of coherent light travel different paths arriving at point P. If the maximum constructive interference is to occur at point P, the two beams must :</p> <p>(1) Arrive 180° out of phase (2) Arrive 90° out of phase (3) Travel paths must differ by a whole number of wavelengths (4) Travel paths that differ by an odd number of half-wavelengths</p>
15.	<p>A particle of mass 'm' undergoes harmonic oscillation with period T_0. A force 'f' proportional to the speed v of the particle, $f = -kv$, is introduced. If the particle continues to oscillate, the period with f acting is :</p> <p>(1) Larger than T_0 (2) Smaller than T_0 (3) Independent of k (4) Constantly changing</p>
16.	<p>Which of the following is equivalent to a unit of momentum ?</p> <p>(1) Newton-meter (2) Newton-Second (3) Joule-Second (4) None of the above</p>
17.	<p>A simple pendulum swings with a period of 1.5 s. What would be the period of the pendulum if the length of its string were doubled, the mass of its bob were cut in half, and the force of gravity were doubled ?</p> <p>(1) 0.5 S (2) 1.5 S (3) 3 sec. (4) There is not sufficient information to estimate the answer.</p>
18.	<p>If the force is applied at the centre of the mass then torque is :</p> <p>(1) Zero (2) Maximum (3) 1 (4) Infinity</p>

Question No.	Questions
25.	The reciprocal lattice of a simple cubic lattice is : (1) Monoclinic (2) Triclinic (3) Cubic (4) Orthorhombic
26.	The specific heat of a solid (atomic weight-M), for unit mass is C_v . Its atomic specific heat C_v will be : (1) C_v/M (2) M/C_v (3) MC_v (4) C_v
27.	The relationship between the Einstein's temperature $(\theta)_E$ and Einstein frequency ν_E is : (1) $(\theta)_E = \frac{h \nu_E}{k}$ (2) $(\theta)_E = \frac{\nu_E}{h k}$ (3) $\nu_E = \frac{h (\theta)_E}{k}$ (4) $\nu_E = \frac{h k}{(\theta)_E}$
28.	For all metals, the ratio of the thermal conductivity to the electrical conductivity is directly proportional to : (1) T (2) T^2 (3) The inverse of T (4) Inverse of T^2
29.	In the crystal structure of silicon we have : (1) Electrovalent Bonding (2) Covalent Bonding (3) Co-ordinate bonding (4) Mixture of covalent and electrovalent bonding

Question No.	Questions
40.	Semiconductor laser is made of : (1) Germanium (2) Silicon (3) GaAs based materials (4) Ruby crystal
41.	According to which statistics, the energy at absolute zero can not be zero ? (1) M – B (2) B – E (3) F – D (4) None of these
42.	In a grand canonical ensemble, a system A of fixed volume is in contact with a large reservoir B. Then (1) A can exchange only energy with B (2) A can exchange only particles with B (3) A can exchange neither energy nor particle with B. (4) A can exchange both energy and particles with B.
43.	In a micro canonical ensemble, a system A of fixed volume is in contact with a large reservoir B. Then. (1) A can exchange only energy with B (2) A can exchange only particles with B. (3) A can exchange neither energy nor particles with B. (4) A can exchange both energy and particles with B.
44.	The quantum statistics reduces to classical statistics under the following condition : (1) $\rho A^3 = 1$ (2) $\rho A^3 \gg 1$ (3) $\rho A^3 \ll 1$ (4) $\rho = 0$

Question No.	Questions
50.	The diamagnetic susceptibility is : (1) Positive always (2) Negative always (3) Zero always (4) All are false
51.	The first thermodynamic law is conservation of : (1) Momentum (2) Energy (3) Both (4) None of these
52.	Energy in a stretched wire is : (1) $\frac{1}{2}$ (load \times extension) (2) Load \times strain (3) Stress \times strain (4) $\frac{1}{2}$ (Stress \times strain)
53.	Which of the following set of Maxwell's relation is correct ? (U – Internal energy, G – Gibb's energy, H – enthalpy and F – Helmholtz free energy) (1) $T = \left(\frac{\partial U}{\partial V}\right)_S$ and $P = \left(\frac{\partial U}{\partial S}\right)_V$ (2) $V = \left(\frac{\partial H}{\partial P}\right)_S$ and $T = \left(\frac{\partial H}{\partial S}\right)_P$ (3) $P = \left(\frac{\partial G}{\partial V}\right)_T$ and $V = \left(\frac{\partial G}{\partial P}\right)_S$ (4) $P = \left(\frac{\partial F}{\partial S}\right)_T$ and $S = \left(\frac{\partial F}{\partial P}\right)_V$
54.	Pauli's exclusive principles is applicable to : (1) M.B. (2) F.D. (3) B.E. (4) None of these

Question No.	Questions
55.	<p>The root mean square speed V_{rms} is :</p> <p>(1) $\left(\frac{8kT}{\pi m}\right)^{1/2}$ (2) $\left(\frac{2kT}{\pi m}\right)^{1/2}$</p> <p>(3) $\left(\frac{2kT}{m}\right)^{1/2}$ (4) $\left(\frac{3kT}{m}\right)^{1/2}$</p>
56.	<p>When ice melts and become water, the ice – water system undergoes a change such that :</p> <p>(1) Entropy decreases and internal energy increases</p> <p>(2) Entropy increases the internal energy decreases</p> <p>(3) Entropy and Internal energy of the system increases</p> <p>(4) Entropy and Internal energy of the system decreases</p>
57.	<p>In a system of 'N' non-interacting and distinguishable particles of spin 1 in thermodynamic equilibrium. The entropy of system is :</p> <p>(1) $2 k_b \ln 2$ (2) $3 k_b \ln 3$</p> <p>(3) $N k_b \ln 2$ (4) $N k_b \ln 3$</p>
58.	<p>Specific heat of metals can be expressed as :</p> <p>(1) T^3 (2) $AT + BT^2$</p> <p>(3) $AT^2 + BT^3$ (4) $AT + BT^3$</p>
59.	<p>Which of the following Maxwell's equation implies the absence of magnetic monopoles ?</p> <p>(1) $\vec{\nabla} \cdot \vec{E} = \frac{\rho}{\epsilon_0}$ (2) $\vec{\nabla} \cdot \vec{B} = 0$</p> <p>(3) $\vec{\nabla} \times \vec{E} = -\frac{\partial \vec{B}}{\partial t}$ (4) $\vec{\nabla} \times \vec{B} = \left(\frac{1}{C^2}\right) \frac{\partial \vec{B}}{\partial t} + \mu_0 \hat{j}$</p>

Question No.	Questions
60.	<p>Which of the following materials is used for making permanent magnets :</p> <p>(1) Platinum Cobalt (2) Alnico V</p> <p>(3) Carbon steel (4) All of the above</p>
61.	<p>A floating point number consists of :</p> <p>(1) Mantissa only (2) Base only</p> <p>(3) An exponent (4) All of the above</p>
62.	<p>The chief reason why digital computers use complemental subtraction is :</p> <p>(1) Simplifies their circuitary</p> <p>(2) Is a very simple process</p> <p>(3) Can handle negative numbers easily</p> <p>(4) Avoids direct subtraction</p>
63.	<p>The Fourier transform of product of two time functions $[f_1(t) f_2(t)]$ is given by :</p> <p>(1) $[f_1(w) + f_2(w)]$ (2) $[f_1(w) / f_2(w)]$</p> <p>(3) $[f_1(w) * f_2(w)]$ (4) $[f_1(w) \times f_2(w)]$</p>
64.	<p>The magnitude spectrum of a Fourier transform of a real-valued time signal has one of the following symmetry :</p> <p>(1) NO (2) ODD</p> <p>(3) EVEN (4) CONJUGATE</p>
65.	<p>Mass of 700 N man moving in a car at 66 km h^{-1} is :</p> <p>(1) 70 kg (2) 100 kg</p> <p>(3) Infinite (4) Zero</p>

Question No.	Questions
66.	Length contraction happens only : (1) perpendicular to direction of motion (2) along direction of motion (3) parallel to direction of motion (4) both (1) and (2)
67.	Average energy of a Planck's oscillation is : (1) $E = h\nu$ (2) $E = n h\nu$ (3) $E = \frac{h\nu}{(e^{h\nu/kT} - 1)}$ (4) $E = mc^2$
68.	Bosons have spin value : (1) 0 (2) 1 (3) $\frac{1}{2}$ (4) 0 or 1
69.	In how many ways two particles can be arranged in three phase cells according to B-E statistics ? (1) 6 (2) 9 (3) 3 (4) 27
70.	The average energy of an electron in Fermi gas at 0° K is (1) $0.24 f$ (2) $0.44 f$ (3) $0.64 f$ (4) $0.8 f$
71.	The electric field at the centre of a uniformly charged conductor is : (1) $\frac{qr}{4\pi\epsilon_0 R^3}$ (2) $\frac{q}{4\pi\epsilon_0 r^2}$ (3) Zero (4) $\frac{q}{4\pi\epsilon_0 R^2}$

Question No.	Questions
96.	<p>Function of the wave vector in case of free particle motion is given by :</p> <p>(1) $E = \frac{\hbar k^2}{2m}$ (2) $E = \frac{\hbar^2 k^2}{2m}$</p> <p>(3) $E = \frac{\hbar k}{2m}$ (4) $E = \frac{\hbar^2 k^2}{2m^2}$</p>
97.	<p>The densest part of a probability cloud occurs at a radius proportional to :</p> <p>(1) n (2) n^2</p> <p>(3) n^3 (4) n^4</p>
98.	<p>The de-Broglie wavelength λ for an electron of energy 150 eV is :</p> <p>(1) 10^{-8} m (2) 10^{-10} m</p> <p>(3) 10^{-12} m (4) 10^{-14} m</p>
99.	<p>No two electrons will have all the four quantum numbers equal. The statement is called :</p> <p>(1) Pauli exclusion principle (2) Uncertainty principle</p> <p>(3) Hund's rule (4) Aufbau's principle</p>
100.	<p>The radius of a hydrogen atom is in its ground state is :</p> <p>(1) 10^{-4} cm (2) 10^{-6} cm</p> <p>(3) 10^{-8} cm (4) 10^{-10} cm</p>

Keys prepared after jumbling for diff. codes with corrections

PHYSICS ENTRANCE EXAM CEE-2017 ANSWER KEY				
Srl. No.	CODE-A	CODE-B	CODE-C	CODE-D
1	1	3	3	4
2	3 2	2	1	1
3	3	3	1	X 2
4	4	3	1	1
5	4	2	1	1
6	2	3	2	2
7	2	2	2	4
8	2	2	3	1
9	1	2	2	4
10	3	3	4	1
11	3	3	X 1	3
12	2	4	3	2
13	3	3	4	3
14	3	2	4	3
15	2	1	1	1
16	3	4	1	1 2
17	2	3	1	2
18	2	4	2	1
19	2	2	1	3
20	3	2	4	2
21	X 1	4	1	1
22	3	1	3 2	4
23	4	X 2	3	3
24	4	1	4	3
25	1	1	4	3
26	1	2	2	3
27	1	4	2	1
28	2	1	2	1
29	1	4	1	2
30	4	1	3	3
31	1	3	3	3
32	4	2	4	2
33	3	3	3	3
34	3	3	2	3
35	3	1	1	2
36	3	1 2	4	3
37	1	2	3	2
38	1	1	4	2
39	2	3	2	2
40	3	2	2	3
41	3	1	2	3
42	1	4	1	4
43	1	3	2	3
44	1	3	2	2
45	1	3	4	1
46	2	3	3	4
47	2	1	4	3
48	3	1	4	4
49	2	2	2	2
50	4	3	4	2

checked and verified
 Bilal 25/6/17
 Amruth ya 2
 25/6/17

keys with corrections

PHYSICS ENTRANCE EXAM CEE-2017 ANSWER KEY				
Srl. No.	CODE-A	CODE-B	CODE-C	CODE-D
51	3	3 1	1	2
52	2	3	4	1
53	3	4	3	2
54	3	4	3	2
55	1	1	3	4
56	1 2	1	3	3
57	2	1	1	4
58	1	2	1	4
59	3	1	2	2
60	2	4	3	4
61	2	3	4	4
62	1	1	1	1
63	2	1	1 2	3
64	2	1	1	3
65	4	1	1	1
66	3	2	2	2
67	4	2	4	3
68	4	3	1	4
69	2	2	4	1
70	4	4	1	3
71	4	2	4	3
72	1	1	1	1
73	1 2	2	3	1
74	1	2	3	1
75	1	4	1	1
76	2	3	2	2
77	4	4	3	2
78	1	4	4	3
79	4	2	1	2
80	1	4	3	4
81	4	1	3	3 1
82	1	1 2	2	3
83	3	3	3	4
84	3	4	3	4
85	1	4	2	1
86	2	2	3	1
87	3	2	2	1
88	4	2	2	2
89	1	1	2	1
90	3	3	3	4
91	3	4	3	1
92	4	1	2	3 2
93	3	3	3	3
94	2	3	3	4
95	1	1	1	4
96	4	2	2 2	2
97	3	3	2	2
98	4	4	1	2
99	2	1	3	1
100	2	3	2	3

Checked and Verified
 Anirudh Jela 25/6/17
 25/6/17